# HISTORY OF SOYBEANS AND SOYFOODS IN KOREA, AND IN KOREAN COOKBOOKS, RESTAURANTS, AND KOREAN WORK WITH SOYFOODS OUTSIDE KOREA (544 CE TO 2021):

## EXTENSIVELY ANNOTATED BIBLIOGRAPHY AND SOURCEBOOK

**Compiled**

**by**

**William Shurtleff & Akiko Aoyagi**




**2021**

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# DEDICATION AND ACKNOWLEDGMENTS

**This book is dedicated Cherl-Ho Lee and Shin-Han Kwon.**
**And to the many generations of soybean growers and soyfoods makers in Korea.**

Part of the enjoyment of writing a book lies in meeting people from around the world who share a common interest, and in learning from them what is often the knowledge or skills acquired during a lifetime of devoted research or practice. We wish to give deepest thanks...

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■ Finally our deepest thanks to Tony Cooper of San Ramon, California, who has kept our computers up and running since Sept. 1983. Without Tony, this series of books on the Web would not have been possible.

This book, no doubt and alas, has its share of errors. These, of course, are solely the responsibility of William Shurtleff.

■ This bibliography and sourcebook was written with the hope that someone will write a detailed and well-documented history of this subject.

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# INTRODUCTION

**Brief chronology of soy in Korea**.

The most widely used soyfoods in Korea today are:

Soy sauce (*ganjang*)
Soybean paste (*doenjang*)
Soybean curd (*dubu*)
Red pepper paste (*gochujang*)
Soybean sprouts (*kongnamul*)
Korean soybean koji (*meju*)
Korean-style natto (*chongkukjang. cheonggukjang*)

**544 CE** – The *Qimin Yaoshu* [Important Arts for the People's Welfare], by Jia Sixie (Chinese) states, when listing the different types of soybeans: There are also the yellow Korean bean (*huang gaolidou*), the black Korean bean (*hei gaolidou*),…" This is the earliest document seen that mentions Korea in connection with soybeans.

**668 CE or before** – "Ancient Chinese records indicate that soy sauce is not indigenous to China, but rather was introduced from Korea during the era of the Koguryo Dynasty" (2nd century BCE to 668 CE) (Kwon & Song 1996, p. 20-32).

**683 CE** – A record states that Korean-style jang (*toenjang*) and soy sauce (*kanjang*) are among the presents exchanged at a royal wedding (Pettid 2008).

**9th century** – Soy sauce and soybean paste start to be made in Korean homes (Cwiertka 2006, p. 389-410).

**1613** – The *Dongui Bogam*, by Heo Jun (Jo, Dyun) is published in Korea. This is an early, important and widely known book in traditional Korean medicine. In it, the medicinal functions of doenjang are first described.

**1650-1700** – Red pepper paste is first mentioned in Korean documents.

**1876** – Japan, starting to act like a European imperial power, "opens" Korea, demanding that Pusan be designated as a treaty port and opened for Japanese free trade and residence – just at Japan herself had been "opened" in 1854 by Commodore Matthew C. Perry, U.S. Navy. Soon Japan "opened" more ports and cities in Korea: Wonsan (1881), Inch'on (1883), Mokp'o (1897), and Kunsan (1899) – all modeled on the unequal Sino-Korean treaty of 1882 (Delissen 2000).

These fateful, unfriendly moves would place Japan on a course that would inexorably lead to World War II.

The number of Japanese residing on the Korean peninsula increased from less than 1,000 in the 1880s to over 170,000 in 1910 (Duus 1995).

**1883 Sept.** – "Account of a secret trip to the interior of Korea" [in 1875], by W.J. Kenny is published in the *Transactions of the Asiatic Society of Japan* (11(Part II):141-47. He mentions various soyfoods, but he did not like them.

**1886** – The earliest known commercial soy sauce brewery in Korea, the Yamamoto Soy Sauce Brewery, is established in the port city of Pusan (Cwiertka 2006, p. 389-410).

**1895 April 17** – The Treaty of Shimonoseki ends the Sino-Japanese War (1894-95); Japanese victory establishes Japan as a regional power. China is obliged to cede Taiwan (Formosa), the nearby Pescadores Islands, and the Kwantung Peninsula in South Manchuria to Japan; recognize Korea's

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independence; etc. The origin of the Sino-Japanese War was a dispute over Korean affairs. Previously China had adamantly insisted on its suzerainty over Korea – which Japan refused to recognize.

**1898** – *Korea and Her Neighbors: A Narrative of Travel, with an Account of the Recent Vicissitudes and Present Position of the Country*. 2 vols., by Mrs. Isabella L. Bird Bishop is published in London. The author made four visits to Korea between Jan. 1894 and March 1897. She mentions various soyfoods.

**1885-1904** – A 30-page study of the grain trade between Korea and Japan is written by Dennis McNamara, Center for Korean Studies, University of California, Berkeley (dated 2 Nov. 1983). Korea increasingly exports rice and soybeans to Japan as Japan industrializes.

**1900** – An article titled "Some Common Korean Foods," by J.D. VanBuskirk is published in the *Transactions of the Korea Branch of the Royal Asiatic Society* (Vol. 14, pages 1-8). Table 1, "Korean food products," based on statistics published in the 1917 report by the Bureau of Agriculture of the government General, shows Korean production in millions of bushels: Rice 61. Barley 25. Millet 19. Wheat 8. Beans and peas 18. The section titled "Bean and pea foods" (p. 4-5) gives the name of each food with Korean characters and discusses:
Bean curd (*tu-bu*)
Bean residue [okara] (*pi-chi*)
Bean sauce (*kan-chang*; a liquid) made with *me-ju* [*soybean koji*]
The solid part of the sauce (*toin-chang*)
Another bean sauce [Korean-style natto] (*ko-cho-chang*)
Sprouted beans (*kong-na-mul*)

**1905 Sept. 5** – The Treaty of Portsmouth ends the Russo-Japanese War (Feb. 1904-1905). In a mere 50 years Japan has transformed herself from an isolated underdeveloped country with no industrial base into a modern nation, a major military and industrial power. The victorious Japanese move into Korea. The treaty gives Japan the Russian lease on the Kwantung Peninsula and the Russian-built South Manchurian Railway as far north as Changchun. This victory wins for Japan full status as a world power and equality with the nations of the West.

**1907** – Korea becomes a Japanese protectorate.

**1909** – The earliest known statistics for soybean area and production in Korea are as follows: The area cultivated rose dramatically from 280,090 *cho* in 1909 to a peak of 375,340 *cho* in 1912 (1 cho = 2.451 acres). Production also rose sharply from 1,533,027 *koku* in 1909 to 2,452,203 *koku* in 1912 (1 *koku* = 180 liters or 47.6 gallons) (*Bulletin Economique de l'Indochine* (Hanoi), March/April 1915, p. 260).

**1910 Aug.** – Using the Japan-Korea Annexation Treaty, Japan forcibly annexes Korea as a province called Chōsen. Japan will continue to exercise rather harsh control over Korea until 1945, including importing a large percentage of the soybeans grown in Korea

**1920** – Soybean production in Japan peaks at about 548,000 metric tons per year, as Japan begins to import more and more low-cost soybeans from Manchuria and Korea. As a result, soybeans become unprofitable for Japanese farmers and they tend to grow soybeans mainly for their own home use. Soybean production in Japan continues to fall until 1945 – near the end of World War II.

**1922** – La Choy Food Products begins to sell soy sauce in the United States. Based in Detroit, Michigan, the company was founded to produce mung bean sprouts in Detroit, by Mr. Ilhan New (a Korean) and Wally Smith. Soon they are doing a booming business and by 1922 they are importing fermented soy sauce from China in wooden barrels to use as a seasoning in their Asian food products.

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Mr. New is the earliest known Korean to make soyfoods in the Western world. By 1923 Chinese & Korean Soy Co. was selling soy sauce in Honolulu, Hawaii.

**1929 Oct. 23** – P.H. Dorsett and William Morse arrive in Keijo (Seoul), Korea, as plant explorers during their 2½ year agricultural expedition to East Asia. They study soybeans (at harvest time) and soyfoods and take many black-and-white photos that still exist in the 8,818-page log of their expedition at the USDA National Agricultural Library (Beltsville, Maryland). The Japanese authorities are very helpful and cooperative. They return to Japan on Dec. 8.

**1930**: From June 24 to July 1 Morse takes a quick trip to northern Korea to look for Zoysia grass.

**1930**: From Aug 21 to Sept. 28 Morse is back in Korea studying soybeans (at planting time) and collecting soybean germplasm in both northern and southern Korea. The log provides a rare, valuable record of soybeans and agriculture in Korea during this time.

**1938** – 17.8% of the soybean imports of Japan proper came from Korea (Lautensach 1988); most of the rest of Japan's soybean imports came from Manchuria.

**1945 Sept. 2** – Surrender of Japan after World War II. The documents of unconditional surrender are signed on board the battleship USS Missouri in Tokyo Harbor. Japan's empire is broken up. Manchoukuo (Manchuria) and Formosa (Taiwan) are returned to China. Korea is divided into north and south.

**1945** – The earliest known Korean tofu company is started in the United States in Los Angeles (Lager 1945).

**1945** – *Korean Recipes*, by Harriet Morris, is the earliest know Korean cookbook that mentions soyfoods published in the United States. It contains a recipe for making soy or bean sprouts at home, and a recipe for using Bean Sprouts (*Khong na-mool*).

**1945** – *Korea: Eine Landeskunde auf Grund eiener Reisen und der Literatur* [Korea: A geography based on the author's travels and literature], by Hermann Lautensach is published. It contains extensive information about soybeans in Korea in 1938. In 1988 it was published in English, with updated Korean names.

**1948 May** – South Korea declares independence as the Republic of Korea with Seoul as its capital.

**1948 Sept. to Dec.** – Heartsill Banks, a soybean expert, goes to Korea to study soybeans and soyfoods. He reports back in several articles published in *Soybean Digest*.

**1949 June** – Raymond Culbertson and Allan K. Smith report on soybeans and soyfoods in Korea in Soybean Digest.

**1950 June 25** – Outbreak of the Korean War between North and South Korea. The war began when North Korea invaded South Korea following clashes along the border and insurrections in the south. Though estimates vary widely, approximately 900,000 North Koreans, or 10 percent of North Korea's population, migrated to the South between 1945 and 1953. The fighting ends on 27 July 1953, when the armistice agreement is signed. The agreement restores the border between the Koreas near the 38th Parallel and creates the Korean Demilitarized Zone (DMZ), a 2.5-mile (4.0 km)-wide fortified buffer zone between the two Korean nations. Minor incidents continue there to this day.

**1966-1975** – "Korea's thriving economy presents the fastest growing new market for American soybeans. Between 1966 and 1970 annual Korean imports of soybeans and soybean products totalled 40,000 metric tons (MT). In the next 5 years

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imports increased to 58,000 MT. Then, in 1976, purchases leaped to 300,000 MT (*Soybean Digest*, 1979. July/Aug. p. SID-1-2).

**1968** – The *Korean Journal of Food Science and Technology* is launched, and is still being published. It contains a large number of articles about Korean soyfoods.

**1968 July** – The American Soybean Association (ASA) decides to expand its market development activities to Korea. Scott Sawyers, ASA country director in Japan, reports back on the soybean market in Korea in *Soybean Digest* (Sept. 1968, p. 68+). In May 1972 Sawyers wrote "Korea – a growing market for U.S. soybeans" in *Soybean Digest*, p. 26-29).

**1972 Aug. 24** – A favorable review of the restaurant Korea House is published in the *Chicago Tribune*. An estimated 10,000 people of Korean ancestry now reside in Chicago. Four years ago there was only one Korean restaurant in the city; now there four.

**1979 July** – The American Soybean Association opens an office in Seoul, Korea with the goal of selling more soybeans and soybean products (oil and meal) in Korea. It is headed by Dr. Kyung Lee, a native Korean and graduate of University of Illinois. Now a U.S. citizen, Dr. Lee has been an ASA employee for nearly six years.

"The bustling Korean economy is one of the fastest growing new markets for American soybeans. In the last three years Koreans have nearly doubled their purchases of U.S. soybeans from 155,000 metric tons in 1976 to over 300,000 metric tons in 1978. Growth is expected to continue…"

**1982** – Dr. Chung's Foods Co. is the largest producer of soymilk in Korea. Annual sales in 1981 were about $14 million.

**1984 April** – *Korea Soybean Digest* begins publication, in Korean only.

**1989** – The best article seen to date about soyfoods in Korea is "Vegetable Protein Foods in Korea," by S.H. Kim and T.W. Kwon of the Korea Foods Research Inst. in Seoul, Korea (In Applewhite 1989, p. 439-442).

**1997 Dec. 18** – Kim Dae Jung, a longtime dissident, wins the presidential election, ushering in a period of freedom and democracy for South Korea.

**2000 Oct. 13** – Kim Dae Jung is named winner of the Nobel Peace Prize for his work toward reconciliation with North Korea.

**2000 July 17** – A new system for Romanization of Korean into English, named the Revised Romanization (RR) is introduced – a revision of the McCune-Reischauer system. It makes Korean (*hangul*) compatible with the computer age. It was developed by the National Academy of the Korean Language from 1995 and was released to the public on 7 July 2000 by South Korea's Ministry of Culture and Tourism in Proclamation No. 2000-8.

**2001 Jan**. – Formation of Soyworld Museum Promotion Committee (SMPC), initiated by Prof. Tai-Wan Kwon, Founding Chairman, searching for the museum site and fund raising.

**2005 Oct**. – Publication of the book *Soybean* by SMPC at Korea University Press (15 chapters, 794 p.).

**2008 April** – Cyber Soyworld Museum and Home-page open (www.soyworld.org). Note: This URL has changed. For the latest URL search for the name Soyworld Science Museum.

**2008 Dec**. – Memorandum of understanding with Yeongju City for the construction of Soyworld Science Museum.

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**2008** – *Korean Cuisine: An Illustrated History*, by Michael J. Pettid is published in London. Outstanding.

**2009 May** – Project for the Basic Plan for the construction of Soyworld Science Museum (Dr. Jong-Hwan Hwang).

**2011 March** – Project for the Soy-world story telling (Ms. Mi-Kyung Yu).

**2013 Feb**. – Completion of basic design of the Soyworld Science Museum in Yeongju.

**2013 March** – Ground-breaking for the start of Museum construction.

**2014 March** – Donation of Soybean Growth Chamber by Dr. Chung's Food.

**2014 Sept**. – Completion of Exhibition Hall, Activity Hall and Soybean Growth Chamber.

**2014 Dec**. – The Korea Food Research Institute begins to publish the *Journal of Ethnic Foods* (Open Access).

**2015 April 30** – Opening of Soyworld Science Museum in Yeongju, South Korea. "The basic message of the museum is that soybean cultivation originated on the Korean Peninsula – not in Manchuria or in China."

According to Dr. Cherl-Ho Lee (Jan. 2018): "The construction cost, building and exhibition except for land and personnel, was 5 billion won (ca. 5 million USD.). The museum was built by Yeongju City. The Yeongju Agricultural Extension Center is managing the museum. The entrance fee has been planned, but for the time being no fee is collected. The number of visitors is 200-300 during weekend, and 50 during weekdays; children 50%, middle and high school students 20%, adults 30%, and a very few foreigners 1-2%."

**Present Status**: South Korea takes great pride in its soyfoods, especially its fermented soyfoods, which many current studies show have therapeutic or medicinal value.

South Korea is also a shining example of a democratic country that has rid itself of three authoritarian regimes.

"Total domestic soybean consumption in MY (Marketing Year) 2021/22 is forecast to stay around 1.39 million MT (MMT). MY 2020/21 soybean consumption is expected to stay around 1.39 MMT, down 0.9 percent from the previous year.

"MY 2021/22 soybean imports are forecast to remain unchanged at 1.3 MMT. MY 2020/21 soybean imports are expected to increase slightly (0.7 percent) to 1.3 MMT.

"The 2021 autonomous food grade TRQ is expected for release in early March 2021.

"MY 2021/22 demand for crushing soybeans will remain flat at one MMT if crushing margins remain steady.

"MY 2021/22 soybean oil imports are forecast at 450,000 MT, up five percent from the current marketing year's estimate. In MY 2020/21, soybean oil imports are expected to increase seven percent to 430,000 MT." (Source: USDA Foreign Agricultural Service, Seoul, Korea).

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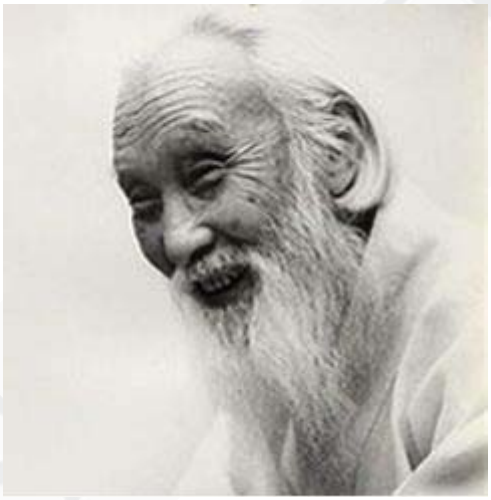
## ABOUT THIS BOOK

This is the most comprehensive book ever published about the history of soybeans and soyfoods in Korea. It has been compiled, one record at a time over a period of 42 years, in an attempt to document the history of this ancient and interesting food. It is also the single most current and useful source of information on this subject.

This is one of more than 100 books compiled by William Shurtleff and Akiko Aoyagi, and published by the Soyinfo Center. It is based on historical principles, listing all known documents and commercial products in chronological order. It features detailed information on:

- 63 different document types, both published and unpublished.
- 1798 published documents - extensively annotated bibliography. Every known publication on the subject in every language.
- 198 unpublished archival documents.
- 147 original Soyinfo Center interviews and overviews never before published, except perhaps in our books.
- 93 commercial soy products.

Thus, it is a powerful tool for understanding the development of this subject from its earliest beginnings to the present.



Each bibliographic record in this book contains (in addition to the typical author, date, title, volume and pages information) the author's address, number of references cited, original title of all non-English language publications together with an English translation of the title, month and issue of publication, and the first author's first name (if given). For most books, we state if it is illustrated, whether or not it has an index, and the height in centimeters.

All of the graphics (labels, ads, leaflets, etc) displayed in this book are on file, organized by subject, chronologically, in the Soyinfo Center's Graphics Collection.

For commercial soy products (CSP), each record includes (if possible) the product name, date of introduction, manufacturer's name, address and phone number, and (in many cases) ingredients, weight, packaging and price, storage requirements, nutritional composition, and a description of the label. Sources of additional information on each product (such as advertisements, articles, patents, etc.) are also given.

A complete subject/geographical index is also included.

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# ABBREVIATIONS USED IN THIS BOOK

A&M = Agricultural and Mechanical
Agric. = Agricultural or Agriculture
Agric. Exp. Station = Agricultural Experiment Station
ARS = Agricultural Research Service
ASA = American Soybean Association
Assoc. = Association, Associate
Asst. = Assistant
Aug. = August
Ave. = Avenue
Blvd. = Boulevard
bu = bushel(s)
ca. = about (circa)
cc = cubic centimeter(s)
Chap. = Chapter
cm = centimeter(s)
Co. = company
Corp. = Corporation
Dec. = December
Dep. or Dept. = Department
Depts. = Departments
Div. = Division
Dr. = Drive
E. = East
ed. = edition or editor
e.g. = for example
Exp. = Experiment
Feb. = February
fl oz = fluid ounce(s)
ft = foot or feet
gm = gram(s)
ha = hectare(s)
i.e. = in other words
Inc. = Incorporated
incl. = including
Illust. = Illustrated or Illustration(s)
Inst. = Institute
J. = Journal
J. of the American Oil Chemists' Soc. = Journal of the American Oil Chemists' Society
Jan. = January
kg = kilogram(s)
km = kilometer(s)
Lab. = Laboratory
Labs. = Laboratories
lb = pound(s)
Ltd. = Limited
mcg = microgram(s)
mg = milligram(s)
ml = milliliter(s)
mm = millimeter(s)
N. = North
No. = number or North
Nov. = November
Oct. = October
oz = ounce(s)
p. = page(s)
photo(s) = photograph(s)
P.O. Box = Post Office Box
Prof. = Professor
psi = pounds per square inch
R&D = Research and Development
Rd. = Road
Rev. = Revised
RPM = revolutions per minute
S. = South
SANA = Soyfoods Association of North America
Sept. = September
St. = Street
tonnes = metric tons
trans. = translator(s)
Univ. = University
USB = United Soybean Board
USDA = United States Department of Agriculture
Vol. = volume
V.P. = Vice President
vs. = versus
W. = West
°C = degrees Celsius (Centigrade)
°F = degrees Fahrenheit
> = greater than, more than
< = less than

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# HOW TO MAKE THE BEST USE OF THIS DIGITAL BOOK - SEARCH IT

**Most Important Thing**: The **KEY** to using this digital book, which is in PDF format, is to **SEARCH IT** using Adobe Acrobat Reader: For those few who do not have it, Google: **Acrobat Reader** - then select the **free** download for your type of computer.

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**Type [Ctrl+F] to "Find." A white search box will appear near the top right of your screen.**
**Type in your search term, such as Seoul or North Korea.**
**You will be told how many times this term appears, then the first one will be highlighted.**
**To go to the next occurrence, click the down arrow, etc.**

**For those using a Mac without Acrobat Reader: Safari is often the default browser. Click "Edit" in the toolbar at top. In the dropdown click "Find," then click "Find..." again. A search bar will open across top of screen with a search box at right. In this box type a word or phrase you would like to search, such as Seoul or North Korea. Click "Done" then scroll through the various matches in the book**.

**Chronological Order**: The publications and products in this book are listed with the earliest first and the most recent last. Within each year, references are sorted alphabetically by author. If you are interested in only current information, start reading at the back, just before the indexes.

**A Reference Book**: Like an encyclopedia or any other reference book, this work is meant to be searched first - to find exactly the information you are looking for - and then to be read.

**How to Use the Index**: A subject and country index is located at the back of this book. It will help you to go directly to the specific information that interests you. Browse through it briefly to familiarize yourself with its contents and format.

Each record in the book has been assigned a sequential number, starting with 1 for the first/earliest reference. It is this number, not the page number, to which the indexes refer. A publication will typically be listed in each index in more than one place, and major documents may have 30-40 subject index entries. Thus a publication about the nutritional value of tofu and soymilk in India would be indexed under at least four headings in the subject and country index: Nutrition, Tofu, Soymilk, and Asia, South: India.

Note the extensive use of cross references to help you: e.g. "Bean curd. See Tofu."

**Countries and States/Provinces**: Every record contains a country keyword. Most USA and Canadian records also contain a state or province keyword, indexed at "U.S. States" or "Canadian Provinces and Territories" respectively. All countries are indexed under their region or continent. Thus for Egypt, look under Africa: Egypt, and not under Egypt. For Brazil, see the entry at Latin America, South America: Brazil. For India, see Asia, South: India. For Australia see Oceania: Australia.

**Most Important Documents**: Look in the Index under "Important Documents -."

**Organizations**: Many of the larger, more innovative, or pioneering soy-related companies appear in the subject index – companies like ADM / Archer Daniels Midland Co., AGP, Cargill, DuPont, Kikkoman, Monsanto, Tofutti, etc. Worldwide, we index many major soybean crushers, tofu makers, soymilk and soymilk equipment manufacturers, soyfoods companies with various products, Seventh-day Adventist food companies, soy protein makers (including pioneers), soy sauce manufacturers, soy ice cream, tempeh, soynut, soy flour companies, etc.

Other key organizations include Society for Acclimatization (from 1855 in France), American Soybean Association, National Oilseed/Soybean Processors Association, Research & Development Centers (Peoria, Cornell), Meals for Millions Foundation, and International Soybean Programs (INTSOY, AVRDC, IITA, International Inst. of Agriculture, and United Nations). Pioneer soy protein companies include Borden, Drackett, Glidden, Griffith Labs., Gunther, Laucks, Protein Technologies International, and Rich Products.

**Soyfoods**: Look under the most common name: Tofu, Miso, Soymilk, Soy Ice Cream, Soy Cheese, Soy Yogurt, Soy Flour, Green Vegetable Soybeans, or Whole Dry Soybeans. But note: Soy Proteins: Isolates, Soy Proteins: Textured Products, etc.

**Industrial (Non-Food) Uses of Soybeans**: Look under "Industrial Uses ..." for more than 17 subject headings.

**Pioneers - Individuals**: Laszlo Berczeller, Henry Ford,

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Friedrich Haberlandt, Artemy A. Horvath, Englebert Kaempfer, Mildred Lager, William J. Morse, etc. Soy-Related Movements: Soyfoods Movement, Vegetarianism, Health and Dietary Reform Movements (esp. 1830-1930s), Health Foods Movement (1920s-1960s), Animal Welfare/Rights. These are indexed under the person's last name or movement name.

**Nutrition**: All subjects related to soybean nutrition (protein quality, minerals, antinutritional factors, etc.) are indexed under Nutrition, in one of more than 70 subcategories.

**Soybean Production**: All subjects related to growing, marketing, and trading soybeans are indexed under Soybean Production, e.g., Soybean Production: Nitrogen Fixation, or Soybean Production: Plant Protection, or Soybean Production: Variety Development.

**Other Special Index Headings**: Browsing through the subject index will show you many more interesting subject headings, such as Industry and Market Statistics, Information (incl. computers, databases, libraries), Standards, Bibliographies (works containing more than 50 references), and History (soy-related).

**Commercial Soy Products (CSP)**: See "About This Book."

**SoyaScan Notes**: This is a term we have created exclusively for use with this database. A SoyaScan Notes Interview contains all the important material in short interviews conducted and transcribed by William Shurtleff. This material has not been published in any other source. Longer interviews are designated as such, and listed as unpublished manuscripts. A transcript of each can be ordered from Soyinfo Center Library. A SoyaScan Notes Summary is a summary by William Shurtleff of existing information on one subject.

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**THE JAPANESE EMPIRE AT ITS GREATEST EXTENT IN 1942**

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**NOTE THAT NORTH KOREA SHARES A VERY LONG BORDER WITH CHINA AND FORMER MANCHURIA. IF SOYBEANS WERE FIRST DOMESTICATED ON THE KOREAN PENINSULA, IT WAS PROBABLY IN NORTH KOREA.**

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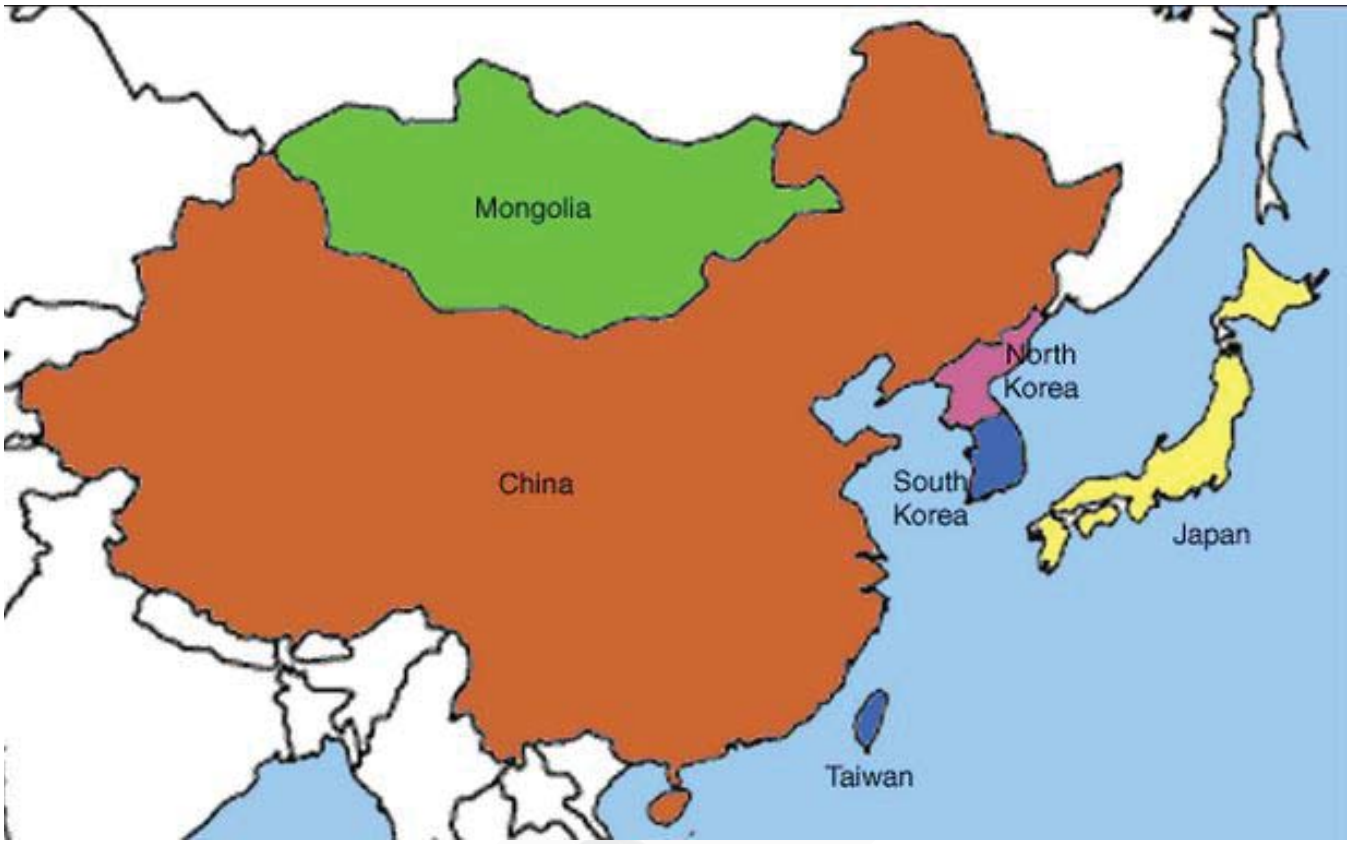



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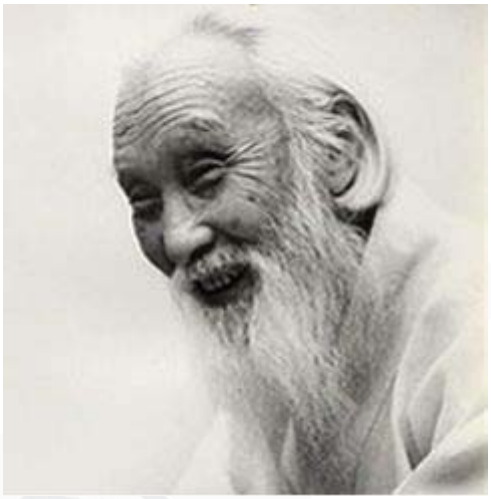

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# INTRODUCING SOYINFO CENTER

**Mission**: To be the world's leading source of information about soyfoods and utilization of soybeans in both printed and electronic formats. Much of our information is **free**!

**Founding**: In October 1972 William Shurtleff and Akiko Aoyagi began full-time research on soyfoods in Japan while writing *The Book of Tofu*. In August 1976 they founded Soyinfo Center (named Soyfoods Center until 2006) in California.

**Books in Print**: 100+ books on soyfoods and soybeans by Shurtleff and Aoyagi are presently in print. These include three popular books, market studies, and 70 comprehensive histories & bibliographies.

**Book Sales**: These books have presently sold more than 830,000 copies. Our best-selling book is *The Book of Tofu*.

**SoyaScan Database**: SoyaScan is the world's most comprehensive computerized database on soybeans and soyfoods. It presently contains 110,500+ records from 1100 B.C. to the present. These include four basic types of records providing detailed information on: 94,600+ published documents, 16,700+ commercial soy products, 6,300+ original interviews and overviews, and 8,400+ unpublished archival documents. These records are unique, and have been added one at a time over many years; none have been downloaded from other databases. A *Thesaurus* of our database is available.

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**Consulting Services**: William Shurtleff has been serving as a consultant to the soyfoods industry for more than 27 years. He probably has more personal contacts in this field, worldwide, than anyone else in the world. He has helped to start more than 450 new companies.

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# HISTORY OF SOYBEANS AND SOYFOODS IN KOREA (544 CE TO 2021)

1. Jia Sixie. 544 CE. Qimin yaoshu [Important arts for the people's welfare]. China. Passage on soy reprinted in C.N. Li 1958 #66, p. 66-67, and #295, p. 216-20. Translated by Shih Sheng-han 1958, 1962. [Chi]

• ***Summary:*** Wade-Giles reference: *Ch'i Min Yao Shu* (QMYS) by Chia Ssu-hsieh. Northern dynasties–Northern Wei (386-534 CE; established by nomadic people from the northern steppes). This is the world's earliest encyclopedia of agriculture. H.T. Huang (2002) adds: "This is the most important book on agriculture or food technology ever published in China. At a remarkably early date it gives both general information and great detail about agriculture and food processing." The QMYS is divided into 10 books / fascicles (*juan*), and subdivided into more than 91 consecutive parts.

In his Preface, Jia Sixie states that the material in his book comes from four sources: (1) The Chinese classics; (2) Contemporary books, proverbs, and folk songs; (3) Information gathered from experts; and (4) His personal experience ("original material").

A partial English-language translation of the "original material" and commentary by Shih Shêng-han was published in 1958 (2nd ed. 1962). The numbered text below is based on the 1962 translation titled "A preliminary survey of the book *Ch'i Min Yao Shu:* An agricultural encyclopaedia of the 6th century." 2nd ed. Peking, China: Science (Kexue) Press. x + 107 p.

Book 2. General comments. The best time to plant soybeans (*dadou*) and oilseed hemp (*youma*) depends on the climate and soil condition. "Realization of the importance of proper choice of season and soil." These two factors are the key to agricultural success. A table (p. 33) shows: Best, medium, and latest time for various operations: Planting spring soybeans: Best time–First ten days of the 2nd month. Medium–First ten days of the 3rd month. Latest time–First ten days of the 4th month. Also gives such times for azuki beans, male and female hemp, and sesame seeds. For making jiang: Best time–12th and 1st month. Medium–2nd month. Latest–3rd month. Making *shi* (fermented black soybeans): Best–4th and 5th month. Medium–20th day of 7th month until 8th month. Latest–None. In addition: Large dark-red beans (*da chidou*) should be planted in the 3rd lunar month, and harvested in the 6th month (See Li 1958 #385).

Note 1. This is the earliest document seen hat uses the verb "harvest" as a verb in connection with soybeans.

Note 2. The scientific- and common name of dark-red beans is unclear; it may well be another name for azuki beans.

Chapter 4. Millets. It is best to plant millets on new fields (without a previous crop), or on a field where the previous crop was soybeans. Best, medium, and least suitable soil / ground for planting various crops. Spiked millet: Least suitable–Following turnips or soybeans. Panicled millets–Medium soil–Following soybeans. 1.3 Amount of seeds to be sown at different seasons: Soybeans: Best time–8 *sheng/ mou* (= 220 ml/508 square meters). Medium time–10. Latest time–12.

Chapter 6, "Soybeans" (*dadou*)*:*

Note 3. The first third (approximately) of this section is quotations from four early Chinese works and commentaries on them: (1) The *Erya* (Literary expositor) (ca. 150 BCE) says: *"rongshu* is the same as *renshu."* Sun Yan's commentary on the *Erya* explains that *rongshu* is the soybean (*dadou*).

(2) According to the *Guangya* by Zhang Yi (Ancient dictionary: Enlargement of the *Erya*) (230 CE), soybeans (*dadou*) are called *shu;* azuki beans (*xiaodou*) are also called *da. Hudou* is *jiangdou.* Dr. Huang adds: The true identity of *hudou* is unknown.

(3) The *Guangzhi* by Guo Yigong (Extensive records of remarkable things) (390 CE) says: When you plant the azuki bean (*xiaodou*), you can get three crops a year. The flavor is good. *Baidou* ("white bean") is coarse, large, and edible. *Cidou* ("prickly bean") is also edible. *Judou* ("millet bean") has a seedling which is like that of the azuki bean (*xiaodou*). The flowers are purple. It can be used for flour (*mian*). It is grown in a place called Zhuti within Jianin (in today's Sichuan). Of soybeans (*dadou*), we have the yellow *luodou* ("drop bean"), the *yudou* ("imperial bean," in which the bean is elongated), the *yangdou* ("poplar bean"), whose leaves are edible, and the *hudou* ("foreign bean"), which comes in green (*qingdou*) and yellow (*huangdou*) varieties.

(4) According to the *Bencao* (probably *Shennong Bencao Jing; Benjing*) (Classical pharmacopoeia of Shennong, the Heavenly Husbandman) (100 CE), when Zhang Qian (W.-G. Chang Ch'ien) traveled to foreign lands, he brought *hudou* ("foreign bean") seeds back to China.

Note 4. Zhang went west along what is now called the Silk Road during the Former / Western Han dynasty, was gone for 11 years, and returned to China in 126 BCE. The *hudou* is now generally thought not to be a soybean.

The *Qimin Yaoshu* then begins: So now (i.e., Later Wei), we have two kinds of soybeans (*dadou*), black and white, as well as *changshao* ("long tip") and *niujian* ("cow

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path") varieties. There are three kinds of azuki beans (*xiaodou*)*:* The green (*ludou*), the red (*chixiaodou*), and the white (*baixiaodou*) varieties. There are also the yellow Korean bean (*huang gaolidou*), the black Korean bean (*hei gaolidou*), the *yandou* ("swallow bean") and the *bidou;* all are varieties of soybeans (*dadou*). Then there are *wandou, jiangdou*, and *laodou;* all are varieties of azuki beans (*xiaodou*).

Note 5. This is the earliest document seen (May 2021) that mentions Korea in connection with soybeans.

Note 6. This is the earliest Chinese-language document seen (May 2021) that uses the word *baixiaodou* to refer to white azuki beans.

Spring soybeans (*dadou*)*:* Plant them at the same time as the early grains; the middle of the 2nd lunar month is best. Use 8 *sheng* of seeds per *mou.* The second best planting time is the first third of the 3rd lunar month; use 10 *sheng* per *mou.* The latest you can plant them is the first third of the 4th lunar month; use 12 *sheng* per *mou.* If you meet with late germinating weather, you can plant in the 5th or 6th lunar month, but you must increase the amount of seed used.

The soil should not be overly fertile. After land has been harvested in the previous autumn, it can be planted sparsely. If the soil is too rich, you may get luxuriant growth but fewer pods. Harvest the crop late. The pods do not drop. If you harvest too early, the seeds will not be full. Use a drill to plant, so the seeds will be placed deep in the soil. The seedlings will be sturdy and have deep roots to reach the moisture in the soil. Pierce (?) once, plow once, and hoe several times.

Mow / cut when all the leaves have fallen. When some leaves are left, it is harder to cut the stems. After mowing, quickly plow stubs under the soil. The soybean stubs dry out easily. If you do not plow them under, the soil will not retain moisture.

To produce [soybeans] for animal feed (*jiao*), use a wheat field as a base, and plant 3 *sheng* of seeds per *mou.* Broadcast the seeds and use a plow to form a narrow and shallow channel; level it plane. If the weather is dry, the stems will be coarse and sturdy, and the leaves sparse. If there are too few seeds, the seedlings will not grow tall; if the seeds are placed too deep, the seedlings will not be able to emerge from the soil.

If the soil is too damp, first plow deeply, then broadcast the seeds away from the plowed furrows and level the soil. Do not do this if the soil is not too damp.

In the 9th month, if you see leaves close to the ground turning yellow and about to fall, immediately harvest the crop. Even if the leaves do not turn yellow, they can easily start to rot. If you do not harvest, the wind will quickly strip the leaves, and the rain will rot the stem. The crop will be ruined.

Book 2, "Cultivating cereal grains." The best way to improve the soil is to plow under green beans (*lüdou*, probably *Dolichos* species rather than mung beans or green gram). Azuki beans or sesame seeds (*huma*) are next (Note 7. Sesame seeds are not a legume and do not enrich the soil). It's best to broadcast these densely in the 5th or 6th month, then plow them under [as green manure] in the 7th or 8th or eighth month. In the yield of spiked millet planted the next spring should be 10 *sheng* per *mou.* The effect is as good as adding the excreta of silk worms or well-rotted compost. Varieties of crops. The Chinese and English names of 7 cereal crops and the number of varieties of each recorded in the QMYS are given; soybeans are not in this list. Fertilizing the ground: Succession of crops. This table is similar to a previous one but: For soybeans: Most favorable forerunner– Spiked millet. For azuki beans the best forerunner is spiked millet or wheat. The QMYS was the first book to state that using green manure is "the best thing to do." The best preceding crops for plowing under as green manure are Dolichos beans (*lüdou*) or azuki beans. The next best crops are hemp, foxtail millet (*su; Setaria italica*), or sesame seeds. The least desirable are rapeseed / colza (*wujing*) or soybeans (*dadou*).

Note 8. This is the earliest document seen (May 2014) worldwide that mentions rapeseed.

Harvesting and storing crops. Soybeans: In the 9th month, when the lower leaves become yellow and fall, reap quickly. Different harvest dates are given for azuki beans and sesame seeds.

Chapter 8 (Li 1958, p. 217)–Hemp: Be careful not to plant soybeans (*dadou*) mixed with hemp.

Chapter 10–Barley or wheat: Upland (high) fields are good for cultivating cereal grains or beans.

Note 9. This is the earliest document seen (May 201) that gives basic formulas for fermented soyfoods or soy condiments such as jiang, soy sauce, etc.

2. Wei Shou. 554 CE. Weishu [History of the Northern Wei dynasty]. China. Passage on soy reprinted in C.N. Li 1958 #68, p. 68. [Chi]

• ***Summary:*** Wade-Giles reference: *Wei Shu*, by Wei Shou (lived 506-572). Published 554 CE; revised 572 CE. This Wei dynasty (386-550 CE), which was part of the Northern Dynasties (386-581 CE), consisted of the Northern Wei dynasty (386-534 CE) and the Eastern Wei (534-550 CE); this book covers the period 385-550 CE (Wilkinson 2000, p. 504, 811).

The soybean is mentioned in four parts of this book: The biography of Cui Kai. Mentions the growth of soybean leaves (*huo*) and four types of grains–soybeans (*shu*), wheat (*mai*), *he* (an indeterminate type of cereal), and setaria millet (*shu*). The term "northeast" is also used elsewhere in this biography.

The chronicle of western regions (*xiyu*). Mentions the four grains, rice (*dou*), setaria millet (*shu*), soybeans (*shu*), and wheat (*mai*).

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Chronicle of the Di tribe: A pastoral people, remnants of an ancient tribe, they lived mostly in *Qinghai* (W.-G. Tsinghai), in far western China, north of the Tibetan Autonomous Region. They lived mainly on meat and fermented milk. They also cultivated barley (*damai*), setaria millet, and soybeans (*dou*). The climate is cold. Note 1. This is the earliest Chinese-language document seen (May 2014) that uses the term *damai* to refer to barley.

Note 2. If soybeans were cultivated in today's Chinese province of Qinghai, most of which lies north and east of Tibet, and which has an average elevation of 3,000 meters above sea level, does this suggest that soybeans might also be grown or used in Tibet?

Record of Ling Zheng: This is probably about a geographical location, since Dunhuang (W.-G. Tun-huang) is mentioned; it is a town in today's western Gansu (W.-G. Kansu) province, north central China, and an important trading center on the Silk Road from the first millennium BCE. The Record states that during a certain year in a certain region there was a very heavy frost; cereals (*he*) and soybeans (*dou*) were all killed. (Translated by H.T. Huang, PhD, June 2002).

Note 3. According to Kwon, Shin-Han (1972, *SABRAO Newsletter* 4(2):107-11. July. "History and the land races of Korean soybean"), the earliest record of soybean culture in Korea is found in this Chinese document (which he calls *Wei-zu*, written in 551 CE). Kwon says this document states that the five sacred grains, namely millet, rice, barley, wheat and soybean, were grown in "Ok-Jo," an ancient tribal nation covering north-eastern China and the north-eastern part of the Korean peninsula. However Kwon considers soybean culture in Korea to have started in the 5th to 4th century BCE or earlier. Kwon cites this entire book, without citing any particular section or pages to prove his important claim, namely that this is the earliest document seen concerning soybeans in Korea, or the cultivation of soybeans in Korea; this is poor scholarship by Kwon. In the passages on soybeans that appear in Li (1958), Dr. Huang can find none that correspond to or confirm Kwon's claim. Dr. Huang adds: In northeastern China the climate is very cold; he wonders if rice (typically a southern crop) could have been cultivated there.

Note 4. During this Northern Wei dynasty, Buddhism became an integral part of Chinese culture. The emperor built the famous Buddhist cave temples at Yungang City, about 16 km from Datong (W.-G. Ta-tung), a city in northern Shanxi province. Datong was the capital of the Northern Wei dynasty. Also, in 526, Bodhidharma arrived in China from India to spread the doctrine that enlightenment / perfection could be realized through inward meditation. Gradually Buddhism spread from the north to the south of China.

Shih Shêng-han (1962), in his translation and interpretation of the *Qimin Yaoshu*, includes a lengthy analysis of the sources from which it is drawn. On pages 14-15 is a discussion (with two excerpts) of this book (*Weishu*). Soybeans are mentioned twice: (1) "In summer, when Scorpio culminates at dusk, sow glutinous panicled millet and soya" (*shu*). (2) Red soil is good for soybeans (*shu*).

Fairbank, Reischauer, and Craig (1973, p. 91) note that Buddhism in China, unlike Christianity in the Roman Empire, was apparently adopted by the rich before it spread downward to the poor. It first seems to have made more rapid progress in the "barbarian" North than in the South, probably because the non-Chinese rulers of this area felt no prejudice against it as a foreign religion. "The greatest imperial patrons of the new religion were the emperors of the 'barbarian' Northern Wei Dynasty (386-534). Two groups of Buddhist cave temples, at Yün-kang near their first capital [Datong] in northern Shansi and at Lung-men near their second capital of Loyang [Luoyang], contain some of the finest artistic remains of early Chinese Buddhism. By the sixth century, however, the South was as thoroughly permeated by Buddhism as the North."

3. Minamoto no Shitagau. 923 CE. Wamyô ruijûshô (Wamyôshô) [General encyclopaedic dictionary. 10 vols.]. Japan. [Jap]*

• ***Summary:*** Heian period. This is a collection of Japanese names, by subject.

Needham (1986, p. 590) cites this as: Minamoto no Shitagau. +934. *General Encyclopaedic Dictionary.*

Shurtleff & Aoyagi (1983. *The Book of Miso*, 2nd ed., p. 221): "Some scholars believe that the pronunciation 'miso' originated in the *Wamyosho* (also called *Wamyo Ruijusho*), the earliest dictionary of the Japanese language, encyclopedic in scale and written between 903 and 938 by Minamoto no Shitagau. It was modeled after Chinese dictionaries and listed many types of hishio including ones pronounced *miso, misho*, and *kara hishio.* It also mentioned fermented black soybeans."

J.R. Wang and Y.H. Lee (1976) in "Traditional soybean foods in Korea" state that: "Since an old Japanese literature [document], *Hwameyruitsuroku* [*Wamyô Ruijusho;* Collections of Japanese Names, by Subject], of Heyan [Heian] records that 'Maljang (Meju) is a Korean soy sauce and paste' and a record on Maljang was also observed in the ruins of Nara, it is evident that soy sauce and paste were introduced from Korea to Japan during the Nara period (645-793 A.D.)."

Sato (1963, p. 33), in his book titled "Documents on Fermented Black Soybeans, Chiang, Miso, and Shoyu," cites this as the tenth earliest Japanese document seen on the subject. See section 16 (Shoume/Anbai). The selections were made during the Encho period then published more than 700 years later in about 1615, during the Genwa era. It is written entirely in Chinese characters (*Kanbun*).

Note: This is the earliest document seen concerning soybeans or soybean products in Korea. It seems very likely

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that soybeans were also being grown in Korea by this time, but this is not stated.

4. Kim, Busik. comp. 1145. Samguk Sagi / Samkuk Saki [Records of the historian / History of the Three Nations]. Goryo (Korea). [Chi]*
• ***Summary:*** This book is well known in Korea as the oldest surviving chronicle of Korean history. It is written in Classical Chinese, the written language of the literati of ancient Korea, and its compilation was ordered by King Injong of Goryeo (ruled 1122-1146) and undertaken by the government official and historian Kim Busik (3 Chinese characters) and a team of junior scholars. For details, see Wikipedia.

But it is also the earliest known document that mentions soybeans or soyfoods in Korea. Cherl-Ho Lee (2016, p. 6) states: "According to the earliest Korean history *Samguk Sagi* (1145 AD) rice, rice wine, oil, honey, soy sauce, soybean paste, dried meat, and fish sauce were the most important food items prepared for a wedding in the royal family in Silla in the year 683 AD."

In reply to a question from W. Shurtleff (Aug. 2017) asking: "What is the earliest document in Korean that mentions the soybeans or soyfoods?" Cherl-Ho Lee replies: "The first Korean record on soybean appears in *Samkuksaki* (History of Three Nations) written by Kimbusik in 1145. It describes a list of royal wedding gifts including Jang (fermented soybean product [soybean paste]) and Shi (soybean fermentation starter) in the King Shinmun 3rd year (683 CE) record."

Note: This is the earliest document seen that mentions Korean Jang (fermented soybean paste). Address: Korea.

5. Yi Saek. 1396? Mogun-jip [Collected Writings of Mogun]. Korea. Undated. [Kor]*
• ***Summary:*** The earliest Korean document seen that mentions tofu is the literary collection of Yi Saek, who lived 1328-1396.

Endnote 16 (p. 202): This collection is titled *Mogun-jip* [*Collected Writings of Mogun*] after his pen name, Mogun. "Yi was one of the leading Confucian literati of the late Koryo period and is appraised as one of the exemplary literary talents of the Koryo dynasty" (Pettid 2008, p. 40-41, 202).

6. Kwon, C.; Yu, H.T.; Roh, J.R.; Park, Y.D. 1433. Hyangyak-jipsongbang See Vol. III. [Kor]*
• ***Summary:*** The earliest known reference to *gochujang* (Red Chili Paste with Soybeans) appeared in this book. Hyangyak means "Korean traditional medicine." It was written by Korean doctors. It appeared during the 15th year of the reign of King Sejong in the Chosun Dynasty [Fig. 2; This book refers to gochujang or gochojang as chojang (2 Cc?) and gochu as gocho or gochu (1 Cc)] [13]. However, the early references to gochujang are primarily focused on its medicinal properties rather than its role as a food additive. For example, gochujang was often used to promote digestive issues caused by weaknesses in the spleen and stomach. Address: Korea.

7. Sejong sillok [Veritable Records of King Sejong]. 1434. Korea: See p. 66, 27b-28a. Record of 24 Dec. 1434. [Kor]*
• ***Summary:*** In Korea's dynastic records, an entry from 1434 states that an emperor from China's Ming dynasty (1368-1644) sent some serving women to the Choson court to prepare various foods; one of these was tofu. "The account states that all the dishes were harmonious and served beautifully and the means of preparing the tofu was even more exquisite"

Endnote 17 (p. 202): *Sejong Sillok* (*Veritable Records of King Sejong*), p. 66, 27b-28a (1434-12-24).

Of the many foods that the women brought to the Choson court from the Ming court, only tofu was singled out for praise in this particular entry (Pettid 2008, p. 41, 202).

8. Han, K.H.; Yim, W.J.; Kwon, C. 1445. Euibangyuchi [Kor]*
• ***Summary:*** The 2nd earliest known reference to *gochujang* (Red Chili Paste with Soybeans) appeared in this book. The early references to gochujang are primarily focused on its medicinal properties rather than its role as a food additive. For example, gochujang was often used to promote digestive issues caused by weaknesses in the spleen and stomach. Address: Korea.

9. Chun, S.E. 1460. Siknyo-chanyo [Kor]*
• ***Summary:*** The 3rd earliest known reference to *gochujang* (Red Chili Paste with Soybeans) appeared in this book. The early references to gochujang are primarily focused on its medicinal properties rather than its role as a food additive. For example, gochujang was often used to promote digestive issues caused by weaknesses in the spleen and stomach. Address: Korea.

10. Ch'oe Pu. 1488. P'yohae-rok [A record of drifting across the sea]. Korea. Unpublished manuscript. [ soy ref. Kor]*
• ***Summary:*** This is the diary of a Korean official–Ch'oe Pu. In Feb. 1488, during the Ming dynasty, he and his crew were caught in a storm off the coast of Cheju, at the southernmost tip of Korea; they drifted for 16 days in an open boat, a terrible ordeal, to the southeast coast of China, landing near Ning-po. After being taken captive, he and his crew suffered many more ordeals, but were gradually sent to Peking, following the route of the Grand Canal. On the way, in Shao-hsing prefecture, the Regional Commander and the other two high officials served him tea and fruit, and wrote a list of twelve foods and drinks to be presented to him. The last item on the list was "One plate of bean-curd."

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In Peking, his adventure attracted the attention of the highest authorities, who provided the means to return him to the border of his homeland at the Yalu River. In 1488 Ch'oe presented his travel diary to the Korean King, "who was pleased and ordered that it be put into the archives."

Note 1. This is the earliest document seen (Nov. 2020) concerning an early foreign traveler in China in connection with soybeans.

Note 2. In 1965 this work, translated into English by John Meskill, was published by Univ. of Arizona Press. Bean-curd is mentioned on p. 73. Address: Korea.

11. Saito, Akio. 1599. [Chronology of soybeans in Japan, 1336 to 1599, the Ashikaga/Muromachi period] (Document part). In: Akio Saito. 1985. Daizu Geppo (Soybean Monthly News). Jan. p. 14. [Jap; eng+]

• ***Summary:*** 1350–Dengaku (Oden) is mentioned in the records of the Gion shrine in Kyoto.

1444 June–The present characters for "tofu" appear in the *Kagakushu* encyclopedia.

1450–The suribachi (a serrated earthenware grinding bowl or mortar) becomes popular among the common people, therefore miso soup becomes popular.

1469–In the feudal domain of Sanuki (*Sanuki no kuni*) the Sakade Salt Farm (*Sakade Enden*) starts operation.

1500–In the published collection of Japanese poems and songs titled *Shichijû-ichiban shokunin-zukushi uta awase*, there is a drawing of a lady in a black kimono and white headband sitting cross legged on a low platform on a street and selling large and small pieces of cut tofu.

1521–The present characters for the word "shoyu appear for the first time in the book *Ekirinbon Setsuyoshu.*

1526–In a memorandum by Munenaga is written: "Late in the night, sitting by the sunken open-hearth fireplace together, and eating many Dengaku tofu" (*Yo mo fuke, irori-be ni hiza o narabe, Dengaku tofu o do kasanari.*) It seems that at the end of the Muromachi period, people spread miso on tofu, grilled it over a fire, then ate it.

1535–In Kishu (today's Wakayama prefecture), Akagiri Umataro? (Zenuemon/Yoshiuemon?) starts selling Yuasa Shoyu, which is derived from Kinzanji miso.

1558–Iida Ichirobei of the feudal domain of Shimôsa (*Shimôsa no kuni;* today's Noda city in Chiba prefecture) makes tamari shoyu, called Kawanaka-jima Goyo Tamari, and sends it to the Takeda family in Koshu. This is the beginning of Noda Shoyu. It is said that the taste of shoyu gave a great boost to the energy of Takeda's army. At about this same time Takeda Shingen (lived 1521-1573) starts to use dried-frozen tofu (*kori-dofu*) for his army in Kawanaka-jima after tasting the delicious kori-dofu from Sahtobei?

1559–The book *Tokitsugu Kyoki* by Yamashina Tokitsugu (lived 1507-1579) states that Tokitsugu sent a small keg of shoyu to Nagahaki kyoku. It seems that at the end of the Muromachi period, shoyu is becoming popular.

1560 May–Oda Nobunaga (who lived 1434-1582) wins the war over Imagawa Yoshimoto (1519-1560) in Okehazama. At about this time people start use the technique of frying to prepare the side dishes to their meals (*fukushoku-hin*) for the first time.

1573-91–Shoyu making starts on the island of Shodo-shima.

1574–Tanaka Chobei of the feudal domain of Shimousa (today's Chiba prefecture) Ichikawa starts making shoyu.

1587–Maruo Magouemon of Hanshu Tatsuno makes shoyu using Mikazuki soybeans.

1591–Akagiri Saburobei of Yuasa in Kishu-han (today's Wakayama prefecture) starts to use Shoyu Kaisen, a ship of at least 200 koku [9,520 gallons] capacity to transport his shoyu to other feudal domains (*kuni*) for sale.

1594–The term *koma-dofu* appears in the Rokuon Diary of Ginkakuji. "Rokuon" means "deer garden." *Koma-dofu* is a very firm tofu which originated in Korea.

Note. This is the earliest document seen (April 2013) that mentions firm tofu. Address: Norin Suisansho, Tokei Johobu, Norin Tokeika Kacho Hosa.

12. Jun, Heo. 1613. Dongui bogam [Principles and practices of Eastern Medicine]. Korea: [Kor]*

• ***Summary:*** Some give the date as 1611. It was translated into English in 2013, after 6 years of translation work. A good description of the book can be found on Wikipedia:

Contents: Overview: Introduction and Contents. Part I: Internal Bodily Elements. Part II: External Bodily Elements. Part III: Miscellaneous Disorders 1. Part IV: Miscellaneous Disorders 2. Part V: Miscellaneous Disorders 3. Part VI: Miscellaneous Disorders 4. Part VII: Herbs, Acupuncture and Moxibustion. Appendices: Index.

The book emphasizes the importance of preventive medicine, a good health regimen, and pragmatic herbal medicine. It discusses traditional diagnostic methods. This book "was written with the hope that people would be able to heal their own bodies." Dr. C.H. Lee wrote in 2008: "It is not surprising to find that fermented soybean products have been used as medicine" in this famous old book. Address: Royal Physician, Korea.

13. Heo Jun [Jo, Dyun]. comp. 1613. Donguibogam (Dongui Bogam {RR}, Tongui Pogam {MR}). 25 vols. Korea: Nae-uiwon. 787 p. 26 cm. Facsimile edition reprinted in 1975 by Namsandang (Seoul, Korea). [Kor]*

• ***Summary:*** This is an early, important and widely known book on traditional Korean medicine. In it, the medicinal functions of doenjang are first described. It describes herbs that can be found on the Korean Peninsula. Embodying a systematic approach, its basic theory is based on the Naegyeong.

The compiler, Heo Jun, started working on the Dongui bogam in the 29th year of King Seonjo's reign (1596) as

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requested by the king. The book was completed in the 2nd year of King Gwanghaegun's reign (1610) and was published by Nae-uiwon ("royal hospital"). The *Dongui Bogam* consists of 25 volumes. It was started by Heo Jun by the king's request but was stopped because of the second Japanese invasion of Korea in 1597. After the war, the king once more ordered Heo Jun to complete the book and this time, the King allowed about 500 books kept in the national library to serve as sources of information. Heo Jun kept writing the book, but before it was completed, the king died. It was completed in the second year of his successor's reign as the fruit of 15 years of hard work.

14. In't Comptoir Nagasaekij [In the office of Nagasaki]. 1647. Letter to Taiwan / Formosa, Oct. 16. Unpaginated. Handwritten, with signature. [Dut]

• ***Summary:*** Shipped and loaded in the sailing ship (*fluijtschip*) the *Zwarte Beer* [literally "black bear"] sailing from this place with a Bill of Lading of the chiefs [of this office] to Taiwan (*Taijoan*) in consignment send to the honorable Pieter Antonisz, Maritime (*Overwater*), President of the Island of Formosa (*Eijlants Formosa*).

The list of provisions sent includes: "12 pots of hard bread costs together with the pots–f 30:--:--. 10 kegs (*balien / taru*) of sake (*sackij*) of 15 *maas* a piece–f 15:--:--. 10 kegs (*balien*) of Soy [sauce] at 27 *condrijn* a piece–f 2:-7:--.

Bibliographic reference in Dutch: NA, NFJ 847, Journal (16-10-1647).

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 847. Boekhoudkundig journaal [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 847. Journal of bookkeeping].

Note 1. This is the earliest document seen (March 2021) concerning soy and Taiwan.

Note 2. This is the earliest Dutch-language document seen (March 2021) that clearly mentions shoyu or soy sauce, which it calls *Soije*.

Note 3. A *maas* and a *condrijn* are old units of Asiatic currency of account used in China and Japan. The VOC glossary says: 1 *maas* = 7 or 8 stuivers, but in Siam 1 *maas* = 9 stuiver. A *condrijn* is smaller than a *maas*. The symbol "f" stands for guilder, the basic Dutch monetary unit. "f 2:07:8" is read "two guilders, 7 stuivers and 6 pennigen." One gulden (singular of guilder) = 20 stuivers. One stuiver = 12 pennigen.

Note 4. In 1624 the Dutch established their first trading post on Formosa. They had their colonial capital at Tayoan City (source of the modern name "Taiwan," and site of present day Anping). This is the earliest document seen (March 2021) that mentions Formosa or Taiwan in connection with soy.

Note 5. This is the earliest document seen (March 2021) concerning involvement by the Dutch or the Dutch East India Co. (VOC) with soyfoods (soy sauce) or soybeans.

Note 6. This is the earliest document seen (March 2021) concerning soy sauce in international trade (imports or exports). In this case exported from Japan to today's Taiwan.

Note 7. This factory (trading post) on Deshima Island in Japan was owned by the Honorable Dutch East India Company (VOC). Deshima was a small island in Nagasaki harbor, on Japan's southernmost main island of Kyushu. In 1600 the Dutch first made contact with Japan when the Dutch ship *De Liefde* drifted ashore in Usuki Bay in northeastern Kyushu. Many of the original 110 crewmembers had died and only 6 of those remaining could walk ashore unassisted. Two of the survivors went on to earn important places in Japanese history: William Adams and Jan Joosten.

In 1616 European ships were limited to the two ports of Nagasaki and Hirado (an island off the northwest coast of Kyushu, just northwest of Nagasaki).

In 1633 the Tokugawa shogunate (upset at Portuguese Christian missionaries intent on making converts and instigating revolts) adopted a policy of national isolation which continued for 221 years until 1854.

In 1639 the Portuguese were expelled. This left only the Dutch among the Europeans still trading with Japan and their representatives were moved in 1641 from Hirado to the tiny artificial island of Deshima / Dejima built by the shogunate in Nagasaki harbor, where they were kept as virtual prisoners. During this time Japan maintained contact with only two other nations: China and Korea. Chinese merchants were also allowed to trade at Nagasaki, but under strict controls.

By 1639 the Japanese had so successfully closed their doors to the outside world that subsequently Japan all but dropped out of the consciousness of Europeans. The only important exception was the annual Dutch vessel from the East Indies to the Dutch trading post on the island of Deshima in Nagasaki harbor.

During the 1600s and 1700s, the Dutch expanded their network of trading posts throughout Asia, they continued to order provisions from Japan via their tiny but very important trading post at Deshima. Address: Deshima, Nagasaki, Japan.

15. Lee, Ik. 1761. Seongho Saseol Compendium of Seongho Lee Ik (1681-1763). Korea: [Chi]

• ***Summary:*** An early description of the soybean appears in this book. The following was translated by Dr. Cherl-Ho Lee of Korea: Soybean is one of the five grains, which people do not value. But if you claim that grain saves people, the power of soybeans is the greatest. The people of later generations have few living well, and many poor, so that all the good food made of good grain is given to the rich, and only soybean is passed to the poor to sustain their life.

The price is equal to unhulled rice when soybeans are

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in cheap rice. When you mill 10 pounds of unhulled rice, you'll have four pounds of polished rice. So you can change 10 pounds of soybean with four pounds of polished rice. In terms of losses, 3/5 is added, which is a big gain.

Grinding soaked soybean with a stone mill will result in soymilk to make dubu [tofu], and there are also abundant amount of residues [biji = okara] left. If you boil it (biji) and make soup, it tastes delicious. Sprouting soybeans to make soybean sprouts adds a few doubles. Poor people can fill their stomachs by grinding beans, cutting bean sprouts, and combining them to make porridge. I know these things as I live in the country, so I will write them down so that I can see and understand them for those who teach and rule the people.

Dr. Cherl-Ho Lee of Korea writes: Seongho Saseol [4 Chinese characters] is a manuscript consisting of 30 volumes in 30 books, written by Lee Ik (1681-1763), a scholar of the Korean Practical Science or Realist School of Confucianism, *Silhak.* This book is an encyclopedia, compiled by his nephews in 1761, in which he wrote about his country's politics, economy, society, culture, geography, customs, thoughts, history, books, and answers to his disciples' questions. It was written in Chinese and translated into Korean in 1977. The Korean alphabet, Hangul, was invented in King Sejong's period in the 15th century, but used mainly by women. Scholars in the Joesun Kingdom preferred to use Chinese characters, much as European scholars preferred to use Latin in medieval times. The Korean alphabet has been used as the official way of writing since the Republic of Korea was founded in 1948. Seongho is Lee Ik's nick name or pen name, and Saseol means compendium or editorial. So, Seongho Saseol can be translated into English as 'A compendium of Seongho Lee Ik (1681-1763).' Address: Korea.

16. Seungjungwon-ilki [Diary of King Chosun Royal Secretariat]. 1768. *
• ***Summary:*** This book mentions that food was not eaten without gochujang.

17. Shimazu, S. 1804. Seikei-zusetsu [Illustrations. 30 vols.]. Japan. 26 cm. [Jap]*
• ***Summary:*** Nagata (1960, p. 75) states that Shimazu has pointed out in *Seikei Zusetsu* (1804-1806) that summer soybeans were sown in April preceding the autumn in the western provinces.

Goto (1984, p. 136) states: "Seikei-zusetsu (1804) outlined the methods of soybean production as recent practices." The book was apparently compiled, authored and/or illustrated by Senshun Sô (1751-1834) and Kunihashira Shirao (1762-1821).

Wikipedia: In the entry for *kongnamul muchim* (the Korean word for soy sprouts) is large color photo soybean sprouts. Address: Japan.

18. Bretschneider, Emil V. 1882. Botanicon sinicum. Notes on Chinese botany from native and Western sources. I. *J. of the North-China Branch of the Royal Asiatic Society* 16:18-230. For the year 1881. [1882* ref. Eng]
• ***Summary:*** The single most important early work on Chinese botany written by a Westerner. Bretschneider, an M.D., lived 1833-1901.

Contents: Preliminary notices (p. 18-22). 1. Contribution towards a history of the development of botanical knowledge among eastern Asiatic nations: Chinese literature on materia medica and botany (p. 22-75, incl. the Materia Medica of Shen Nung, p. 26-32), Chinese works on agriculture (p. 75-86). Chinese geographical works containing botanical information (p. 86-92). Early acquaintance of the Chinese with Indian and Western Asiatic plants (p. 92-95). History of materia medica and botany in Japan (p. 96-101). On the botanical knowledge of Coreans [Koreans], Manchoos [Manchus], Mongols, and Tibetans (p. 101-05).

2. On the scientific determination of the plants mentioned in Chinese books (p. 105+, incl. Cleyer, Siebold, and Kaempfer, p. 124-27). 3. Alphabetical list of Chinese works (p. 131-216). Index of Chinese authors (p. 217-22). Appendix: Celebrated mountains of China (p. 223-28).

"Preliminary notices: "More than ten years have elapsed since I published a little essay (1) intended to show the mode adopted by the Chinese in treating of Natural science, especially Botany, and what degree of advantage European Botanists may derive from the study of Chinese botanical works. The present paper now brought before the public, although treating of the same subject and reproducing occasionally the matter of my former essay, will prove to be virtually a work new in substance, entirely recast, into which also a considerable amount of new information has been introduced.

"In resuming my past labours after a long interval I cannot but repeat what I confessed in the preface of my former paper, that I am neither a Sinologue nor Botanist, my knowledge of Chinese as well as of Botany being quite limited..." Footnote (1) "On the Study and Value of Chinese Botanical Works, with Notes on the History of Plants and Geographical Botany from Chinese sources, by E. Bretschneider. Illustrated with 8 Chinese wood-cuts. This article appeared originally in the *Chinese Recorder* of 1870 and 1871, published in Foochow. The editor of this periodical, at that time, seems to have had little experience in proof-reading; at any rate my paper (although presented in a very clear manuscript) came to light with such a profusion of misprints and other inaccuracies, that it would have been ridiculous to append to it a complete list of errata. I therefore would feel quite disposed to disavow this my first scientific essay; all the more since at the time I wrote it I had not yet sufficiently mastered the subject, and many of my former statements require modification."

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Concerning Shen nung, "Chinese works on agriculture" (p. 75) states: "The primeval Emperor *Shen nung*, whom the Chinese believe to have composed the first treatise on Materia medica, is also credited with having laid the foundation of Chinese Husbandry. His name implies this tradition, for Shen nung means: the Divine Husbandman. It is related in the early records that the people of his age were rude and wholly unacquainted with the advantages of agriculture. They subsisted on fruit, vegetables, and the flesh of birds and beasts. Shen nung examined first the quality of the soil, fashioned timber into ploughs and taught the people how to till the ground and raise grain. On a previous page I referred to the mountain in Shan si, where tradition makes him first teach his people the fundamental processes of agriculture. Sz' ma Ts'ien [Ssu-ma Ch'ien] (B.C. 163-85) records in the *Shi ki* [*Shih chi; Historical records*] (book 1) that Shen nung sowed the five kinds [of cereals]."

In the section on the work of early Europeans who studied the flora of East Asia, the following researchers are discussed in detail: Cleyer (p. 124), Kaempfer (p. 125-26), Thunberg (p. 126), Siebold (p. 126-27), Miquel and Zuccarini (p. 127), Hoffman and Schultes (p. 127-28), Dan. Hanbury (p. 128), O. Debeaux (p. 128), Dr. Fr. Porter Smith (p. 128-29), and P. Perny (p. 130; very critical). Address: China.

19. Bretschneider, Emil V. 1882. Botanicon sinicum. Notes on Chinese botany from native and Western sources [Part I]. London: Trübner & Co. 228 p. No index. 28 cm. [1882* ref. Eng]

• ***Summary:*** The contents of this book was first published in 1882 as an article in the *Journal of the Royal Asiatic Society, North China Branch.* (Vol. XVI, 1881; Article III). Series 2. The contents and pagination of this book is the same as the original article (which see). This book has been digitized in full view on HathiTrust. Address: M.D., Physician of the Russian Legation at Peking, China.

20. Griffis, William Elliot. 1882. Corea: The hermit nation. New York, NY: Charles Scribner's Sons. xxiii + 462 p. See p. 270. Illust. Map. Index. 23 cm. 8th ed. 1907. [99* ref]

• ***Summary:*** An excellent, early history of Korea by a fine historian. Contents–3 parts: I. Ancient and medieval history. II. Political and social Korea. III. Modern and recent history.

Chapter 30, "Housekeeping, diet, and costume" states (p. 270): "Among the poorer classes, a cooked fish is rarely seen on the table; for no sooner is it caught than it is immediately opened and devoured. The raw viands are usually eaten with a strong seasoning of pepper or mustard, but they are often swallowed without condiment of any sort. Often in passing along the banks of a river, one may see men fishing with rod and line. Of these some are nobles who are not able, or who never wish to work for a living, yet they will fish for food and sport. Instead of a bag or basket to contain the game, or a needle to string it upon, each fisher has at his side a jar of diluted pepper, or a kind of soy [sauce]. No sooner is a fish hooked, than he is drawn out, seized between the two fingers, dipped into the sauce, and eaten without ceremony. Bones do not scare them. These they eat, as they do the small bones of fowls."

Note: This is the earliest document seen (Nov. 2020) that mentions Korean soy sauce, which it calls simply "soy." Address: Ithaca, New York. Formerly of the Imperial Univ. of Tokio, Japan.

21. Kenny, W.J. 1883. Account of a secret trip to the interior of Korea [in 1875]. *Transactions of the Asiatic Society of Japan* 11(Part II):141-47. Sept. [Eng]

• ***Summary:*** Translated from the Japanese. Page 142: 19 March 1875 near Pusan. "The food was rough and coarse, and assailed my nose with such a stench that indicated that it was putrid. One glance at it was quite sufficient to create a bitter taste in the mouth. To give a specimen or two of the dishes–one was herrings and shrimps pickled in salt (the latter cut in small pieces), exceedingly offensive to the smell. The soup or broth, made of bean sauce (Daidzu [soybeans] {a large French bean [sic]} and wheat are boiled, then mixed together, pounded and made into lumps; these are piled up, with straw between, for several weeks, after which they are again taken out, and, when dried, are ready for use), is thick like mud. With the exception, perhaps, of the pickled shrimps, I could not bring myself to eat any of these dishes." Note: This bean sauce may have been Korean-style miso, *doenjang*, however it does not typically contain wheat as an ingredient.

Page 144-45: March 27... "In this house I stopped about a fortnight. Their food was rice or pulse, sometimes mixed, half and half, with wheat; and as to vegetables (they rarely used cultivated vegetables, but generally picked young shoots of wild herbs), they steam them, dip them into vinegar and soy [sauce], and then use them. During the fortnight or so I remained at this house I never saw them eating meat once. It is 'said that even the middle and higher classes find it difficult to eat meat, and can only eat salt fish. The articles of food are for the most part rancid in smell. They make no particular change in their garments for inside and outside wear. Their bodies and limbs are impregnated with filth; their clothing is a nest of vermin."

22. Forbes, Francis Blackwell; Hemsley, William Botting. 1886-1888. Enumeration of all the plants known from China proper, Formosa, Hainan, the Corea, the Luchu Archipelago, and the island of Hongkong; Together with their distribution and synonymy. *J. of the Linnean Society of London, Botany* 23:1-521. See p. 188-189. [14 ref]

• ***Summary:*** Discusses the following Glycine species: 1. Glycine hispida Maxim. Cultivated throughout China and Japan and other parts of Asia. 2. Glycine Soja, Sieb. et Zucc.

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Grows in Amur, Mandshuria [Manchuria], and Japan. "This may be the wild form of the foregoing cultivated plant, and it is treated as such by most botanists; but as it is so easily distinguished, we follow Maximowicz in keeping them apart."

3. Glycine tabacina, Benth. Described near Amoy in Fokien [Fukien / Fujian province] by Sampson, and at Whampoa [Huangpu] in Kwangtung [province in southeastern China, which contains Canton] by Hance. Grows in New Caledonia, and very widely diffused in Australia.

4. Glycine tomentosa, Benth. Described at Talienwhan in Shingking by Swinhoe, hb. Hance, and at Amoy in Fokien by Sampson, hb. Hance, and at Tamsui in Formosa [today's Taiwan] by Oldham. Grows in the Philippine Islands and Eastern Australia. "[Walpers, in Nov. Act. Nat. Cur. xix., Suppl. i. p. 324, records *Johnia Wightii*, Wight et Arn. = *Glycine javanica*, Linn., a common Asiatic and African plant from Cape Lyngmoon.]"

The frontispiece, facing the title page, is a detailed, fold-out map showing all of China and Corea [Korea], showing Chinese provincial boundaries, and major cities and rivers.

Note: This is the earliest document seen (March 2021) concerning soybeans (but only wild perennial relatives of soybeans) in Taiwan; cultivated soybeans had not yet been reported in this country. No mention is made of soybeans or their wild perennial relatives in Korea or Hong Kong.

See also: The peanut (p. 171) *"Arachis hypogaea*... a South-American plant, is cultivated in China, as in most warm countries.

*Pueraria Thunbergiana* (p. 191-92; long and detailed discussion, with many references). Address: 2. Asst. for India in Herbarium of the Royal Gardens, Kew.

23. Kellner, O. [Oskar Johann]; Nagaoka, M.; Kurashima, Y. 1889. Researches on the manufacture and composition of "miso." *Bulletin of the College of Agriculture, Tokyo Imperial University* 1(6):1-24. Dec. [12 ref. Eng]

• ***Summary:*** Contents: Introduction. Raw material and preparation of miso: Soy beans, koji from rice or barley, common salt. The chemical processes during the ripening of miso (incl. chemical composition of fresh substance and dry matter, which include nitrogenous substances or albuminoids, ether extract [crude fat], carbohydrates, crude fibre, ash, solubility, water). Varieties, composition, and nutritive properties of miso: (1) "Shiro miso, white miso, is characterized not only by its white colour but also by its low content of salt and by the short time it will keep good"–no longer than 10 days; 4 days fermentation time. (2) "Yedo miso, so called from the former name of the metropolis" [Yedo/Edo, now Tokyo]; 20 days. (3) "Inaka miso, country miso, is the richest in salt and is prepared with the help of barley koji"; 11-12 months. (4) "Sendai miso derives its name from the city of Sendai in Miyagi prefecture where it is widely prepared, but is frequently also termed *Aka miso* (red miso)"; 8-15 months. (5) Other sorts of miso which are only of local importance. Four are consumed mostly in miso soup: Sano miso, Nagaseyama miso, Mikawa or Sanshiu miso [Sanshu miso]. Four others can be consumed uncooked and used as condiments: Kinzanji miso ("named after a Buddhist temple and prepared by fermenting a mixture of soy beans, barley koji, salt, starch-sugar {*amé*}, slices of egg plant {*Solanum melongena*}, and ginger roots"), Sakura miso ("quite similar to the preceding, but sweeter on account of an admixture of large quantities of starch-sugar or raw cane sugar"), Tetsuka miso [Tekka miso] ("is common miso with the addition of sesamum oil, roasted soy beans, and slices of the roots of burdock {*Arctium Lappa"*}), Kogo miso ("is prepared like common miso but with an addition of rice bran").

Note 1. This is the earliest English-language document seen (Dec. 2012) that contains the term "roasted soy beans."

The introduction begins: "Miso, e.g. a food prepared from a mixture of soy beans, rice or barley, common salt, and water, by slow fermentation, seems to have been known in Japan since remote times. Its manufacture, like so many other useful processes, appears to have been taught to the Japanese by Chinese or Koreans. At least the *Sandai jitsu roku*, tells us, that a Chinese priest named *Jingo* transmitted more than 1000 years ago a small quantity of miso to the then Emperor of Japan, and the name *'Korei shiwo'* sometimes, though not frequently used instead of the word 'miso,' points to its introduction from Korea, where indeed, as well as in China, miso is still a favorite food.

"In Japan miso is very widely consumed, especially by the lower classes, who enjoy it as a sort of food adjunct to the vegetables of which their daily diet consists. Although it is eaten throughout the whole country, it seems to be especially favoured in the north-eastern provinces. Statistics on its consumption do not exist at present and may also be difficult to compile, as in the countryside it is made by families themselves [at home], and only in large communities are special miso works [factories] established. Assuming, however, 10 monme (37.5 grms.) to be the lowest quantity daily consumed per head, and 20 millions out of the 39 [million] of the whole population to eat miso every day, a yearly amount of nearly 30 million kilograms of miso is arrived at, for the preparation of which more than half the yearly produce of soy beans (2.3 million koku [335,000 tonnes] in 1883) is needed. Although these figures are certainly too low, they surely indicate the importance of this food in the nutrition of the Japanese people."

Tables show: (1) The composition of three different types of soy beans that make good shoyu and good miso, and the weight of 1000 grains/seeds of each (p. 3). (2) The composition of four different types of sea salt: Ajino from Bizen, Ako from Harima, Mitajiri from Suwo, and Giotoku from Shimosa [Shimôsa] (p. 4). (3) The composition of soy

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beans and of barley, and amount of each used in making miso (p. 6). (4) The composition of the fermenting miso after 50, 85, 120, and 150 days, on a fresh (as-is) basis (p. 7) and a dry-matter basis (p. 8). (5) Changes in nutrients in the soy beans and in the barley during fermentation (p. 11). (6) Changes in the miso during fermentation (p. 13). (7) Temperature of the original mixture and length of fermentation for four types of miso: Shiro miso, Yedo miso, Inaka miso, and Sendai miso (p. 15). (8) Composition of five types of miso (p. 19). (9) Proportion of raw materials, age, temperature of the beans when mixing them with the other ingredients, and price per *kin* (=0.601 kg) of the same four types of miso.

Note 2. Dr. Kellner published three subsequent articles in this journal but none concerned soybeans: (1) "Manuring experiments with paddy rice" (Bulletin No. 8, June 1890); (2) "Manuring experiments with paddy rice. (Third year)" (Bulletin No. 11, July 1892); (3) "Comparative experiments on the effects of various phosphatic fertilizers on upland soil, and analysis of rice grain" (Bulletin No. 12, March 1893).

Note 3. This is the 2nd earliest English-language document seen (April 2021) that contains statistics on the production or consumption of soyfoods (in this case miso), in Japan.

Note 4. This is the 2nd earliest document seen (April 2021) that contains statistics on miso by geographical area.

Note 5. This is the earliest English-language document seen (Aug. 2001) that mentions the word "nutrition" in connection with soy.

Note 6. This is the earliest document seen (April 2021) that mentions "Inaka miso" [made at home in the countryside], or "Tetsuka miso" [Tekka miso], or "Yedo miso" [Edo miso], or "Sendai miso" [a dark rice miso made in and around the city of Sendai], or "Kinzanji miso," or "Sanshiu miso" [Sanshu miso, a soybean miso made in central Japan].

Note 7. The parallel Japanese title of this English-language periodical is *Tôkyô Nôrin Gakkô. Gakujutsu hôkoku.* Address: Dr., Prof. of Agricultural Chemistry, Imperial College of Agriculture and Dendrology, Komaba, Tokyo, Japan.

24. Forbes, Francis Blackwell; Hemsley, William Botting. 1889-1902. Index flora sinensis: Enumeration of all the plants known from China proper, Formosa, Hainan, the Corea, the Luchu Archipelago, and the island of Hongkong; Together with their distribution and synonymy. 3 vols. London: Taylor and Francis. Illust. 22 cm.
• ***Summary:*** The content of this book is identical to the three articles that appeared in the *Journal of the Linnean Society,* vols. 23, 26, and 36. Glycine species were discussed in Vol. 23. See p. 188-189.

25. Whitney, William Dwight. ed. 1889. The century dictionary: An encyclopedic lexicon of the English language. 6 vols. New York, NY: The Century Co. See vol. I, p. 488.
• ***Summary:*** This dictionary contains three entries related to the soy-bean in Volume 1. At the entry for "bean" we read: "Sahuca or soy beans, the seeds of *Glycine Soja,* largely cultivated in India and China, from which the sauce known as *soy* is made.

"bean-cake, n. A large cheese-shaped compressed cake of beans after the oil has been expressed, used largely in northern China as food for cattle, and in the sugar-plantations of southern China as manure."

"bean-curd, n. A thick white jelly resembling blanc-mange [blancmange], made of beans, much eaten by the natives of northern China, Corea [Korea], and Japan."

Note 1. This is the earliest document seen (Aug. 2014) concerning soybean products (bean-curd) in Korea; soybeans as such have not yet been reported.

Note 2. This edition of *The Century Dictionary,* published from 1889-1891, is the earliest edition listed in the *National Union Catalog.* Address: Prof. of Comparative Philology & Sanskrit in Yale Univ.

26. Giles, Herbert Allen. 1892. A Chinese-English dictionary. London: Bernard Quaritch; Shanghai, Hongkong, Yokohama & Singapore: Kelly and Walsh, Ltd. xlvi + 1416 p. 31 cm. [4 ref. Eng; chi]
• ***Summary:*** This massive volume, weighing almost 12 lb, contains more than 1,450 pages and 13,848 Chinese characters. Contents: Dedication (to the Honourable C.P. Chater). By the same author (17 books). Preface: Number of characters, the characters numbering, duplicate characters, phonetic arrangement, orthography, the tones, the dialects (Beneath the number attached to each character will be found its rhyme (R) as given in the *P'ei-wên-yün-fu.* The romanization of each character is given in Cantonese, Hakka, Foochow, Wênchow, Ningpo, Peking, Mid-China, Yangchow, and Ssuch'uan {Szechwan} dialects, as well as in Korean, Japanese, and Annamese, each being distinguished by its initial letter), the definitions, the entries, etymology, grammar, difficulty of Chinese, personal. Philological essay (incl. tones, ranging from 4 to 9, in ten dialects). Table of sounds.

Examples of soy-related characters:

*Chiang* (p. 122, No. 1220). "A soy made by mixing salt with bean-flour. Sauce. Pickled food." Fourteen compounds using this character are given, including: Bean sauce, soy. Pickled bean curd [fermented tofu]. Bean sauce. Soy [sauce] is of two kinds, the clear and the thick. Dry relishes. Soy colour–a dark reddish drab. He won't use money for vinegar to buy soy.

*Ch'ih* (p. 205, No. 1996). "Salted fruits, etc., dried and used as relishes." Four compounds incl.: Salted beans. Soy, sauce.

*Ch'ou* (p. 259, No. 2521). "Sweet-smelling; strong-

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smelling. Stinking. *Ch'ou fu.* "stinking bean-curd; noxious."

Note 1. This is the earliest English-language document seen (Oct. 2011) that mentions *Ch'ou fu* which it translates as "stinking bean-curd." This is also the earliest document seen (Oct. 2011) that uses the term "stinking bean-curd."

*Fu* (p. 458, No. 3686). "Rotten; putrid; worthless." Eleven (p. 458, No. 3686). "Rotten; putrid; worthless." Eleven compounds and sayings include: Bean curd, see No. 11,417. Bean curd officials–a term of contempt applied to certain of the poorer classes of official servants who are compelled to feed largely on this cheap food. Also explained as flabby or unenergetic officials. A Mongol name for cheese. A kind of milk made from beans (*rufu* = milk + fu) [Note: Probably fermented tofu, *not* soymilk].

*Huang* (p. 522, No. 5124). Yellow. Compounds: Yellow beans [soja].

*Mao* (p. 778, No. 7,679). "Hair, down, feathers." But the word "Hairy beans" = edamame does not appear here.

Shih (p. 988, No. 9999). See No. 1996.

*Ta* (p. 1,036-37, No. 10,470). "Great." But the word "Great bean" = soybean does not appear here.

*Tou* (p. 1,127, No. 11,417). "Beans; pulse." See also No. 11,412. Thirty compounds, incl.: Bean-sprouts. Bean-curd. A cheap restaurant (a bean-curd restaurant). Bean-cake. Bean oil. Big bean, black bean, or yellow bean = the soja bean (*Glycine hispida*, Max.), used for making bean-curd, soy, oil, etc. Ground-nuts.

*Yu* (p. 1,316-17, No. 13,409). "Oil, fat, grease." 45 compounds incl. Sesamum-seed oil. Linseed. Wood oil. An oil factory. Oil dregs. But "bean-oil" = soybean oil does not appear here.

Note 2. This is the earliest English-language document seen (Aug. 2007) that contains the term "sesamum-seed oil." Note 3. Herbert Giles lived 1845-1935.

Note 4. Unfortunately, the pronunciation of the compounds is not given (as in Mandarin).

Note 5. This is the earliest English-language document seen (Oct. 2011) that uses the term "pickled bean curd" to refer to fermented tofu.

Note 6. This is the earliest English-language document seen (Oct. 2002) that uses the term "Wood oil" to refer to what would later be called "China wood oil" or "tung oil," a pale yellow drying oil obtained from the seeds of tung trees (any of several trees of the genus *Aleurites*), and used mainly in quick-drying varnishes and paints, and for waterproofing. Address: H.B.M. [Her Britannic Majesty's] Consul at Ningpo [Zhejiang province, China].

27. Gilmore, George William. 1892. Korea from its capital: With a chapter on missions. Philadelphia, Pennsylvania: Presbyterian Board of Education and Sabbath-School Work. 328 p. See p. 210. Illust. 19 cm.

• ***Summary:*** Page 210: "Of beans and lentils many varieties, all small, are grown; they are used for food by man and beast. In the winter a common dish–and by some foreigners said to be a very toothsome one–is made of sprouted [soy] beans." Address: Rev., A.M.

28. Japan, Dep. of Agriculture and Commerce, Agricultural Bureau. 1893. A descriptive catalogue of the agricultural products exhibited in the World's Columbian Exposition. Tokyo: Printed by Seishibun-sha. 115 p.

• ***Summary:*** The World's Columbian Exposition was a World's Fair held in Chicago, Illinois, to celebrate the 400th anniversary of Christopher Columbus's arrival in the New World in 1492.

Discusses 38 commercial products, with most divided into basic information and products made from the crop. Includes: Rice ("The manures applied to rice fields" include "green manures, farm yard manures, composts, ordures, fish manures, Sake kasu, Shoyu kasu, rape seed cake, and soy bean [cake] {p. 11}), barley ("It is much used as the material for making miso. Miso is prepared by pounding together boiled soy bean, salt, and the Koji {yeast}* prepared from common barley or naked barley; and is one of the most common articles of food in Japan." (Footnote: *"Eurotium oryzae). It [barley] is also used for making *ame* {p. 23}).

Wheat ("Wheat is used principally for preparing soy [sauce], vermicelli, onmen [sic, somen?], undon [sic, udon], and several kinds of confectionary" {p. 27}. It is also used for making *fu* or wheat gluten; "Roast 'fu' is used as food by boiling it with soup, soy, mirin, etc." {p. 29}), naked barley (*Hordeum nudum; hadakamugi*), Job's tears (*Coix lacryma; hatomugi*), soy bean (*Soja hispida; daidzu*), adzuki (*Phaseolus Radiatus*, [*azuki*]), sasage (*Dolichos Umbellatus*), haricot bean (*Phaseolus vulgaris*), peas, buckwheat ("Sobakiri" and "Kôri-soba" are both seasoned with soy sauce {p. 46}), rape seed (*Brassica chinensis, natane*) and rape seed oil (*natane abura*), sesame seeds (yellow {*kigoma*}, white {*shirogoma*}, and black {*kurogoma*} are displayed) and sesame oil (made from only yellow and white sesame), yegoma (*Perilla occimoides*), hemp, shiitake, chilli (*Capsicum Longum; tôgarashi;* "The fresh unripe fruit and leaves of certain varieties are eaten by cooking them with soy, sugar, "Katsuwobushi" [katsuobushi],* etc." {p. 103}). Also discusses: Dried daikon (p. 109-11), konjak flour (*Conophallus konjak; konniak-ko, konnyaku;* "For cooking, it is cut into small pieces and boiled with soy, soup, mirin, sugar etc." {p. 112}), kampio (*Lagenaria vulgaris; kampio* [*kampyo, kanpyo*]*;* "It is used as an article of food by boiling with water, soy, sugar, mirin etc." {p. 113}), wine.

Concerning the soy bean: In 1887, the total area of arable land devoted to soy bean cultivation is 4,633,152 *tan* (1 *tan* = 0.245 acre; thus 1,142,472.2 acres or 462.352.16 hectares). The total production of soy bean in the Empire was estimated to be 3,253,790 *koku* [419,459 metric tons] (1 *koku* = 180 liters, and 1 bushel = 35.2390 liters; thus 585,682,200 liters = 16,620,284 bushels).

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Note 1. From the above figures, a yield of 14.53 bushels per acre can be calculated.

From 1887 to 1891 the price of soybeans per *koku* ranged from 4.180 yen in 1888 to 5.319 yen in 1890. Four specimens of soybeans were exhibited:

No. 24. Green soy bean (*awo-daidzu*) The produce of Akumi-gun, in Yamagata prefecture.

No. 25. Black soy bean (*kuro-daidzu*). The produce of Sapporo-gun, in Hokkaido. No. 26. Common soy bean. The produce of Chikuba-gun, in Ibaraki prefecture. No. 27. Soy bean (Itachi-daidzu). The produce of Iruma-gun, in Saitama prefecture.

"Daidzu or soy bean is extensively used in Japan to prepare various kinds of foods indispensable for the daily meal, such as 'soy' or 'shôyu,' 'tamari' (a kind of soy), tofu, and miso. It is also largely used as a food for horses and manure [bean cake].

Note 2. This is the 2nd earliest English-language document seen (April 2012) that mentions tamari, which it calls "tamari" (not "tamari shoyu").

A analysis of the percentage composition of 3 kinds of soy beans analyzed by the Sanitary Experiment Station at Tokio is given; Green soy beans have the highest crude protein content (42.85% with 12,28% water). White soy beans (*shiro-daidzu*) have the highest ash content (5.00% with 13.46% water). Black soy beans have the highest fat content (18.26%, and the 2nd highest crude protein content 40.25%, with 11.09% water). Soy bean (*Itachi-daidzu*) from Saitama prefecture.

Although daizu is abundantly produced in Japan, since its daily consumption by all classes of people is great, it is now imported from China and Korea in large quantity. However imported soy bean is never used to make first class shoyu or soy, since the imported beans are inferior to those produced in Japan.

A table shows the quantity (in *kin*) and value (in *yen*) of soy bean exported from Japan from 1887 to 1891; 2.1 million *kin* were exported in 1889.

Four specimens of soy sauce are on display. Two brands (the trade marks are shown) are made by Mr. Mogi Shichirouemon, and two are made by Mr. Mogi Saheiji. All are made at Noda-machi, Chiba prefecture, Japan. Brands (a) and (c) are of the first quality; brands (b) and (d) are of the second quality.

A table shows the amount of shoyu made in Japan each year from 1887 to 1891; the amount ranges from 1,304,551 *koku* in 1888 to 1,157,982 *koku* in 1890. Since 1 *koku* = 180 liters, the amount made in 1888 is 234,819,180 liters. The total number of shoyu manufacturers in 1889 was 10,682. A table shows the price (in yen) of various brands and quantities of shoyu from 1887 to 1892. A brief description of the process for making shoyu is given. The word "barm" is used instead of koji. Either barley or wheat can be used with daizu to make the barm. The "mixture is kept for about 25 months, stirring it occasionally with a paddle, say twice a day during winter and three times in summer, and when it is fermented to the required degree, soy is extracted by means of a soy press. The clear liquid thus obtained is pasteurized by heating to about 130º F. and when entirely cooled, it is transferred into casks."

As shoyu is manufactured from daizu, wheat, etc., "it naturally contains a large quantity of albuminous matter. Shoyu is used in Japan as table salt is in Europe and America; consequently it is indispensable for daily use for cooking fish, meat, vegetables. etc. It has a remarkable merit when applying it in the place of sauces (like 'worcestershire') for beefsteak, fry, stew, etc. It answers better than salt when used with cold meat.

"Japanese soy or 'Shoyu' has long been exported to various parts of Europe where those who once taste it never fail in extolling its flavour. It is said that in Holland, Japanese soy has been used by many people from long years ago and highly esteemed by them." A table shows the chemical composition of shoyu.

"Since the fine flavour of Japanese soy has recently become known to people abroad, several trial consignments were made both to Europe and America, and the result, though it has obtained a high reputation among them, still it has not yet become a leading article of export." A table shows the annual amount and value of shoyu exported from Japan from 1887 to 1891. It ranges from 1,302.71 *koku* worth 11,091 in 1887 to 3,749.01 *koku* worth 41,028 yen in 1891. Thus the exports are growing rapidly.

Three specimens of tamari are one display, one dilute and one concentrated. The first two are made and sold by Mr. Ishima Mosaku. The 3rd (regular tamari) is made and sold by Mr. Morimoto Chôhachi. All are made at Yokkaichi in Miye [Mie] prefecture. Tamari is made chiefly in the prefectures of Miye, Aichi and Gifu [in central Japan]. Tamari is very similar to shoyu except that no wheat is used in manufacturing tamari.

Tofu (bean curd): "Tofu is one of the most favourite foods of Japanese and sold in all places both in towns and villages. The specimen here exhibited is called Yakidofu and is prepared by roasting partially dried 'Tofu' over a charcoal fire." "As 'Tofu,' sometimes called bean curd, being a coagulated vegetable albumen of soy beans, it contains a large proportion of nutritious matter, most important to human life, especially, to those who subsist mainly upon vegetables." The price of this Yakidofu is 18 yen per 10 dozen.

Note 3. This is the earliest English-language document seen (April 2013) that mentions grilled tofu, which it calls *Yakidofu.*

A specimen of Kôri-tôfu or frozen bean curd is displayed; it is made in Minami Adzumi-gun, Nagano prefecture. "As it can be preserved for many years it is a suitable for provision for vessels undertaking long voyages."

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Concerning adzuki: There are both red adzuki and white adzuki. Early varieties are sown in the spring; late varieties {called aki-adzuki in the autumn}. "It is mostly used for preparing "An"–a pulpy mixture of boiled Adzuki flour and sugar, and in that state is largely used for making various kinds of confectionary." It is also used to make "Sarashi-an or refined flour of 'adzuki," and "shiruko–a juice prepared by boiling the flour with a suitable quantity of water and adding sugar..." Note 4. Shiruko could be described as adzuki bean soup with mochi (rice cake).

Concerning rape seed: "Rape was formerly cultivated to a great extent but since the introduction of Kerosene Oil, the acreage of its cultivation has been much diminished, yet it is grown in nearly all parts of Japan and forms one of the important farm crops."

29. Japan. Dep. of Agriculture and Commerce, Bureau of Commerce (Nôshômushô Shôkôkyoku). 1893. General view of commerce & industry in the empire of Japan. Tokyo: Printed by M. Onuki. ii + 491 p. See p. 22, 37, 67, 247, 324, 345, 349-51, 429-30, 440-41, 469-70, 474. Index.

• ***Summary:*** Name of organization with diacritics is: Nôshômushô Shôkôkyoku. Pages 21-22: A list of all the 71 commodities exported from the port of Kobe in 1891 whose value exceeded ¥10,000. The largest by far was rice (5.5 million yen), followed by tea, matches, and camphor. Also: Kanten or colle vegetable [agar] 408,615. Rape seed oil 114,572. Sea weeds 22,372. Cut sea-weeds 17,765. Soy [sauce] 11,483 yen.

Page 37: After the "Restoration of Meiji," a new port was opened at Kobe, near Osaka. Its principal articles of merchandise were "rice, salt, sugar, tea, soy,..."

On pages 61-67 are tables of Japanese weights and measures and comparative tables with those of the empire of Great Britain, including both troy and avoirdupois. These show Japanese units for length (9 units; the standard is the shaku), area of land (6), capacity (5), and weight (6; the standard is the kwan). In 1885 the Government of Japan joined the Universal Metric Convention, and in 1891 established the present system of weights and measures.

Page 67: Industrial pursuits can be classified into original ones (that existed from ancient times, having first been introduced from China and Corea [Korea]) and those introduced from the West. Original industries include "salt making, sugar making, Sake brewing, soy brewing, oil producing,..."

Page 247: Exports (Class 22) include "Soy. The total value of the latest export is 41,029 yen, and chiefly exported to Hawaii."

Page 324: A table shows imports (both weight and value) of "Oil-cake" from 1887 to 1891, from China, Korea, and Other.

Page 345: Class II–Duty free goods includes "Oil cake."

Page 349: Class II–Duty free goods, includes "All kinds of Mush-rooms, excepting Shiitake, Confectionaries, all kinds of Liquors, Vinegars, Soy [sauce], Oils, and Prepared Tobacco... Sea-weeds excepting Kobu [Kombu, seaweed],..."

Pages 429-30: "Table of the total quantity [weight in picul or catty] and value [in yen] of the commodities exported from Japan to the United States." Soy [sauce] rose from 7,862 catties [1 catty weighs 1.33 lb] worth 261 yen in 1887 to 9,744 catties worth 1,146 yen in 1891.

Page 440-41: Chapter 7, "Commercial and industrial unions in Japan," lists the 2,013 "trade unions" of businesses in the same general field. One of these, "Liquor and soy," has 106 members.

Pages 469-70, 474: Table III lists "Industrial corporations." One class, "Soy and miso," has 4 members and capital of 75,500 yen. Address: Tokyo, Japan.

30. *Mataura Ensign* (*Otago, New Zealand*). 1894. Corea [Korea] and Coreans: Roasted dog and other delicacies. In search of a female. Sept. 29. p. 7.

• ***Summary:*** From NZ Press, by Fare Fac: "The Kingdom of Corea has for centuries been a bone of contention between China and Japan... But, with one exception, the Chinese have always come out victorious. This was in 1592," when Japanese forces invaded the country and defeated the Chinese. Five years later, however, the Chinese again became possessed of the country, and have held it as a suzerain ever since. It was the Japanese who gave the name to the outside world. The Chinese name is Tsiotsien, the native name Kaoli, and the Japanese name Korai, *Anglice* Korea or Corea."

The eastern slope is not very fertile, so most of the population lives on the western slope. Here they raise a little barley, rice and [soya] beans in the alluvial pockets of the foothills.

"The [soya] bean cake is the pressed marc of the pulse grown on the western shores. The oil is used internally and externally–it smells worst when it in used outside–also for lighting and lubrication. The marc is used for fuel and stock food. The bean cakes look exactly like 24 inch grindstones and are quite as soft."

31. Cavendish, Alfred Edward John; Goold-Adams, Henry Edward. 1894. Korea and the sacred white mountain: Being a brief account of a journey in Korea in 1891. London: George Philip & Son. 224 p. Illust. (40 original, many color). Maps. Index.

• ***Summary:*** This book is an amplification of the author's diary kept during a stay of a few weeks in Korea. Soy is mentioned as follows: Page 12: "Chefoo is the watering-place for Korea, Pekin, Tientsin, and Shanghai, but the foreign portion of it is very small, with three indifferent boarding-houses, but good pears and good bathing, if you do not mind a naked fisherman or two about. The chief exports appear to be straw plait for hats and bean-cake for manure."

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Page 33-34: Korean ponies, which carry foreign travelers and their belongings, are very small. The forage ration consists of about 2 lbs. of beans and millet boiled in water, and the whole poured hot into a trough; the average feed is two gallons of this mixture, given three times a day, and supplemented by 2 lbs. of chopped straw (rice or millet).” “Other means of transport are found in donkeys, cattle, and coolies.”

Page 48: Beans are becoming largely grown in Korea, for the demand for them in Japan is increasing, as they are used in the manufacture of Bean-curd, Miso, and Soy [sauce], while the Japanese are growing instead mulberries for sericulture. Wheat, barley, and rice, the latter of two kinds, one of which grows in dry soil, are also increasing, the export of these in 1890 being–barley, 5,260,533 lbs., value $50,341; [soya] beans, 87,950,800 lbs., value $1,004,762; wheat, 5,869,466 lbs., value $60,381; rice, 116,622,000 lbs., value $2,057,868.”

Note: This is the earliest document seen (May 2021) that gives statistics for trade (imports or exports) of beans [probably mostly soybeans], from Korea.

Page 54. “Besides flax, maize, and cotton, there were fields of the small millet (*Setaria italica*), substitute for porridge, and of the tall millet, Susu or Kaoliang (*Holcus Sorghum*), with stems 8 to 12 feet high and as thick as a man’s thumb, turning to golden yellow or bright mahogany colour; from the latter kind the Koreans make the coarse cloth of which their rough garments are composed, when they do not use Manchester shirtings; also fields of beans, food for cattle and men, and the foundation of Japanese soy [sauce] and our Worcestershire sauce.”

Pages 146-47: “He produced some samshu, a muddy fluid which smelt and tasted like Kaffir beer, with strong spirit in it; this peculiar taste is due to the bean-water [water in which soy beans have been boiled] which they mix with the spirit distilled from rice or millet. We were given a bottle of this liquor by the head-man, and the cook bought another of Chinese make, which was quite clear and less diluted with bean-water.”

Pages 195-96: “Whilst waiting in the inn to-day, I had plenty of opportunities of observing the nauseous smell of the food greedily devoured by the Koreans. Five or six little dishes, containing various preparations of meat or fish, chillies, [soy] beans, cabbage, rice, &c., were ranged on a little table a foot high, and gave forth a most evil odour. A Korean likes his viands very highly seasoned, and in eating takes a little of every dish into his mouth, that he may enjoy the pleasant mingling of the different flavours.” Note: At least one of these dishes probably contained Korean-style soy sauce or miso–but we cannot be sure.

Bean or beans (usually noted in passing as a crop with other crops) are mentioned on pages 66, 67, 68, 134, 138, 150, 191, 194, 199. Address: 1. Captain, F.R.G.S., 1st Argyll and Southern Highlanders, now in Edinburgh; 2. Captain, R.A.

32. The First Sino-Japanese War (1894-1895), and the Treaty of Shimonoseki (17 April 1895) (Important event). 1895.
• ***Summary:*** The origin of the Sino-Japanese War was a dispute over Korean affairs. “Japan’s opening of Korea in 1876 led to increasing embroilment with China over the peninsula. Peking adamantly insisted on its suzerainty over Korea, which Japan refused to recognize...

“During the next decade the Chinese intensified their efforts at modernizing their military forces, particularly the navy, while the Japanese became increasingly involved in Korea, thus setting the stage for an even more serious confrontation. Then the Tonghak (‘Eastern Learning’), a popular religious organization with a strongly antiforeign bias, broke out in revolt in southern Korea in 1894, China sent a small body of troops at the Korean king’s request, and Japan then sent in a larger force, demanded reforms of the Korean government, and finally seized control of it and had it declare war on China. War followed between Japan and China on August 1.

“The ensuing hostilities were the first real test of the efforts at military modernization both China and Japan had been making for a whole generation. Most Westerners assumed that the Chinese giant would win through sheer size, but Japan quickly proved that its modernization had been more successful. Its armies seized the whole of Korea and then invaded Manchuria. But victory was largely determined by sea power, which in the absence of railways controlled even China’s access to Korea. While the Chinese fleet was larger, the Japanese was qualitatively much better. On September 17 off the mouth of the Yalu River, the Japanese, using modern British naval tactics, severely crippled the Chinese fleet, which came out like cavalry, lined abreast. The Japanese then captured the naval base of Port Arthur in South Manchuria and besieged Weihaiwei on the northern coast of Shantung, where the remainder of the Chinese fleet was bottled up. Weihaiwei fell, the fleet surrendered, and China had to sue for peace.

“The terms of the Treaty of Shimonoseki, signed between Itô and Li on April 17, 1895, were relatively severe, though perhaps less so than they might have been had not a Japanese fanatic shot and wounded Li. China was obliged to cede Taiwan, the nearby Pescadores Islands, and the Kwantung Peninsula in South Manchuria; recognize Korea’s independence; pay 200 million taels indemnity; open more ports; and negotiate a commercial treaty. The latter, signed in 1896, gave Japan all the privileges that the Western powers had in China and added the further privilege of carrying on ‘industries and manufactures,’ using the cheap labor in the treaty ports.” Note: The Treaty of Shimonoseki gave all foreigners a clear right to establish factories in treaty ports. After 1895, foreign-run factories using Western technology rapidly increased in number as, revealingly, did privately

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owned Chinese factories using Western technology.

"Japan's triumph, however, was soon tarnished by a blatant power play by the Western nations. Russia, which itself had ambitions in both Manchuria and Korea, was alarmed by Japan's success. It persuaded Germany and France to join in a diplomatic intervention on April 23, 1895, 'advising' Japan to give up the Kwantung Peninsula. Bowing to *force majeur,* Japan complied, receiving in compensation 30 million taels of additional indemnity. There was naturally a strong reaction of indignation among the Japanese public, which became further embittered when the same three powers appropriated pieces of China for themselves in 1898, the Russians taking, under a twenty-five year lease, the Kwantung Peninsula that Japan had been forced to disgorge only three years earlier.

"The achievement of equality: Still, Japan's victory over China greatly impressed the West, and the British in particular, disillusioned with the incompetence of the Chinese government, began to show a decidedly more pro-Japanese attitude."

"On July 30, 1902. the Anglo-Japanese Alliance was signed–the first military pact on equal terms between a Western and a non-Western nation... The British, seeing their long dominance of the eastern seas threatened by the rise of new naval powers, bolstered their position in East Asia by allying themselves with the only strong naval power in the area. They also forestalled by this pact any Russo-Japanese pact to partition Northeast Asia and instead secured Japanese support for the maintenance of the treaty system in China. The Japanese, faced with growing rivalry with Russia over Korea and Manchuria, needed the alliance to ensure that, if war broke out, Russia would not be joined by other European powers, as it had been in its intervention over the Kwantung Peninsula in 1895. The wording of the alliance made it clear that in such a case Britain would come to Japan's aid."

But an even more important victory came a few years later in 1904, when Japan defeated the powerful Russian Empire.

Source: Fairbank, Reischauer, and Craig. 1973. *East Asia: Tradition and Transformation.* p. 553-55.

33. Japan. Dep. of Agriculture and Commerce, Bureau of Commerce (Noshomusho Shokokyoku). 1897. General view of commerce & industry in the empire of Japan. Tokyo: Printed by Y. Yamaguchi. 315 p. See p. 22-23, 234. Also published in 1900 in Paris by M. de Brunoff)

• ***Summary:*** Name of organization with diacritics is: Nôshômushô Shôkôkyoku. Page 5: "The treaty ports or towns open to foreign trade are: Yokohama and Tokyo, on the Bay of Tokyo. Kobe and Osaka on the Bay of Osaka. Niigata, on the western coast of Honshiu [Honshu]. Hakodate, on the Tsugaru Strait. Nagasaki, on the south-western coast of Kiushu [Kyushu], Kelung, Tamsui, Takow, and Taiwan on the western coast of Taiwan. Ten partially opened ports in Japan and three in Corea [Korea] are also listed.

On pages 18-22 are tables of Japanese weights and measures and comparative tables with those of the empire of Great Britain, including both troy and avoirdupois.

Agriculture and mining (p. 22-23): Agriculture has been the leading pursuit of the people since earliest times and in the greater part of the cultivated area rice is grown; other principal food crops are wheat, barley, and soya beans. Industries not imported from the west include "salt making, sugar making, sake brewing, soy brewing, oil producing,... (p. 23).

Imports–Class II.–Duty free goods (p. 228) includes: "Grain, including rice, paddy, wheat, barley, oats, rye, peas, beans [incl. soya beans], millet, Indian corn. Flour and meal prepared from the above. Oil cake [when imported from Manchuria, this was typically soya bean cake].

Exports–Class II.–Duty free goods (p. 232-34) includes: "All kinds of mushrooms, excepting Shiitake, Confectionaries, all kinds of liquors, Vinegars, Soy [sauce], Oils, and Prepared Tobacco... Sea-weeds excepting Kobu [Kombu, seaweed],..." Address: Tokyo, Japan.

34. Bird, Isabella L. (Mrs. Bishop). 1898. Korea and her neighbors: A narrative of travel, with an account of the recent vicissitudes and present position of the country. 2 vols. London: John Murray. Vol. 1: x + 261 p. Illust.

• ***Summary:*** In Vol. 1: Preface, p. vi: "It must be evident to all who know anything of Korea, that a condition of tutelage, in some form or another, is now absolutely necessary to her existence as a nation. The nominal independence won for her by the force of Japanese arms is a privilege she is not fitted to enjoy, while she continues to labour under the burden of an administration that is hopelessly and superlatively corrupt."

Page xi: The author made four visits to Korea between Jan. 1894 and March 1897 as part of her larger plan to study the characteristics of the Mongolian races. Her first journey produced the impression that Korea was the most uninteresting country she ever travelled in.

Soy [sauce] is mentioned–Pages 141-42: If, while traveling, no "clean room" existed in an inn, "I had a room in the women's quarters at the back, remarkable only for its heat and vermin, and the amount of ang-paks, bundles of dirty clothes, beans rotting [fermenting] for soy [sauce and paste], and other plenishings which it contained,..."

Page 177: "A quart of rice, which when cooked is of great bulk, is a labourer's meal, but besides there are other dishes, which render its insipidity palatable. Among them are pounded capsicum, soy [sauce], various native sauces of abominable odours, kimchi, a species of sour kraut [*kimchi*], seaweed, salt fish, and salted seaweed fried in batter. The very poor only take two meals a day, but those who can afford it take three and four."

Pages 178-79: "The Korean is omnivorous. Dog meat is

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in great request at certain seasons, and dogs are extensively bred for the table." And Koreans waste nothing. "Cooking is not always essential. On the Han [river] I saw men taking fish off the hook, and after plunging them into a pot of red pepper sauce, eating them at once with their bones. Wheat, barley, maize, millet, the Irish and sweet potato, oats, peas, beans, rice, radishes, turnips, herbs, and wild leaves and roots innumerable, seaweed, shrimps, pastry made of flour, sugar, and oil, *kimchi*, on the making of which the whole female population of the middle and lower classes is engaged in November, a home-made vermicelli of buckwheat flour and white of egg, largely made up into a broth, soups, dried persimmons, spongecakes, cakes of the edible pine nut and honey, of flour, sugar, and sesamum seeds, onions, garlic, lily bulbs, chestnuts, and very much else are eaten. Oil of sesamum is largely used in cooking, as well as vinegar, soy [sauce], and other sauces of pungent and objectionable odours, the basis of most of them being capsicums and fermented rotten [soy] beans!"

Note: The Han is a major river in today's South Korea and the fourth longest river on the Korean peninsula after the Amrok (Yalu), Tuman (Tumen), and Nakdong rivers.

Page 182: The inn, if inn it was, gave me a room 8 feet by 6, and 5 feet 2 inches high. *Ang-paks*, for it was the family granary, iron shoes of ploughs and spades, bundles of foul rags, seaweed, ears of millet hanging in bunches from the roof, pack-saddles, and worse than all else, rotten beans fermenting for soy [sauce and paste], and malodorous half-salted fish, just left room for my camp-bed."

Note: The author does not mention Korea's very popular soybean pastes–such as doenjang or kochujang. She may well have used the word "soy" to refer to both soy sauce and soy pastes.

Bean or beans are mentioned: Page 18: "Hides, [soy] beans, dried fish, *bêche de mer*, rice, and whale's flesh are among the principal exports. It was not till 1883 that Fusan was officially opened to general foreign trade, and its rise has been most remarkable."

Page 39: In the market booths are to be seen "rice, millet, maize, peas, beans,..."

Page 85: In 1894 they paid taxes on barley, beans, rice, and cotton.

Page 100: "... they conveniently export their surplus produce, chiefly beans, tobacco, and rice, and receive in return their supplies of salt and foreign goods."

Page 112: In the Han River valley: "Every valley has its streamlet, and is barred across by dykes of mud from its head down to the Han–rice, with tobacco, beans, hemp, and cotton, being the great articles of export."

Page 119: "Ma-Kyo is the river port of Che-chön... "It exports rice, beans, and grain from the very rich agricultural country on both sides of the river,..."

Page 123: "When full grown a bull can carry from 350 to 500 lbs. They are fed on boiled beans, cut millet stalks, and cut pea haulm, and the water in which the beans are boiled."

Page 138: Korean ponies "are fed three times a day on brown slush as hot as they can drink it, composed of [soy] beans, chopped millet stalks, rice husks, and bran, with the water in which they have been boiled."

Page 147: "There is much wet rice along the route, as well as dry rice, with a double line of beans between every two rows,..."

Page 149: "It is a most fertile tract, and could support a large population, but not being suited for rice, is very little cultivated, and grows chiefly oats, millet, and beans, which are not affected by the strong winds."

Page 150: "There the villagers could not or would not take us in. They said they had neither rice nor beans, which may have been true so late in the spring."

Page 185: "A smaller valley contains about 3,000 acres of rice land only, and on the slopes surrounding all these are rich lands, bearing heavy crops of wheat, millet, barley, cotton, tobacco, castor oil, sesamum, oats, turnips, peas, beans, and potatoes."

Page 186: "In wheat, barley, or rye fields the sowing is in October, and the harvest in May or June, after which beans, peas, and other vegetables are sown."

Page 187: "Grain, peas, and beans are threshed out with flails as often as not in the roadway of a village,..."

Page 189: The village "has several schools, and exchanges rice and beans for foreign cottons at Won-san,..."

Page 217: Newchwang "is a city of 60,000 souls, the growth of its population having kept pace with its rapid advance in commercial importance since it was opened to foreign trade in 1860. Several British steamers with big Chinese characters on their sides were at anchor in the tideway, and the river-sides were closely fringed with up-river boats and sea-going junks, of various picturesque builds and colours, from Southern China, steamers and junks alike waiting not only for cargoes of the small beans for which Manchuria is famous, but for the pressed bean-cake which is exported in enormous quantities to fertilise the sugar plantations and hungry fields of South China."

Page 218–Concerning Newchwang: "'Peas,' really beans (Footnote: *Glycene hispides* [sic, *Glycine hispida*] {Dr. Morrison}), are its chief *raison d'être*, and their ups and downs in price its mild sensations. 'Pea-boats,' long and narrow, with matting roofs and one huge sail, bring down the beans from the interior, and mills working night and day express their oil, which is as good for cooking as for burning."

Page 235–Muk-den [Mukden] is a busy place, and does a large and lucrative trade, specially in grain, beans, and furs."

Seaweed is mentioned on pages 38, 140, 142, 177, 179, 182, 198-99. Kimchi: p. 98, 147, 177. Address: F.R.G.S., Geographer, Great Britain.

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35. Bretschneider, Emil V. 1898. History of European botanical discoveries in China. 2 vols. London: Sampson Low, Marston and Co., Ltd. xv + 1167 p. Indexes (names of persons, names of plants). 28 cm. 2nd ed. 1935. [200+* ref]
• ***Summary:*** This magnificent work has been digitized in full view on HathiTrust.

Vol. I ends on page 624. Vol. II is on pages 625-1167. National Union Catalog says Bretschneider's formal Russian name is Emilii Vasil'evich Bretshneider (1833-1901).

The soy bean (search for Soja OR hispida OR soy) is mentioned on 22 pages of this book.

In Vol. 1: On pages 401-03 the author discusses the life and work of George Bentham, the author of *Flora Hongkongensis.*

On pages 403-51 the author discusses the life and work of Robert Fortune. "The travels and explorations of R. Fortune in China, beginning with the year 1843, inaugurate a new era in the history of botanical discoveries in that country. Previous to that time the Chinese plants known to our botanists in Europe and introduced into our gardens, came from Canton or Macao...

"R. Fortune was born in Berwickshire, Scotland, on the 16th of Sept., 1812, and was educated in the parish school of Edrom... Fortune visited China four times, 1843-45, 1848-51, 1853-56, 1861, and accordingly published four interesting accounts of his travels in that country." Fortune traveled in Japan during 1860, visiting the ports of Nagasaki, Kanagawa, and Yukuhama [Yokohama] near Yedo. He visited Yedo for 15 days. In the spring of 1861 he returned to Japan. His four books are "Three years wandering in the northern provinces of China" (1847), "A journey to the tea countries of China" (1852; in which he discusses the soy bean), "A residence among the Chinese" (1857), and "Yedo and Peking: A narrative of a journey to the capitals of Japan and China" (1863).

Pages 536-37 discuss Louis C.N.M. Montigny, who was born on 2 Aug. 1805 at Hamburg [Germany] of French parents. He first went to China in 1843, as *chancellier* accompanying the French Embassy. In 1847 he was appointed Consular Agent at Shanghai, where he stayed until about 1858. He died on 14 Sept. 1868 and his obituary appeared in the *Revue Horticole* (1869, p. 52). During his residence in Shanghai he rendered great services to natural science and horticulture by introducing into France interesting beasts and birds, and useful Chinese economic plants–including *Soja hispida* and its oil. These plants were cultivated a distributed by the *Société d'Acclimatation* of Paris.

Page 545 notes that Voisin, a French missionary who went to China in 1824, obtained from China several economic plants among which was the textile plant, *Ko.* Seeds were presented to the Museum of Natural History in Paris through Stanislas Julien and the plants raised from these seeds were examined by Prof. Jussieu, who found that it was a legume resembling *Dolichos bulbosus.* It was later identified as Pueraria.

Pages 554-55 discuss Stanislas Julien the great French sinologist, who was born in 1797. In 1832 he succeeded A. Rémusat as Professor of the Chinese language at the Collège de France. He translated several interesting Chinese treatises on economic plants, their cultivation and use, generally with a view to incite his countrymen to introduce these plants into France. In 1855 he wrote about *Soja hispida* in the *Bulletin of the Society for Acclimatization* (France) (p. 225). He died in 1873.

Contents: Preface (book includes, in addition to China proper, Manchuria, Mongolia, Eastern Turkestan, Tibet, Corea [Korea], and the Liu kiu [Loochoo] and Bonin [Ogasawara] Islands. Note: The latter are about 30 subtropical islands located about 1,000 miles directly south of Tokyo, Japan).

Also discusses: azuki beans (*Phaseolus radiatus,* p. 76, 129), cowpeas (*Vigna sinensis,* p. 77), hemp (*Cannabis sativa,* p. 166, 169. 228, 493, 520. 522-23), kuzu (*Pueraria Thunbergiana,* p. 175, 738, 755, 1051), *Arachis hypogaea* (groundnuts; peanuts) (p. 231, 233, 451, 663, 844), sesame (*Sesamum orientale,* p. 11, 158, 165, 226, 487).

Concerning *Prunus mume* we read: "Near the entrance to the pass on the Canton side, Abel [Dr. C. Abel, 1816-1817] saw a species of *Prunus* in full flower, in Chinese *mei hwa shoo;* hence the name of the mountain. (The *mei hwa* is *Prunus Mume,* S. & Z. [Siebold & Zuccarini]) (184)" (p. 233). See also p. 893.

Note: This is the earliest English-language document seen (Dec. 2006) that uses the term *Prunus mume* to refer to the name of the tree whose fruit is used to make umeboshi salt plums. Address: Late physician to the Russian Legation at Peking; now at St. Petersburg.

36. Gifford, Daniel L. 1898. Every-day life in Korea: A collection of studies and stories. Chicago, New York, Toronto: Fleming H. Revell Co. 231 p. See p. 20, 53. Illust. Map. No index. 20 cm.
• ***Summary:*** Page 20: "Beans are used for food–put sparingly into the rice kettles, or decomposed for a peppery sauce which furnishes one of their side dishes. Again they are mixed with chopped straw and boiled in water, forming a hot mixture that is the sole food of cattle and horses in Korea. Beans are also an article of export." Note 1. These beans are soybeans and the peppery sauce may be *kochujang.*

Page 53: "The heaping bowl of rice is then discussed, either with the brass spoon or chop-sticks. And the chop-sticks descend every now and then upon the contents of the little side dishes, the brine-soaked 'mu,' or turnip, the bits of dried fish or meats, a species of sauerkraut [*kimchi*] composed of cabbage, shrimp, ginger, onion, red pepper, salt, etc., with an occasional dip into the bean sauce [soy sauce]

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(à la Worcestershire). For liquid food he drinks cold water, or the water in which the rice has been cooked."

Note 2. In 1898 Pyeng-yang [Pyongyang] was "by far the most important city in the north of Korea,..." As of 2009, it is the capital of North Korea. Address: Rev., Mendota, Illinois. Formerly eight years a missionary in Pyeng-yang [Pyongyang], Korea.

37. *Lake Wakatip Mail* (*New Zealand*). 1899. The industries of Japan. July 7. p. 4.
• ***Summary:*** "Agriculture is the chief pursuit of the people of Japan, and in the greater part of the cultivated area rice and the principal food crops, wheat, barley, and soya beans, are grown. Mulberry trees are planted everywhere. Tea is mainly planted in the south of Honshiu and in Taiwan, Formosa. The mineral wealth of the empire is great, but much improvement is needed in mining. The coal production is rapidly increasing, especially in Kiushiu and Hokkaido. The development of the iron industry is somewhat slow, but much is hoped for in the future. The production of silver has been steadily rising; copper and antimony are also among the principal exports of the country.

"The industries of the Japanese empire may be distinguished as 'original' and 'imported.' The original industries which existed from early times are those of ceramics, weaving embroideries, lacquer work, paper, metals, leather, wood, and bamboo carvings, camphor, vegetable wax, salt, sugar, sake, soy [sauce], oil, tobacco, indigo, and raw silk. These industries seem to have been first introduced from Corea or China, but the lapse of several hundred years has obliterated the original traces. Their scope of working is generally small, and the tools and instruments used are rude and simple. The industries which have been introduced into the country are those lately brought over from Europe and America. These comprise cotton spinning, brick making, preparation of drugs and chemicals, cement works, wire making, woollen manufacture, shipbuilding and machinery; match, paper, and soap making. These industries are generally carried on in a large scale, employing a vast number of workmen and using water and steam power. According to the latest returns, the total number of factories belonging to companies and individuals is five thousand nine hundred and eighty-five, one thousand and ninety-eight of these being provided with steam engines and two hundred and twenty-one with both steam and hydraulic engines."

38. YUrkevich, Lyutsian. 1899. Soya rannyaya, kak nasyshchnaya pishcha dlya gubernii, postradavshikh ot neurozhaya [Early soya as daily food for provinces suffering from crop failure]. Kiev, Ukraine, Russia: Printing House of Peter Barsk. 19 p. 20 cm. [Rus]
• ***Summary:*** Sigizmund Yaroshevskii brought soybeans to Russia from abroad; however, due to lack of effort to acclimatize these soybeans, they started to disappear. In 1893, I. Ovsinskii [Ovsinsky, Owinski, Owinsky] reintroduced black and brown varieties of soybeans from the East to the Podol'skaya region [part of Ukraine in 2002]. In 1895, Yurkevich brought soybeans from North Korea into Chernigovskaya, Mogilevskaya and Vilenskaya regions [also part of Ukraine in 2002]. It was found that soybeans, which were inexpensive and nutritious, could be used to feed the starving and malnourished population. Also, soybeans were used in Russia as a feed for army horses (when Yurkevich traveled to Korea, he also noticed that their horses were fed soybeans). Also discusses: Acclimatization and cultivation of soybeans. Unique features of soybeans. Six recipes for dishes made with soybeans: 1. Soy flour to make bread. 2. Soy flour to make *mamalyga* (boiled dough). 3. Soy flour to make pancakes. 4. Cooked soybeans to make porridge. 5. Soybeans to make soy oil. 6. Miso used in a porridge.

Both August Chechet (who lived under the name of Gal'vachi) in an article in the agricultural journal, *Roln. i Hodow* No. 40 of 1898, and J. Farcy in his article in *Journal de l'agriculture pratique* No. 14 of 1898 approvingly recommend soybeans. There follows a long quotation from Chechet's article. Address: Kiev, Ukraine, Russia.

39. *Times* (*London*). 1900. Japanese commercial interests in Manchuria. Oct. 5. p. 12, col. 2. [1 ref]
• ***Summary:*** "The Commissioner of Chinese Customs at Niu-chwang [pinyin: Yingkou, formerly Newchwang; Niuchwang, Niuzhang] refers, in his report for the past year, to the important part played by Japan in the recent rapid growth in the foreign trade of Manchuria."

"This growth in trade with Japan may be said to have commenced with the war between Japan and China [1894-1895], which probably opened the eyes of the Japanese to the wealth of Manchuria and the peculiar value of its products to themselves. The Soya bean is consumed in enormous quantities in Japan, the better qualities for food and the inferior ones as manure. In former years the supply was obtained from Korea, but the Manchurian bean is cheaper. Beancake is used as a food for cattle and for manure, and its value in both respects is well known. Japanese shipping at Niu-chwang naturally shows a great increase likewise."

40. *Journal of the Oriental Institute* (*Vladivostok*). 1900-1901. Sovremennaia letopsis' Dal'nego Vostoka [Contemporary chronology of the Far East]. p. 157-58. [Rus]*
• ***Summary:*** This chronology was published in installments under a specific grant from the Governor-General of the Amur Region. The entry for 1900-1901 titled "Japanese interests in Manchuria" describes increasing Japanese soybean imports from Niuzhuang, Manchuria, since soybeans from Manchuria are found to be less expensive than those imported from Korea.

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41. VanBuskirk, J.D. 1900. Some common Korean foods. *Transactions of the Korea Branch of the Royal Asiatic Society* 14:1-8.

• ***Summary:*** Table 1, "Korean food products," based on statistics published in the 1917 report by the Bureau of Agriculture of the Government General, shows Korean production in millions of bushels: Rice 61. Barley 25. Millet 19. Wheat 8. Beans and peas 18. Since exports and imports of foodstuffs are relatively small compared to the amount produced, and the number of animals fed is not large, "these figures should give us a good idea of the amount of food eaten."

Rice is sometimes cooked with peas or beans (incl. soy beans) mixed in (called *pat-pap* or *kong-pap*). But the cooking takes longer and the beans are often not well cooked, and thus less digestible (p. 3).

The section titled "Bean and pea foods" (p. 4-5) gives the name of each food in Korean characters and discusses: (1) Bean curd (*tu-bu*), equivalent to Japanese tofu, is curded with the "concentrated mother liquid from sea water" [Jap. nigari]. The bean residue [okara] (*pi-ch'i*) left over from making tofu is also sometimes eaten. Bean curd "is not generally eaten without further preparation; it is commonly added to soups and stews and often made into omelets with eggs; another palatable food is made by cooking the bean curd for a short time in bean sauce (*chang*) and serving this with sesame oil, pepper and onions; it is called *to-bu cho-rim.* Bean curd may be eaten without further cooking served in sauce."

Note 1. This is the earliest English-language document seen (April 2013) that uses the term *tu-bu* to refer to Korean tofu.

Pea curd (*mook*) is similar to beancurd in composition but made from peas using a very different process.

"Bean Sauce (*kan-chang*) is somewhat like the Japanese 'sho-yu' but is more salt and not sweetened. Soy beans are thoroughly boiled, mashed, made into cakes and partially dried. These cakes (*me-ju*) are stored for months and allowed to mold and slowly ferment: when ripe they are broken up and soaked in salt water for a long time, then strained, the solid part being dried and used as a condiment (*toin-chang* [*doenjang*]). The liquid is boiled and the coagulated protein scum frequently removed; when sufficiently concentrated the liquid sauce is cooled and stored. This is the indispensable condiment for Koreans.

Note 2. This is the earliest English-language document seen (Nov. 2020) that uses the term *kan-chang* to refer to Korean soy sauce.

"Another bean sauce (*ko-cho-chang*) is made by taking about equal parts of the fermented bean cakes, rice, and salt, with a large amount of red pepper, the mixture being soaked in a small amount of water till ripe. This too is very important as a condiment."

Note 3. This is the earliest English language document seen (April 2021) that uses the term *toin-chang* to refer to Korean fermented soybean paste (*doenjang*). clearly mentions Korean-style red pepper paste, which it calls "ko-cho-chang,"–today commonly called "red pepper sauce."

Note 4. This is the earliest document seen (Nov. 2020) that clearly mentions Korean-style red pepper paste, which it calls "ko-cho-chang,"–today commonly called "red pepper sauce."

"'Kong-cha-ban' is made by boiling beans in the bean sauce; they do not swell but are hard, brittle, and very salty. Sugar and sesame oil may be added when serving them.

"Sprouted beans (*kong-na-mul*) are very common. The beans are soaked in water and allowed to sprout. When the sprouts are quite long both beans and sprouts are boiled and served–sauce is generally added."

Kim-chi, a fermented food made from cabbage or sliced turnips, is sometimes served with added bean sauce.

Among animal foods: "'Mut-chim' is dried fish soaked in water, then shredded; it is then soaked in bean sauce. Sesame oil and pepper are added; it is then allowed to stand for a short time." Address: M.D.

42. Speer, Robert E. 1901. The "morning calm" country–Korea: The country which Russia covets and which Japan must have. *American Magazine* (*The*) (*Frank Leslie's Popular Monthly*) 52(2):174-86. June. See p. 182.

• ***Summary:*** Page 182: "At the inns along the road you order your meal as 'a table of rice,...' It is brought on a low, pretty, four-legged table and set down on a floor before you. On it are rice, in a copper bowl, cucumber soup, an omelette, salt fish, shredded cabbage in salt water, salted shrimps, hard bean sauce made out of the pressed bean extract, of which great quantities are said to be shipped from China and Korea as the basis of Worcestershire sauce. But perhaps this is a fable. There are many such told in Asia."

Note: The term "hard bean sauce" probably refers to Korean-style soy sauce. But the meaning of the word "hard" is unclear.

43. *Oesterreichische Monatsschrift fuer den Orient* (*Vienna*). 1901. Industrielles aus Japan [Japanese Industries]. No. 10. Page 114, col. 2. Oct. [Ger]

• ***Summary:*** The production of the Japanese bean sauce shoyu, also known as soy (*Soja*), serves primarily for [local] consumption, since it appears to be indispensable to the Japanese for their foods. In spite of the fact that a large portion of shoyu is imported from the northern provinces to Nagasaki prefecture (Nagasaki-ken), the production here is nevertheless not insignificant (even though shoyu is also exported by the Chinese and the Japanese to Korea and China), amounting to 13,547 yen for 1899. This bean sauce is produced from wheat, beans, cooking salt, and water, and its aroma and flavor are particularly popular with the English and the Americans.

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In Nagasaki prefecture, around 9,100 *koku*, or 1,638,000 liters are produced [each year]. The price for one koku (180 liters) in Nagasaki amounts to approximately 3 to 5 yen.

Some of the industrial branch offices that are listed below serve exclusively for the filling of the needs of the Nagasaki prefecture. Their products are of low quality, but they satisfy the modest needs of the middle classes.

Note: Translated by Philip Isenberg (MM, CT), Long Beach, California. Address: Import-Geschaeft in Prag.

44. Dep. of Finance (Okurashô). 1901. Financial Annual of Japan (No. 1). Tokyo, Japan: Government Printing Office. 74 p.

• ***Summary:*** A table titled "Amount of taxation under various heads" (p. 12-13) gives the government revenue (in yen) from various types of taxes from 1867-68 to 1901-02. The soy [sauce] tax began in 1885-86 and was 640,179 yen that year. The rates of taxes on soy and income were raised in 1899. The soy tax jumped from 1,535,648 in 1898-99 to 2,453,392 in 1899-1900. In 1901-02 it was 3,808-730.

Note 1. In 1867-88, Japan's main sources of income were land tax (2.00 million yen), customs duties (0.721 million yen) and other miscellaneous taxes (0.534 million yen) for a total of 3.265 million yen.

In 1901-02, Japan's main sources of income were land tax (46.56 million yen), income tax (5.618 million yen), saké tax (55.280 million yen), various business taxes (6.263 million yen), customs duties (15.77 million yen) and other miscellaneous taxes (2.233 million yen) for a total of 138.741 million yen.

Note 2. In 1894-95 was the First Sino-Japanese War, over domination of Korea; Japan won. In 1904-05 was Russo-Japanese war; Japan won, gaining complete control of Korea. Address: Japan.

45. Hosie, Alexander. 1901. Manchuria: Its people, resources, and recent history. London: Methuen & Co. xii + 293 p. See p. 180-84, 218-24, 240-45, 252-53. Illust. Index. 23 cm.

• ***Summary:*** The Preface states that Hosie was in charge of the British consulate at Newchwang in Manchuria from Nov. 1894 to July 1897 and from April 1899 to April 1900. In 1900 he made the first careful estimate of soybean production in Manchuria, calculating the amount at 600,000 tons. He noted that during that period most of Manchuria's soybean exports went to southern China, through the ports of Swatow, Amoy, and Canton, where mills were erected for extracting the oil; the cake was used for fertilizing sugar plantations there and in Java. Nearly all of the soybean oil exported from Manchuria was consumed in China.

Note 1. This is the earliest document seen that gives soybean production or area statistics for Manchuria.

Chapter 2, titled "Recent events in Manchuria" (p. 39-72) begins with the Sino-Japanese war of 1894-95 (it began on 3 Aug. 1894 and concerned a dispute over the kingdom of Corea [Korea]), the Japanese invasion of Corea and Manchuria, Japanese victory and the treaty of Shimonoseki (17 April 1895), the complexities of railway construction and financing in Manchuria (from the start of construction of the Manchurian Railway on 28 Aug. 1897), and the expected effects of the new railroads on Manchurian trade. Manchurian trade currently labors under serious disadvantages due largely to climatic conditions, absence of good roads, and the slow and clumsy methods of transport. "I have said that it is practically impossible to sow, reap, and export [soy] beans, the most valuable trade product of the country, in the same year, and that they have to be carried by cart and stored at depots on the waterways to await shipment when the ice breaks up in the following spring. In this way capital is locked up for months and heavy storage charges are incurred" (p. 67). The Russian Central Manchurian Railway should greatly alleviate these problems. Bubonic plague struck Manchuria in 1899 (p. 69).

Note 2. This is the earliest document seen (Jan. 2008) concerning the transportation of soybeans by railway.

Chapter 7, titled "Agriculture and agricultural products" (p. 172-98) contains extensive information on "Beans" (which are actually soybeans). Beans are often used on large farms in the second year of a 4-year crop rotation consisting of millet, beans, rice (or barley or wheat), and millet. Other important cereal crops are Job's tears (*Coix lachryma*, used medicinally and in making sweetmeats) and tall millet (*Kao-liang*).

"A large variety of beans is grown in Manchuria, and, together with their resultants, bean-cake and bean-oil, they constitute by far the most valuable item in the export trade of the three provinces." In April they are sown by hand in drills, and the crop ripens in September. "The Chinese distinguish the beans of commerce by their colours, and they are known as Yellow (Huang Tou), Green (Ch'ing Tou), Black (Hei, or Wu Tou), White (Pai Tou), Red (Hung Tou) and Small Green (Lü Tou). The yellow, green and black are varieties of the soy bean (*Glycine hispida, Moench.*, or *Dolichos soja*, L.)..." The white and red beans are "the ray-fruited dwarf bean (*Phaseolus radiatus*, L.)" [azuki bean]. The Lü Tou (small green bean, *Phaseolus mungo*, L.) [mung bean], "the smallest but one of the most important of the beans of commerce cultivated in Manchuria," is used to make vermicelli and bean sprouts (p. 184).

Concerning soy beans: The "yield per acre, which requires from 16 to 18 lb. of seed, is estimated at from 27 to 39 bushels, with a weight of about 40 lb. per bushel." [Note: A U.S. bushel of soy beans weighs 60 lb.]. "Each variety of soy bean has a number of sub-species. The yellow has three, known respectively as (a) Pai-mei (white eyebrow), from the white scar on the saddle or point of attachment to the pod; (b) Chin-huang, or Chin-yüan (golden yellow or golden round), from the golden colour and more rounded shape of

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the bean; and (c) Hei-chi (black belly), from the dark brown scar on the saddle. All the three sub-species are highly prized for the quantity of oil or fat which they contain, but sub-species (a) and (b) are noted for the quality of the bean-curd (Tou-fu) or legumine obtained from them, as well as for the sprouts which are procured by soaking the beans in water, and which are greatly relished as a vegetable.

"There are two sub-species of the green bean (Ching-Tou)." One has a green epidermis (skin) but is yellow inside, while the other is green on the both the surface and inside.

The black bean (Wu Tou) has three sub-species:–(a) To-wu-tou (large black bean), where the epidermis is black and the inside green. It yields oil or fat, and it is likewise boiled with millet or rice and used for food.

"(b) Hsiao-wu-tou (small black bean), where the bean is somewhat smaller than the sub-species (a), with a black epidermis and yellow inside. It is largely used for horse feed and also yields oil, the refuse being employed for feeding pigs. It is likewise pickled for food.

"(c) Pien-wu-tou (flat black bean), where the epidermis is black and the inside yellow. It is flattened and elliptical in shape, and is mostly used for pickling and for horse feed." (p. 181-82).

A detailed description is then given of Tou-fu, or bean curd, and how it is made (p. 183-84).

"Besides these beans of commerce there are several varieties of garden beans cultivated for food, such as...; the Mao Tou, or hairy bean [probably green vegetable soybeans], with short hairy pods, each containing one to three beans (epidermis white and inside green);... With the exception of the Mao Tou these are usually cooked and eaten with the pods" (p. 186).

"The plants grown in Manchuria whose seeds yield oil are six in number. They are (1) *Dolichos soja,* L., or soy bean," (2) Castor oil plant. (3) *Sesamum orientale,* or sesame. (4) *Perilla ocymoides,* L., or perilla. (5) The cotton plant. (6) *Cannabis sativa,* L., or the true hemp plant. "The names and uses of these [six] oils are the following: (1) *Tou yu* [soy bean oil]–cooking, mixing paints and lighting" [illumination]. All these six "oil-yielding seeds" (with the exception of *sesamum seeds,* which are roasted) are crushed, steamed and subjected to great pressure. A table (p. 188) shows the percentage and value of the oil and cake extracted from these six seeds.

A black-and-white photo shows a Chinese bean mill at Newchwang with a huge granite stone wheel (facing p. 220).

Also discusses: Job's tears or pearl barley (p. 180-81). *Phaseolus radiatus* (the ray-fruited dwarf bean [azuki] which is red or white, p. 182-83). Hemp, a valuable textile plant (p. 186-88, 251). Sesamum seed (p. 188). Ground-nuts [peanuts] (p. 188, 251). The ground nut (*Arachis hypogæa,* L.) is cultivated in Manchuria for food, however not to any great extent. The oil is not extracted from the nuts, as it is in the south of China. Seaweed (p. 258).

A second edition of this work was published in 1904 (London: Methuen & Co., 293 p.; New York: C. Scribner's Sons; see p. 181-87). In the 1910 ed. (published in Boston by J.B. Millet Co.; 320 p.), see p. 75-79. Address: M.A., F.R.G.S., Once Acting British Consul, Tamsui; Now at Aberdeen (Scotland or Hong Kong).

46. Irish, H.C. 1901. Garden beans cultivated as esculents. *Missouri Botanical Garden, Annual Report* 12:81-165. See p. 147-48. [3 soy ref]

• ***Summary:*** The article begins: "In entering upon a study of garden beans in 1898, all procurable varieties catalogued by leading seed firms of America and Europe were grown at the Missouri Botanical Garden during that and the two succeeding years. Habit of growth and other varietal characters were carefully noted in the field each year. These, together with the seed characters, have been brought together and classified. The varieties studied are here grouped under five genera which are distinguished from each other mostly by technical characters as follows:" Phaseolus, Dolichos, Vigna, Glycine, and Vicia. There follow detailed descriptions, keys, synonymy and figures of all the seeds various esculent [edible] varieties, with notes on diseases, culture, and cooking.

Under *Glycine hispida* Maxim. (p. 147-48) is a list of five previous scientific names for the soybean and the sources in which those names were first cited. A photo (plate 44) shows the front and side views of six soybean varieties.

A full-page original illustration (line drawing, plate 46) shows the leaves, pods, and flowers of a soybean plant.

Describes five varieties whose seeds can be obtained from seedsmen Haage & Schmidt: Yellow Soy, Black Soy, Green Soy, Brown Soy, and Etampes Soy. The accession numbers for each of these, and their original foreign names and places or countries of origin are given.

A long footnote states that a number of the domestic U.S. seeds came from the Field Columbian Museum or the Philadelphia Commercial Museum [Pennsylvania]. Most of the imported seeds came from Japan, including at least seven soybean ("Daidzu") varieties: (1) Yellow–10757, "Daidzu," Mujage Agric. School, Japan. (2) Yellow–10758, "Daidzu," Iwate Agric. Institute, Japan. (3) Yellow–10760, "Daidzu," Japan. (4) Black–10752, "Kuro mame," Japan. (5) Black–10753, "Daidzu," Osaka Agric. School, Japan. (6) Green–7743, "Awo-daidzu," Yamacata [sic, Yamagata], Japan. (7) Green–10756, "Daidzu," Iwate Agric. Institute, Japan.

But at least one each came from Russia (10470 Kazan), Siam (10574 "Waa Tai"; 10768 "Lau Lao Peas"), Korea (10771 "Pea Bean"), Floyd County, Georgia (USA; 10932), and Polk County, Georgia (USA; 10937 "Weevil Proof Peas" (Beans)).

47. *Oesterreichische Monatsschrift fuer den Orient:*

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*Hauptteil* (*Vienna*). 1902. Japanische Handelsbeziehungen zu Korea [Japanese trade relations with Korea]. No. 7. July. Page 84, col. 1. [Ger]

• ***Summary:*** Among the articles that Japan imports from Korea are, above all, foods, such as rice, whose import into Korea amounted to 47 million yen in 1900, as well as shoyu (Shoyu) and other beans, grain, and salt meat.

Note: Translated by Philip Isenberg (MM, CT), Long Beach, California. Address: Import-Geschaeft in Prag.

48. Hulbert, Homer B. 1902. The products of Korea. Ed. 2. Seoul, Korea:

• ***Summary:*** Homer Bezaleel Hulbert lived 1863-1949.

Note: In 1905 Homer B. Hulbert (A.M., F.R.G.S.) was editor of *The Korea Review,* published by the Methodist Publishing House, Seoul, Korea. Hulbert's book, *The Products of Korea* is reviewed and quoted in 1902 (in Vol. 2, No. 3), and the section on beans is quoted on pages 109-11, as follows:

"Next in importance to rice come the different kinds of pulse, under which heading we include all the leguminous plants, the bean and pea family. That Korea is well provided with this valuable and nutritious form of food will be seen from the following list of the commonest kinds. Of round beans, or peas, called *kong*, we find the 'horse bean,' often called 'bean-cake bean,' the 'black bean,' the 'green bean,' the 'oil bean,' the 'spotted bean,' or 'checkered bean,' the 'chestnut bean,' the yellow bean,' the 'white- cap bean,' the 'grandfather bean,' the 'brown bean,' the 'red bean.' There are several of the long beans that come under the name *kong*, such as the 'South-river bean,' the 'Japanese bean' and the 'Kwaug-ju bean,' but most of the beans proper belong to the family called *p'al* which includes the 'mixed bean,' a variety which produces various colors of beans in a single pod, the colors being black, red, yellow, white and blue; the 'speckled bean,' the 'court-dress bean,' the 'white bean,' the 'black bean,' and the 'blue bean.'

"Of all these different varieties of pulse the first or 'horse- bean' is by far the most common. It is the bean which forms such a large part of the exports of Korea. It is supposed by Koreans to have originated in north-western China and derives its name from the fact that it is used very largely for fodder [for horses].

"Of all these different varieties the only one that is surely indigenous is the black bean, as it is found no-where else in eastern Asia. Of the rest the origin is doubtful. The horse bean grows in greatest abundance in Kyüng-sang Province and on the island of Quelpart, though of course it is common all over the country. The black bean flourishes best in Chül-la Province; the green bean, oil bean and white cap-bean flourish in Kyüng-geui Province; the yellow bean, in Whaug-ha Province; the South River bean, in Ch'ung Ch'üng Province; the grandfather bean (so called because of its wrinkles) grows anywhere, but not in large quantities; the brown bean and chestnut bean, in Kang-wün Province; the different kinds of *p'at* all grow best in southern Korea.

"Of these different kinds of beans the horse bean alone is largely exported, although a few black beans are also taken to Japan.

"It would be difficult to over-estimate the importance of these different species of pulse to the Korean; for they furnish oily and nitrogenous elements that are wanting in the rice. It is impossible to enumerate the different kinds of food which are prepared from beans for they are almost as numerous as the dishes we make from wheat flour. It will suffice to say that, on an average, the Koran eats about one sixth as much beans as rice. They say that the man who eats beans will be strong, and they attribute it to the oil, which is found in such large proportion especially in the round bans or *kong.*

"The most celebrated story about beans, current among the Koreans, tells about how they saved the life of a noted Chinaman. His brother had usurped the throne of the Wei Kingdom and, as in most oriental countries, the younger brother was an object of suspicion. He was seized and brought before the King, his elder brother. The King said, 'From the place where you are standing step forward seven paces and if during that interval you do not compose a quatrain you will be condemned.' It is easy to believe that this threat was a spur to Pegasus. The young man stepped forward the seven paces and spoke the following lines:

"The bean-husks crackle beneath the kettle

"The beans themselves boil in the kettle;

"Both beans and husks come from the same root.

"It is sad to see products of the same stem antagonize each other.

"The brother on the throne was so struck by the truth of this that he acquitted his younger brother, whose loyalty had always been perfectly sound.

"The price of beans as compared with rice may be said to be one half, as a general rule; though local conditions will vary the rule at times. There are certain kinds of beans which cost nearly as much as rice while the cheapest kinds cost only one fourth as much. The commonest bean, the horse-bean, costs about one third as much as rice.

Note: From the above, it seems clear that what Koreans call "horse-bean" is the same as we call soybean. "Black beans" may be our "black soybeans," and the "oil bean" may also be a type of soy bean, as may several others.

49. Dmitriev, Konstantin. 1903. Ekskursiya dlya izucheniya porta In-kou [A trip for the study of the port of Yingkou]. *Izvestiya Vostochnogo Instituta* (*J. of the Oriental Institute, Vladivostok*) 7:21-146; 8:115-270. [Rus]

• ***Summary:*** As the major export port for Manchurian soybeans and soy products prior to the completion of the Chinese Eastern Railway and the consequent rise of Dairen and Vladivostok to preeminence, Yingkou is the appropriate

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focus for a study of the increasing export trade to Southern China and Japan (especially) in the 1880s. Pages 85-88 list foreign companies and establishments operating in Yingkou in 1902-03.

Of particular interest might be Bandinel and Co. known in Chinese as Jichang (?) which represented such worldwide and regional ocean freighters as Hamburg- American, Lloyds and Mitsui Bussan as well as the oil mill carrying its own name (*Jichangyan*).

Tables (p. 256) give 1901 export statistics for soybeans, cake and oil both by quarters and destinations (Hong Kong, Japan, Chinese ports, Samarang [Semarang, Central Java], and Korea). Address: Manchuria.

50. Roberts, H.F. 1904. The signs of spring. *Industrialist* (*The*) (*Manhattan, Kansas*) 30(22):339-45. March 19.
• ***Summary:*** A charming essay on farming, fraudulent seedsmen, soybeans, etc.

Pages 341-42: "It is amusing to find a number of dealers advertising the soy-bean under the name of the 'Japanese Coffee Berry.' One catalogue says, 'This Japanese bean we find by actual test, when roasted and coarsely ground, tastes so nearly like Brazilian coffee that the difference is hardly perceptible.' Another dealer calls it 'The German Coffee Berry,' and says: 'While in Germany we took the greatest pains to look up our great German Coffee Berry, and to our surprise and pleasure we found it used in almost all hotels and restaurants in Switzerland, Germany, Holland, and France. They use large quantities, mixing it with Rio and other genuine coffee, and we predict that no novelty offered in years will meet with such a hearty reception as the German Coffee Berry. It is the poor man's friend and the rich man's delight; ripening in Wisconsin and the Dakotas in 4½ months."

"But he has still another, that he designates by the grotesque name of 'Japanese Jaavaa Coffee,' that appears to be nothing more than another variety of soja bean. Concerning this wonderful plant he announces: 'Travelers in Corea and Japan and missionaries on duty in these countries have long referred to a berry that was used there as a coffee substitute. Customers have written us regarding this coffee. Some call it Idaho Coffee, the Colorado Coffee, the California Java, and Domestic Coffee Berry. We obtained a supply of seed, have grown it here in the North, and find that in some respects it is superior to our Great German Coffee Berry, and we offer it as a fit companion to this most remarkable novelty in the coffee substitute line. The berry is larger, is different shaped, and the growth of the plant is somewhat different from the German Coffee Berry. It is certainly a healthier drink than genuine coffee, and we are sure that those using same will not regret it.'

"The 'Jaavaa' comes fifty cents higher by the pound than the 'German.' Why not, with such a title? The odd part of the matter is that the self-same dealers in other places in their catalogues offer for considerably less the same article under its legitimate name, the soja or soy-bean."

Note: This is the earliest (and only) document seen (Feb. 2021) that uses the term "Japanese Coffee Berry" to refer to the soy-bean.

51. China, Imperial Maritime Customs. 1904. Decennial reports on the trade, navigation, industries, etc., of the ports open to foreign commerce in China, and on the condition and development of the treaty port provinces, 1892-1901, with maps, diagrams, and plans. 2 vols. Shanghai, China.
• ***Summary:*** Vol. I is "Northern and Yangtze Ports." This is Statistical Series No. 6.

Page 3: Newchwang–"Regarded from the standpoint of volume of commerce, Newchwang became one of the most important of the Treaty ports. The very aspect of the place underwent a rapid change during these last years. The mud village of the 'sixties' [1860s] grew into a rich and populous town, with many fine shops, houses, and temples, and with something of a modern look, due to the tall chimneys of the steam beancake factories. The river was crowded with great steamers, and the chant of the boatmen on the numberless Native craft intermingled with the scream of the steam-launch; the Foreign quarter, once consisting of a few semi-Chinese cottages, exhibited quite a pretentious array of European buildings–the mansion of the merchant, the church, the hospital, the hotel,–with lower evidences of civilisation in the shape of the grog shop; whilst a few miles off, on either side, were the two Railway Settlements, already little towns themselves. Add to these changes the outward and visible signs of the Russian military occupation in the year 1901, the European carriages and horses and the jinrikshas on the roads, as well as the number of Foreigners of all nationalities to be seen in the streets, and it will be realised that the sleepy bean mart of the old days has passed away for ever.

"Economical and political causes both contributed towards this sudden start forward.

"For many years it had been the policy of the Chinese Government to keep Northern Manchuria undeveloped. But in the 'eighties' there were signs of a change of view. The northern frontier was fortified and some encouragement was given to immigrants to take up unoccupied land in the three provinces. They had poured in in large numbers for many years before; for example, in 1876 it was estimated that about 1,000,000 Shantung and Chihli peasants came into Manchuria. But official encouragement no doubt acted as a stimulus; people continued to arrive, more land was brought into cultivation, and more grain produced. The immigrants who survived the hardships of travel and the first few struggling years inevitable to the pioneer, soon found that they were in a far richer land than that of their own provinces. The virgin soil gave forth abundantly; there was a great wealth of agricultural products to be disposed of;

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transport, though difficult and expensive, was not hampered by fiscal oppression; and, by a happy stroke of fortune, at the moment when there was superabundance of supply there arose in Japan a great demand for the staple productions. The discovery of the Japanese market for beans and beancake was the most potent economical factor in the development of trade in Southern Manchuria."

Page 15: Newchwang (plus Manchuria in general)–"Turning to Exports, Appendix No. 6 [p. 42] is a comparative table showing the exportations of Bean products during the past three decades. Comparing the annual average of each decade, we find evidence of a large increase in production, showing how the demand in Japan stimulated supply, though it must be remembered that the table is imperfect as a record of output, as it does not include the junk [a Chinese inland sailing vessel] statistics, which were available for the first time only in 1901. As regards steamer figures, however, it appears, taking average figures, that nearly three times as much Beancake went away in the last decade as in the first; about seven times as much Bean Oil; and more than twice the quantity of Beans. Bean products constitute about 80 per cent. of our total Exports; so the above figures explain much of Newchwang's recent prosperity."

Pages 22-23: Newchwang–"Industries–Bean mills–Since the closing, in 1868, of the first steam bean mill, which proved a complete failure, owing chiefly to Native opposition, the idea of making beancake by machinery was evidently never lost sight of. The southern Chinese merchants, who have nearly the whole beancake trade in their hands, at last realised the advantage to be gained by making beancake and extracting the oil by machinery. In 1896 a steam bean mill, under Foreign* auspices, probably to avoid Chinese official supervision, commenced work.

Note: *Shannon Brown (1981, p. 463) states: In 1896 in Newchwang, Butterfield and Swire (B&S; second only to Jardine, Matheson and Co. among British firms in China) finally opened the steam-powered bean mill that they had been considering since 1893.

"Since then three more have been started–one in the summer of 1899, one in the autumn of 1900, and one in the autumn of 1901. All these mills are fitted with electric light, and though mostly under Foreign protection, they are entirely under Chinese control, the machinery being worked by Chinese without any Foreign aid. The four factories between them are able to turn out 15,600 beancakes per day. It requires about 8 *tou* (240 catties) of beans to make five bean-cakes, which are passed by the Customs at an average of 48 catties each. The process of making the beancake by machinery is similar to the Native method. The beans are crushed between two iron rollers driven by steam; they are then placed on the steaming grate, where steam is supplied from the steam boiler, instead of from a pan with boiling water underneath the grate; the oil is pressed out with jackscrew presses. The beancakes made by machinery when compared with those made by Native method are stronger and drier, also paler in colour and better in appearance generally. The cost of outturn is about 20 per cent. cheaper and the yield of oil about 7 per cent. more. The cost of outturn by machinery being Taels 0.25 and the yield of oil 22 catties per five cakes; whilst the cost by Native method is Taels 0.30 and the yield of oil 20 catties per five cakes."

Page 28: "All goods imported and exported from or to sea pay Duty and Likin. All imports from Chinese ports only pay half, or Coast Trade, Duty, with the exception of [soya] beans, beancake, bean oil, grain, Native cloth, black tea, fine and coarse chinaware, earthenware, and Lo-hai paper, which pay full Duty but on a reduced tariff scale."

Page 42: Appendix No. 6, a table, gives "Export of beancake, bean oil, and beans, with decennial averages, 1872-1901. For each item and each year is given the weight in piculs and the value in Haikwan taels.

Note 1. Between 1872 and 1901 the weight of beancake that passed through Newchwang customs increased 6.5 fold, the weight of bean oil increased 5.4 fold, and the weight of [soy] beans increased 3.8 fold.

Note 2. In Peking Chinese, *hai-kuan* = maritime customs. A tael is a former Chinese monetary unit based on the value of a tael of standard silver.

Page 43: Appendix No. 7, a table, gives "Average prices of [soya] beans, beancake, and bean oil, 1892-1901 (in Haikwan taels per 300 catties for beans, per 10 pieces for beancake, and per 100 catties for bean oil).

Note: A digital search for the terms bean, beans, beancake, or bean oil will show that that are mentioned on at least 45 pages in this remarkable report. Address: Shanghai, China.

52. Hoshi, Hajime. 1904. Handbook of Japan and Japanese exhibits at World's Fair, St. Louis [Missouri]. n.p. 206 p.
• ***Summary:*** The Preface begins: "Since Commodore Perry, of the United States Navy, opened Japan to the world's commerce [in 1854], the foreign trade of the country has developed with wonderful rapidity. This startling rapid development of Japanese trade is due to the readiness and celerity [swiftness] with which the frank and courageous people of the Empire abandoned their old customs and turned their faces toward a new civilization. There was no hesitation, no halting, no looking backward. The entire nation awoke with a start to the realization that it was moving in the wrong direction, and turned about and dropped easily in the march of modern progress. Foreign ideas were adopted, foreign methods were imitated and frequently improved upon, and the closest commercial relations were sought with the United States and the countries of Europe. With this adoption of foreign ideas came a desire for foreign goods. New methods made necessary the use of Western machinery in factories and on farms. Even Western foodstuffs became popular.

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"Japan's total foreign commerce was increased from 26.6 million yen in 1868 to 582.6 million yen in 1902 or 2,219 per cent. The total exports were increased from 15.5 million yen in 1865 to 281.7 million yen in 1903 or 1,811 per cent. During the same period the imports increased from 10.7 million yen in 1865 to 300.9 million yen, or 2,790 per cent."

Baron Masanoho Matsudaira is Vice-President of the Imperial Japanese Commission to the Louisiana Purchase Exposition.

Concerning "Shoyu, or soy.–The shoyu manufactories in 1901 numbered 15,993, producing 68,940,680 gallons annually" (p. 28).

In 1902 Japan's principal exports in million yen were (p. 40-41): Copper, crude and refined–10.3. Rice–6.7. Tea, green (pan fire)–6.2. Tea, green (basket fire)–3.6. Camphor–3.4. Cuttle fish–1.8. Fish oil–1.5. Sake–0.83. Sea weed–0.61. Shoyu (soy)–0.39.

Palace of Agriculture (p. 119). "In the Palace of Agriculture the Japanese Exhibit occupies an area of 8,667 square feet." "Tea, one of the leading products of Japan, forms the most important exhibit of the space." "There is a large exhibit of shoyu or soy, a famous Japanese sauce made from beans. This sauce is in as common use in Japan as salt and pepper are in the United States. It is used as a relish on the table, also for cooking and salad dressing. Soy is wholesome and exceedingly cheap, which qualities, combined with its splendid flavor, make it a most desirable article of diet.

"Sake, the national drink, is also well represented in the exhibit."

The names of the members of the Japanese Commission and of the commissioners now in the United States are given on pages 112-13. he names of the members of the Japan Exhibit Association are given on page 113. Note: Nowhere is this long and detailed book is the name of Jokichi Takamine mentioned.

The Japanese Garden: Area, 150,000 square feet is described in detail (p. 114-15), as are each of the buildings in it. These include the Japanese Pavilion (the building materials for it "were brought from Japan. It was built entirely by native carpenters after the style of Daimyo's garden–Goten, of about 400 years ago. The architectural style of the building is Heike. The artistically curved roofs, majestically projecting one upon the other..."). Note: This was the building that was renamed Sho-Foo-Den / Sho-Fu-Den by Jokichi Takamine. Other buildings are the Observation Cottage and (standing by the lake) and a reproduction of the Kinkaku Temple in Kyoto (*Kinkaku-ji*, the Temple of the Golden Pavilion).

"The total space occupied by Japan [p. 115] covers 282,455 square feet. he area is three times as great as that covered by Japan at the Paris Exposition in 1900, and three times as large as Chicago [Illinois] in 1893."

"Soy brewers and trade marks" (p. 161, full page, with the trade mark of each shown large and clear): Kikko Sakai: Brewer K. Toyoda, Sakai, Osaka, Japan. Yamakawa-roku: Brewer R. Wakaye, Osaka, Japan. Kikko Mata: Brewer M. Kawamori, Sakai, Osaka, Japan. Mitsu Uroka: Brewer G. Tagashima, Kaidzuka, Idzumi, Japan. Uyeki: Brewer K. Uyeki, Osaka, Japan. Yama-Ju: Brewer M. Yamamoto, Osaka, Japan. Maruichi Jo: Brewer S. Masuda, Osaka, Japan. Maru Matsu: Brewer Y. Motsutani, Osaka, Japan. Hon Ichi: Brewer K. Yehara, Osaka, Japan. Sun: Brewer K. Shindo, Osaka, Japan.

Across the bottom of this page: "The virtue of the sauce and direction for use. The Japanese Soy with the Trade Marks is brewed from the very best Japanese [soy] bean, wheat and salt. The Soy is of dark brown color and is specially adapted for every kind of boiled, baked and fried fish; for chops, steaks and cutlets and cold meats; also for cooking of vegetables. The article possesses a particular taste and flavor and advances [enhances] the digestion.

"The Japanese Soy with these Trade Marks may be stored for a long period and is guaranteed never to turn bad.

"The article is sold for 6 to 9.60 yen per case of 4 *go* bottles, F.O.B. Osaka. An order to any of the brewers will receive prompt attention."

Page 166: 1/3 page display ad for Ueki Shoyu, Osaka. Page 180: ½ page display ad for "Best shoyu. Ota Shoyu Brewing Company, (912 Minamiota Machi, Yokohama, Japan) was established in 1850..." Its shoyu is known as "Fuji Shoyu." "Second medal in 1859 and first Silver Medal in 1903. Exported to Germany, America, Hawaii, Corea, Shanghai, Hong Kong, England, Canada, Australia, India, Singapore, etc., through G. Brandel & Co., No. 41 Yamashita Cho, Yokohama."

Page 189: Full-page ad for "Shoyu, Japanese sauce. Izumiyama Shoyu Brewing Co., Hachinohe Mutsu, Japan. Its two trade marks are shown.

Page 193: ½ page display ad for "Maru Sen Shoyu. Awarded medals and shohai [trophies] at the World's Exhibition, Paris, 1903, and others. Marusen Shoyu is brewed by Sutejiro Hosono, Kinatomura, Kitakanbara, Niigata ken, Japan.

Note: There was no World Exhibition or World's Fair or any such international exhibition in Paris in 1903, There was an *Exposition Universelle* in 1900 in Paris, and another in 1925.

Page 197: Full-page ad for Kameya Shoyu & Company, Nakaidzumi cho, Shidzuoka ken [Shizuoka-ken], Japan. A large photo shows Sokichi Tsukichi, proprietor, standing in a Western-style room with one hand on a chair. This shoyu is exported to the United States, Hawaii, Europe, China, and Corea [Korea].

53. *USDA Bureau of Plant Industry, Inventory.* 1905. Seeds and plants imported during the period from September, 1900, to December, 1903. Nos. 5501 to 9896. Seed and plant

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introduction and distribution. No. 10. 333 p. Feb. 8. Also titled USDA Bureau of Plant Industry, Bulletin No. 66.

• ***Summary:*** Soy bean introductions: Glycine hispida.

5764-5766. "From Washington, D.C. Three varieties of soy beans from Japan, grown during the season of 1900 on the Potomac Flats.

"5764. Common. (S.P.I. No. 4912.)

"5765. Best White. (S.P.I. No. 4913.)

"5766. Best Green. (S.P.I. No. 4914.)"

6312/6314/6326/6333 -6336. "From the Tokyo Seed and Plant Company, Tokyo, Japan. Received April 20, 1901.

"6312. *Black Flat.*

"6314. *Yoshioka.*

"6326. *Rokugatsu.*

"6333. *Gosha.*

"6334. *Black Round.*

"6335. *Green Medium.*

"6336. *Bakaziro"* [*Bakajiro*].

6379. "Grown on the Potomac Flats, District of Columbia, under the direction of W.R. Beattie, from No. 3870."

6386/6396/6397/6414/6416. "From Pyeng Yang, Korea. A collection of seeds of economic plants which are cultivated in Korea. Presented by Rev. W.M. Baird. Received May 3. 1901.

"6386. *Black.*

"6396. *White.*

"6397.

"6414. 'Plant in May.' (Baird.)

"6416. *Black.*" Note:

Note 1. This is the earliest document seen (March 2021) concerning soybeans in Korea, or the cultivation of soybeans in Korea.

6556/6558-6561. "From China. Received through Dr. G.D. Brill, May 17, 1901. A collection of seeds and plants made during an extended trip through China in 1900. The notes regarding the various numbers are copied from letters written during this period, no separate descriptive list of the various introductions having been furnished. Doctor Brill's numbers are given.

"6556. (No. 57.) 'Much used for bean curd and oil all over central China. Probably as many of these are grown as all the other varieties together.' (*Brill.*)

"6558. From Hankow. (No. 59.) 'Used for bean curd and oil. Considered better than No. 6556.' (*Brill.*)

"6559. From beyond Chiu Niu. (No. 60.) 'Planted between the rows of rice and ripening late in the fall, after the rice is harvested. Used the same as No. 6556, only quality poorer. Will grow on very wet land.' (*Brill.*)

"6560. From beyond Chiu Niu. (No. 61.) 'Planted and used the same as No. 6559. Planted in July or August.' (*Brill.*)

"6561. From Hankow. (No. 62.) 'A black bean, used for same purposes as Nos. 6559 and 6560, but of better quality. Not planted with other crops.' (*Brill.*)"

8422-8424. "From Yokohama, Japan. Received through Dr. S.A. Knapp, February 24, 1902.

"8422. *Ita Name.* Early.

"8423. *Ita Name.* Medium.

"8424. *Ita Name.* Late." Note 2. This is the earliest document seen (March 2021) that contains the words/name "Ita Name," which make no sense in Japanese. Perhaps "Eda Mamé" was intended.

8489-8497. "From Washington, D.C. Received March 10, 1902. A collection of seeds grown on the Potomac Flats by Mr. W.R. Beattie from seeds furnished by the Office of Seed and Plant Introduction.

"8489. Grown from No. 6314.

"8490. Grown from No. 6333.

"8491. Grown from No. 6334.

"8492. Grown from No. 6386.

"8493. Grown from No. 6396.

"8494. Grown from No. 6336.

"8495. Grown from No. 6397.

"8496. Grown from No. 6416.

"8497. Grown from No. 6312."

8584/8586. "From Chin-kiang, China. Received through Dr. S.A. Knapp from Rev. Dr. S.P. Barchet, Shanghai, China, April 15, 1902.

"8584. 'A very prolific, nearly white variety used for making oil and also for food. It is sometimes ground into flour and used for making cakes.' (*Knapp.*)

"8586. 'A very oily variety, used chiefly for fattening purposes. Planted in July or August.' (*Knapp.*)"

8900. "From Anjo, Japan. Received through Messrs. Lathrop and Fairchild (No. 963, June 29, 1902), July 24, 1902. 'Twenty-six numbered seeds of a giant soy bean presented to the Department by Mr. K. Obata, director of the Tokai branch agricultural experiment station at Anjo, Japan, on condition that should any of the seeds prove to have inherited the characteristics of its female parent he is to have returned to him a fair quantity of the beans which it produces. All the beans have been numbered, and it is desired especially that a record of each be kept for information. This "most exceptional sport" ["an individual exhibiting a sudden deviation from type beyond the normal limits of individual variation usually as a result of mutation, esp. of somatic tissue"] from which these beans are taken measured 12½ feet in length and had a stem 1 inch in diameter at the base. It yielded about one-fifth of a gallon of beans, while ordinary plants, I am assured by Mr. Obata, give from 50 to 60 seeds only. Its root system is well developed, but whether unusual it is impossible to say, as it was dug before Mr. Obata saw it. The history of this "most remarkable sport" is as follows: Mr. J. Miyazaki, a descendant of a Samurai and now a second-hand clothier in the village of Okasaki [Okazaki?], found in his small back yard a soy bean which neither he nor his wife had planted

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purposely, but over which they quarreled, the wife wishing to pull it up because it grew to such unusual proportions and spread over the whole yard. Mr. Miyazaki, however, found in this abnormal plant something to interest him, and when the local district fair was held in Mukada in October he dug up the plant and exhibited it there, but he unfortunately and thoughtlessly ate up most of the beans. Mr. Obata, of the experiment station at Anjo, saw the plant at the fair, visited Mr. Miyazaki's place, and rescued the remaining handful of seed. He got samples of the soil where the plant grew and has sown about 20 seeds in this soil at the experiment station. I have seen and photographed this remarkable sport and think it worth of the most careful attention.' (*Fairchild.*)"

9344. "From Chiu-hua, China. Secured by Dr. S.P. Barchet, of the United States consulate, Shanghai, China, at the request of Dr. S.A. Knapp. Received January 22, 1903. *Chiu-hua.* 'In case of future reference to the bean, if you call this the *Chiu-hua* bean I shall know what is meant, in the absence of a botanical name, as I have not seen this bean anywhere else. It is sown broadcast in paddy fields before the rice is harvested. The moist ground favors the sprouting, and the standing grain shields the sprouting plant from the sun. By the time the rice is harvested the beans have taken firm roots and require no further care. Horses and cattle are very fond of them green or in the ripe state. The bean also makes a good food for man. This bean I think well worth a trial in the Southern States.' (*Barchet.*)"

9407-9418. "A collection of soy beans grown by Mr. W.R. Beattie on the experimental grounds on the Potomac Flats, from introduced seed.

"9407. Grown in 1902 from S.P.I. No. 4912.
"9408. Grown in 1902 from S.P.I. No. 4913.
"9409. Grown in 1902 from S.P.I. No. 4914.
"9410. Grown in 1901 and 1902 from S.P.I. No. 6312.
"9411. Grown in 1901 and 1902 from S.P.I. No. 6333.
"9412. Grown in 1901 and 1902 from S.P.I. No. 6334.
"9413. Grown in 1901 and 1902 from S.P.I. No. 6336.
"9414. Grown in 1901 and 1902 from S.P.I. No. 6386.
"9415. Grown in 1901 and 1902 from S.P.I. No. 6396.
"9416. Grown in 1901 and 1902 from S.P.I. No. 6397.
"9417. Grown in 1901 and 1902 from S.P.I. No. 6414.
"9418. Grown in 1901 and 1902 from S.P.I. No. 6416."

Note 3. This is the earliest document seen (March 2021) that clearly refers to the cultivation of soybeans in Washington, DC (on the Potomac Flats). This document contains the earliest clear date seen for the cultivation of soybeans in Washington, DC (1900).

Note 4. This is the earliest document seen (March 2021) that mentions the Potomac Flats, an experimental garden owned and used by the USDA in Washington, DC, before it purchased the Arlington Farm in 1900. Even before that, starting in 1865, there was an experimental garden around the original USDA building on The Mall. The Potomac Flats were acquired by the USDA in 1899. They were located in Washington, DC, on the banks of the Potomac River, probably in what is now Potomac Park.

Note 5. This is the earliest document seen (March 2021) concerning David Fairchild and soybeans. Address: Washington, DC.

54. Uyeno, K. 1905. Kankoku kôji no kenkyû hôkoku, dai ikkai [Report of examination of Corean (Korean) koji, No. I.]. *Yakugaku Zasshi* (*J. of the Pharmaceutical Society of Japan*) No. 277. p. 203-12. March. [Jap; eng]
• ***Summary:*** Investigation of its composition, and its saccharifying action, power, and products. It is considered identical to the "Fonkio" and "Weekio" of northern China. Like Fonkio, it contains 2 varieties of Mucor, plus one other variety closely resembling these two. Address: Yakugakushi, Japan.

55. Southern Prolific: New U.S. domestic soybean variety. 1905. Seed color: Yellow (straw), hilum light brown.
• ***Summary:*** Sources: Tabor, Paul. 1923. "Soy beans for Georgia." *Georgia State College of Agriculture, Extension Circular* No. 90. 4 p. Feb. See p. 1-3.

Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 10. "Introduced under S.P.I. No. 37250 from Seoul, Chosen [Korea], in 1914... Seeds straw yellow with light brown hilum, about 2,710 to the pound; germ yellow; oil 18.1%." Address: USA.

56. Korentschewski, W.; Zimmermann, A. 1905. Sanitaer-hygienische Untersuchung des chinesischen Bohnenoeles [A sanitary-hygienic investigation of Chinese soybean oil]. *Chemiker-Zeitung* 29(58):777-78. July 22. [Ger]
• ***Summary:*** Some 20 different species of these beans are sold under the name 'doutsa,' some being used as human food, others as fodder for cattle, and others again for the extraction of the oil. A kind of vermicelli is also prepared from certain species. The oil is expressed by means of primitive plants in the Chinese factories and exported in large quantities to Japan and Korea. The method of extraction consists in first crushing the beans into caked masses by means of mill stones, then heating them on stone slabs until the appearance of vapors, and finally expressing them in an iron receptacle. As first obtained the oil is turbid, but after some time becomes clear, the deposit consisting of sand particles and vegetable fibres. Only the clear oil is exported, but the turbid oil is sold locally. It has a faint odor recalling that of Chinese wood (tung) oil, is bland to the taste, and of a dark brown colour. Four commercial samples examined by the authors (one being obtained direct from the factory in Kharbin [Harbin]) gave the following results:–Water, 0.3 to 1.80 per cent.; specific gravity at 15ºC, 0.9264 to 0.9287; solidification point, -14.6º to -15.3ºC; saponification value, 207.9 to 212.6; ester value, 203.9 to

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207.7; insoluble fatty acids, 93.6 to 94.28 per cent.; iodine value (Hübl), 114.8 to 137.2; solidification point of fatty acids, 16ºC to 17.3ºC; melting point of fatty acids, 20ºC to 21ºC; Maumené test, 102º to 116ºC; and acid value 1.86 to 15.46. It was concluded that the oil contained a large proportion of oleïn. Practical tests showed that the oil was readily absorbed by the system and possessed a high food value.

Note: This is the earliest document seen (March 2000) that mentions tung oil. Address: 1. Dr.; 2. Mag. pharm.; Both: Aus dem chemisch-bakteriologischen Laboratorium des I. Militaerhospitals in Charbin (Chemical-Bacteriological Lab., I. Military Hospital, Harbin, Manchuria).

57. Korentschewski, W.; Zimmermann, A. 1905. Sanitaer-hygienische Untersuchung des chinesischen Bohnenoeles [A sanitary-hygienic investigation of Chinese soybean oil (Abstract)]. *Chemische Revue ueber die Fett- und Harz-Industrie* (*Hamburg, Germany*) 12(8):190-91. Aug. [1 ref. Ger]

• ***Summary:*** A German-language summary of a German-language article with the same authors and title published in 1905 in *Chemiker-Zeitung* 29(58):777-78. July 22. Address: 1. Dr.; 2. Mag. pharm.; Both: Aus dem chemisch-bakteriologischen Laboratorium des I. Militaerhospitals in Charbin (Chemical-Bacteriological Lab., I. Military Hospital, Harbin, Manchuria).

58. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1905. Trade of Korea. The Russian-Japanese War was helpful. No. 2359. p. 5-6. Sept. 13.

• ***Summary:*** Now that the war in the East is over, Korea will come in for a great deal of consideration and discussion, commercial, financial, and industrial. The year 1904 was one of the best in Korea's history. The war helped rather than hindered trade, the commercial highways being held open. Cereals yielded large crops and sold high, both Japan and Russia buying. Labor was abundantly supplied with work at good wages. Much of this had to do with the movement of troops. This brought in millions of dollars of unexpected and unusual money. It is interesting to note that the Koreans never had so much money to spend and that they spent it freely; hence any improvement in Korea or in the East is bound to be followed by advantages to foreign trade.

"One disadvantage, due doubtless to the war, and partly to the increased wages, was the increased cost of living. This advanced 50 per cent, in some cases fully 100 per cent.

"Railways were built in many parts at about $50,000 a mile, fully $8,000,000 being expended thereon. The gross value of the foreign trade was a little more than $26,617,487, of which $13,701,295 was for imports from abroad. The exports reached $3,466,752."

"Influence of Japan: A large part of the banking business is in the hands of Japanese and is tending more and more toward complete absorption by them. Everywhere progress and prosperity are marching hand in hand. Natural hindrances to trade are being overcome by scientific methods worthy of the West or by expedients worthy of the East. For example, the shallowness of the river at Chemulpo long hindered the arrival of large vessels." The Japanese are deepening it at considerable cost.

"The latest population figures give Korea 6,000,000 souls, including Ham Keung, a province in the north, under Russia before the war. Seoul, the capital, has 200,000 and is constantly increasing. There are 50,000 Japanese in the Kingdom."

The railway company controlling traffic between Seoul and Chemulpo increased freight charges significantly on July 1, with no advanced warning. "The Chinese and Japanese merchants of Seoul and Chemulpo were the principal sufferers. The latter, through their chambers of commerce, at once lodged a protest with the railway company."

"Opposition service organized: In opposition to the railroad these merchants have now organized a service from Chemulpo up the Han River to Seoul... For some years past there have been heavy annual shipments of [soya] beans and pease from Yongsan to Chemulpo, and the steamers running under the new arrangement will therefore be certain of a reasonable amount of return cargo."

59. Bureau of Plant Industry. 1905-1929. Records of the Division of Plant Exploration (Archival collection). Washington, DC. Undated. 28 cm. *

• ***Summary:*** National Archives and Records Service (Washington, DC)–Record Group 54: Records of the Bureau of Plant Industry, Records of the Division of Plant Exploration. Project studies:

Vol. 41: "China Trip," Records of P.H. Dorsett.

Vol. 76: "Foreign Exploration–Closed projects, 1905-1915."

Vol. 77: "Northwestern China Exploration, 1912-1915."

Vols. 105-109: "Letters of Frank N. Meyer."

Vol. 110: "Published descriptions of seeds and plants collected in North and Central China, Manchuria, North Korea, and East Siberia by Mr. Frank N. Meyer from September 1, 1905, to June 12, 1908."

Vol. 149: "Explorations and itineraries, 1897-1932."

Reports, notes, and other records of Frank N. Meyer, Boxes 3-18. In Box 17 is most of the information about Meyer's death, including the key report that Sokobin filed on 12 June 1918.

Explorers, maps and routes, Box 32.

Another way of looking at this material is through the website: http:// arcweb.archives.gov/ arc/action/ ExternalIdSearch?id=383. Search on "exploration" within the above group resulted in the following selected records/ files: (1) Historical Files, compiled 1903–1939. ARC

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Identifier 2133190 / MLR Number NC 135 135H. (2) General Correspondence, compiled 1900–1940. ARC Identifier 2133187 / MLR Number NC 135 135F. (3) Progress Reports, compiled 1903–1936. ARC Identifier 1676968 / MLR Number NC135 26B. (4) Photographs of the Office of Foreign Seed and Plant Introduction and Successor Offices, compiled ca. 1900–ca. 1953. ARC Identifier 516515 / Local Identifier 54-FS. (5) Project Studies Submitted by Foreign Agricultural Specialists, compiled 1902–1932. ARC Identifier 2133249 / MLR Number NC 135 135K. (6) Subject File for Materials Relating to Soybeans, Collected by the Soybean Investigations Office, compiled 1911–1967. ARC Identifier 542099 / Local Identifier 310-SOY. Photographs and other Graphic Materials and Textual Records from the Department of Agriculture. Agricultural Research Service.

Note: The last three look potentially interesting. Address: USDA. Phone: 313-764-3482.

60. The Russo-Japanese War (Feb. 1904-1905), the Treaty of Portsmouth (5 Sept. 1905), and the Japanese move into Korea (Important event). 1905.

• ***Summary:*** "The event that really won for Japan full status as a world power and equality with the nations of the West was its victory over Russia, the biggest, even if not one of the more advanced, of the Western powers. Russia in 1896 had obtained from Peking the right to build the Chinese Eastern Railway across Manchuria to its port of Vladivostok on the Sea of Japan, thus shortening the Trans-Siberian Railway, the rail link it had started in 1891 to construct across Siberia to the Pacific. When Russia obtained the lease of the Kwantung Peninsula in 1898, it also got the right to connect this line by a southward extension, the South Manchurian Railway, to the ports of the peninsula, Port Arthur and Dairen (Dalian in Chinese). These railway concessions gave Russia considerable control over Manchuria, and the Boxer crisis allowed it to overrun the whole area militarily. Its efforts to take Manchuria over completely, however, ended in diplomatic frustration, and it agreed to a phased withdrawal of its forces.

"Mutual suspicion and enmity steadily mounted between Japan and Russia... Japan broke off relations on February 6, 1904, started hostilities on February 8 with a night torpedo-boat attack on the Russian fleet in Port Arthur, and only two days later declared war."

In the 5-month war that followed, the Japanese navy destroyed its Russian counterpart to win the final victory. The mighty Russians were shocked by their overwhelming defeat at the hands of a little-known Madame Butterfly nation. "Both countries were exhausted by war, and the Russians were plagued at home by revolution. They both readily accepted President Theodore Roosevelt's diplomatic initiative and met to discuss peace terms in Portsmouth, New Hampshire.

"The Treaty of Portsmouth, signed on September 5, 1905, recognized Japan's 'paramount interest' in Korea, restored at least in theory China's sovereignty and administration in Manchuria, and gave Japan the Russian lease on the Kwantung Peninsula and the Russian-built South Manchurian Railway as far north as Changchun. The Japanese were eager to extract an indemnity from the Russians, but the latter were adamant on this point, and eventually Japan settled for the southern half of Sakhalin [Island] instead [below the 50th parallel north, which Japan called Karafuto]. It was the failure to win an indemnity that the Japanese public found so disappointing.

"Japan was now free of all foreign competitors in Korea." In Nov. 1905 Japan "secured a convention making Korea a Japanese protectorate and ending its diplomatic contact with other powers." In 1907 Japan extended control over the Korean government and disbanded the Korean army. "In August 1910 Japan quietly annexed Korea." Called Chôsen, "Korea was governed for Japan's strategic and economic purposes by Japanese officials under a military governor-general."

In its victory over Russia, Japan became the first non-white or non-Western nation to defeat a white or Western nation. In a mere 50 years Japan had transformed itself from an isolated underdeveloped country with no industrial base into a modern nation, a major military and industrial power.

Japan was now free of all competitors in Korea, and in November 1905 secured a convention making Korea a Japanese protectorate and ending its diplomatic contact with other powers. In 1907 the Japanese extended control over the Korean government, arranged that Japanese could serve as Korean officials, and disbanded the Korean army. The widespread rioting that greeted these moved was severely suppressed. In Aug. 1910 Japan quietly annexed Korea. "There was no protest from the powers, which generally approved what was judged at the time as an inevitable step in world progress. The Japanese called Korea Chôsen and governed it for their own strategic and military purposes by Japanese officials under a military governor-general.

With the annexation of Korea, Japan also became a major imperialist/colonial power, with important colonies in Korea and Taiwan, and predominant rights in South Manchuria. It entered World War I as Britain's ally and, although playing only a minimal military role, it picked up the German colonial possessions in East Asia and the Pacific, including Kiaochow Bay and the port of Tsingtao on the south coast of Shantung. "Japan sat at the Versailles Peace Conference as one of the victorious Five Great Powers–the only non-Western nation to be accepted as a full equal by the West. Thus the Meiji leaders had succeeded far beyond their fondest dreams."

Source: Fairbank, Reischauer, and Craig. 1973. *East Asia: Tradition and Transformation.* p. 555-57.

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61. Oshima, Kintaro. 1905. A digest of Japanese investigations on the nutrition of man: Miso (Document part). *USDA Office of Experiment Stations, Bulletin* No. 159. 224 p. See p. 28-30. [1 ref. Eng]

• ***Summary:*** "Miso: This material is prepared from a mixture of soy beans, barley [note that he does not say rice], common salt, and water by a slow process of fermentation. Although it is highly probably that the process of preparing miso was first introduced either from China or from Korea, the exact date of the introduction is not known. Mention is made of miso in a Japanese record of the latter part of the ninth century.

"In the extent to which it is used, miso surpasses all other preparations from soy bean. Among the rural population and wage-earners in general it forms an indispensable part of the daily menu; among the people living in cities, however, it is used somewhat less extensively. Its chief use is in making soup and in cooking vegetables. For this latter purpose, however, miso and shoyu are to a certain extent replaceable, and generally when more shoyu is used the amount of miso consumed is smaller.

"Since it is the general custom for the people in rural districts to prepare miso for their own use, no accurate statistics regarding the total quantity manufactured and consumed are available. It has been estimated that the daily consumption of miso per person in the rural districts is about 40 grams. In the statistics of 25 dietary studies described beyond (p. 131), with people living elsewhere than in the country, the average daily amount was 43 grams, but the range was from 13 to 100 grams.

"The production of miso depends primarily on the action of a fermenting agent known as koji. The process of preparing the koji used for miso is similar to that for sake-koji (see p. 36), except that for the latter only rice is used, whereas miso-koji may be made from either rice or barley. The object of preparing miso-koji is to propagate certain forms of fungi, of which *Aspergillus oryzae* is the principal one. The koji also contains diastatic and inverting ferments which change the carbohydrates of the raw materials into maltose, glucose, etc., and a proteolytic ferment which acts upon the nitrogenous bodies, converting them into simpler and more soluble materials. The yeast which causes alcoholic fermentation is also regularly present. Koji is dried and finely powdered before it is used.

"To prepare miso the soy beans must first be steamed, and upon this process depends largely the quality and especially the color of the final product. The steaming is continued usually twenty-five hours, at first with strong heat but later very gently. When the beans are properly steamed and cooked, they are rubbed into a thick, uniform paste, to which are added proper amounts of powdered koji, salt, and water. The whole mass is then well mixed and stored in a special vat. The temperature of the mixture is kept at about 15º to 20º C., though as the fermentation advances it often rises to 25º C.

"Different kinds of miso are distinguished by color, taste, and keeping properties, and are prepared by somewhat different processes, the differences consisting chiefly in the use of rice or barley koji, the amount of common salt added, a longer or shorter fermentation, and the temperature at which it takes place. Two of the most important kinds of miso are the following:

"*White miso.*–This material is white in color, contains a small amount of common salt, is fermented with rice-koji for three to four days, and may be preserved about ten days.

"*Red or sendai miso.*–This material is red in color, contains a relatively large amount of common salt, is fermented usually with barley-koji for one and one-half to two years, and may be preserved for several years."

A table shows the composition of white miso and red miso. Note: The source of this table is cited incorrectly. Address: Director, Hokkaido Agric. Exp. Station, Sapporo, Japan.

62. Takenob, Y. 1905. Japan Year Book. Tokyo: Japan Year Book Office. 430 p. See p. 68, 104, 123, 126, 130, 348, 375, 382. [Eng]

• ***Summary:*** This book gives statistics for the Japanese empire: Japan Proper, Korea, and Formosa. At the beginning of the book, before the title page, are many pages of large advertisements on unnumbered pages. Likewise at the back of the book. For example, a full-page ad for Mitsui Bussan Kaisha (Mitsui & Co. in Europe & America) states that the company was established in 1876, and that they are "General Commission Merchants" for the import of [soy] beans, bean cakes, cotton,..."

The population of Japan Proper (p. 14) was:

1873–33.3 million.
1883–37.0 million.
1898–43.7 million.
1903–46.7 million.

A table of "Weights, measures and moneys" is on the page after the Table of Contents.

Page 68. In chapter VII on "Finances" is a table titled "Budget for April 1905 to March 1906. Revenue." "Tax on Soy" [sauce] brought in revenue of an estimated 4.541 million yen in 1904 and 5.149 million yen in 1905.

Page 104. In the chapter on "Agriculture," a table shows production of beans, including Soja beans and red [azuki] beans, 1895-1903 (in 1,000 koku). Production of soja beans increased from:

2.94 million *koku* in 1895
3.16 million *koku* in 1896
2.99 million *koku* in 1897
3.10 million *koku* in 1898
3.10 million *koku* in 1899
3.41 million *koku* in 1900
3.10 million *koku* in 1899

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3.56 million *koku* in 1899
3.10 million *koku* in 1901
3.13 million *koku* in 1902
3.64 million *koku* in 1903.

Page 123. In the chapter on "Forestry and fishery" is a section titled "fish fertilizers" which states: "The demand of fish-fertilizers has lately become quite marked, so active indeed that the supply can hardly keep pace with it. A large quantity of bean-cakes from North-China [Manchuria] is therefore arriving in Japan to make good this deficit. The following table shows the average amount of our fish-fertilizers made at home and of Chinese bean-cakes imported, during the recent ten years. The average for the last 10 years of "Homemade fish fertilizers" is 38.891 million kwan [kan] valued at 7.592 million yen, compared with "Chinese bean-cakes" weighing 20.282 million kwan valued at 2.524 million yen. Note: The soybean cakes are much less expensive per unit weight than the fish fertilizers.

Page 126, 130. The chapter on "Manufacturing industry" states (p. 126) that the manufacture of sake and soy [sauce] were among the principal forms of manufacturing in Japan before the country was opened to foreign commerce. A table titled "Quantity and value of chief manufactured goods" (p. 130) gives the amount of soy [sauce] made each year from 1894 to 1902. The quantity increased from:

1.329 million *koku* in 1894
1.409 million *koku* in 1895
1.505 million *koku* in 1896
1.528 million *koku* in 1897
1.532 million *koku* in 1898
1.838 million *koku* in 1899
1.557 million *koku* in 1900
1.717 million *koku* in 1901
1.762 million *koku* in 1902

Page 348. The chapter on "War finance" explains how Japan is financing its present Russo-Japanese war. One way is through extraordinary special taxes, including an addition 1.13 million yen tax on soy [sauce]. is a "Budget for April 1905 to March 1906." The two main sources of tax revenue are Land tax 63.6 million yen, and Tax on liquors 60.5 million yen. Tax on Soy is only 5.1 million yen.

In the Appendix, page 13 (under Group VII) gives the import tariff list for "Beans, soja" and page 20 (under Group X) gives the import tariff for "Oil, bean." There is both a "General tariff" and a "Extraordinary special tax."

Page 368: A table gives statistics for "Beans and peas" exported from Korea, but none for soybeans alone. Address: Tsukiji, Tokyo, Japan.

63. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1906. Railroads in Korea. New lines bisecting the empire–American materials and methods. No. 2513. p. 1-5. March 16.

• ***Summary:*** "One of the great factors in opening up Korea to trade is the building of a system of railroads through the hermit nation by the Japanese. Vice-Consul-General Straight, of Seoul, supplies a complete description of these, of which the following is a condensation:

"The Seoul-Wiju Railroad was opened to the public for general traffic on December 1, 1905. With a few breaks at the larger streams, trains were running through from New Wiju, the northern, to Yongsan, the southern, terminus as early as April. The Japanese, in thirteen months, had constructed 310 miles of railway. Immediately after the declaration of war they had commenced their work, using for some distance the embankments and culverts which the Franco-Korean Company, after several years of sporadic effort, had constructed near Seoul."

"Resources in North Korea: The country tapped by the Seoul-Wiju Railroad is rich in rice, [soya] beans, millet, and barley, and is capable of much greater production than at present."

Page 5: "Japanese are now established in large numbers at all the important cities along the railroad and at the small places as well, and the number of immigrants is constantly increasing. The Koreans themselves are more prosperous than ever before, owing to the large expenditures by the Japanese forces, and it is probable that the natives will be better governed in the future and for the first time in many years able to profit by the results of their own industry. There are indications that the next few years will witness an unparalleled development and a transformation in the commercial conditions that have prevailed in the past."

64. Kaempfer, Engelbert. 1906. The history of Japan, together with a description of the Kingdom of Siam 1690-1692 (translated by J.G. Scheuchzer from the original edition of April 1727. 3 vols.). Glasgow, Scotland: James MacLehose and Sons. Vol. 1, xc + 334 p. Reprinted 1971 New York, NY: AMS Press Inc.

• ***Summary:*** Please see the original 1727 edition of this work for a long quote on soybeans, miso, shoyu, and azuki beans; it appears in this 1906 edition in Vol. 1, p. 187-88. Many of Dr. Kaempfer's botanical specimens may still be seen in the Natural History Museum, South Kensington. The front matter in this book is very interesting: The frontispiece shows a full-page portrait (illustration, painting) of Sir Hans Sloane. List of illustrations. Publisher's note. Biographical note of the Scheucher family, by Sir Archibald Geikie. To the King, by J.G. Scheucher. The names of the subscribers [alphabetical]. The author's preface. The life of the author, by the translator. An introduction, by the translator.

In the author's preface Kaempfer explains (p. xxix-xxxiii) that the Swedish Embassy, where he was secretary, was dismissed by the Persian Court. Since his native country Germany was at war, he decided to travel rather than to return home. He joined the Dutch-East India Company and

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went to Japan, where most visitors find it very difficult to obtain any information about the country, since all Japanese are obliged by solemn oath not to discourse with foreigners. But Kaempfer developed a rare friendship with his interpreters and the Japanese officers on his island (Deshima in Nagasaki Bay). He assisted them in the fields of medicine, astronomy, and mathematics, and in turn was able to learn about their country. Kaempfer was especially fortunate in gaining "the assistance of a discreet young man, by whose means I was richly supplied with whatever notice I wanted concerning, the affairs of Japan. He was about twenty-four years of age, well vers'd in the Chinese and Japanese languages, and very desirous of improving himself. Upon my arrival, he was appointed to wait on me, as my servant, and at the same time to be by me instructed in Physick and Surgery" (p. xxxii). The chief of the island allowed him "to continue in my service during the whole time of my abode in the Country, which was two years, and to attend me in our two journeys to Court, consequently four times almost from one end of the Empire to the other... As I could not well have obtain'd my end without giving him a competent knowledge of the Dutch language, I instructed him therein with so much success, that in a year's time he could write and read it better than any of our interpreters: I also gave him all the information I could in Anatomy and Physick, and farther allow'd him a handsome yearly salary, to the best of my abilities... There was not a Book I desired to see, on these and other subjects, which he did not bring to me, and explain to me, out of it, whatever I wanted to know."

A very interesting map of Japan shows each of the provinces and off-shore islands, with the name of each written in both English and Japanese characters (*kanji*).

Note: The long index in volume 3, which makes interesting reading, includes acupuncture, algae (marine, used for food), amasake (amazake, see sake), *Amoenitates Exoticæ*, atheists, Buddhism & pagan worship, cami [kami], Canagawa [Kanagawa], cannnib, hempstuffs, Corea [Korea], Cublai–Tartar monarch, culis (see coolies), Deshima (island of Kaempfer at Nagasaki), Dutch East India Company, Fide Jori [Hideyori], Fide Joshi [Hideyoshi], Gendsii [Genji], gokokf [go-kokufu, chief kinds of peas], herbals, Hirando, Isje [Ise], Jejas [Ieyasu], Kami, Kioto (see Miaco), Koja [Koya], Marco Polo, Mikado, moxa, Nagasaki, oil seeds, opium, paganism, paper made by Japanese, pulse, Pythagoras, Quannon [Kwannon], religion, sago, saki [sake], salt, sasen [zazen], secular monarchs [Shogun], sesamum (plant and oil), Siaka (Buddha), Shimonoseki, submarine plants, Tokaido, Tokio, transmigration of souls, umbrellas, Wilstach (Maria Sophia, wife of Dr. Kaempfer). Address: Physician to the Dutch Embassy to the Emperor's Court, Edo (Tokyo), Japan.

65. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1907. Southeastern Manchuria. Commercial prospects through opening of new railroad. No. 2779. p. 1-4. Jan. 28.
• ***Summary:*** "A lengthy report from Vice-Consul-General Charles J. Arnell, of Mukden, deals with the completion of the new Japanese railroad from Antung on the Korean border to Mukden, and the prospective industrial and commercial development of the southeastern Shenking Province, through which the new line passes. A summary of the report follows:

"The new Japanese railway from Antung to Mukden, a distance of 187 miles (100 as the crow flies), first constructed lightly for military purposes, has been rebuilt, though no tunneling will probably be done until the survey of the permanent railway has been made. The gage is 1½ feet. The rails and rolling stock were supplied by the Baldwin Locomotive Works. The system consists of 150 locomotives, and the two sizes of open freight cars carry two and five tons, respectively, the total carrying capacity at present being only 1,200 tons.

"Operations of railroad: The line was opened to general traffic, both freight and passenger, in August last. Two schedule-time runs are daily made from each end in addition to more or less regular ones between some of the intermediate points. The journey from Antung to Mukden requires two days."

"Agricultural development (p. 3): Agriculturally southeastern Shenking stands far from the head of the list, as compared with other parts of Manchuria, both in relative arable area and in fertility of soil. The principal products are maize, millet, and [soya] beans, and these seem to do scarcely more than supply the local demand, as none of them, except a small quantity of beans in the form of oil and cakes, ever reaches the seaboard for export.

"The export trade in bean cake here is in the hands of a Japanese firm, the Mitsui Bussan Kaisha, which buys up the total output of the four principal Chinese companies in Antung, the monthly figure averaging some 8,000 cakes. The manufactured bean products exported from Newchwang derived from this region are small... Whatever part of these products reaches a foreign market passes principally through Antung and Newchwang. It is doubtful that any great stimulus can be given in this region to these industries. Practically all of the arable land is already under cultivation. The valleys do not contain an unfilled spot, and many of the mountain slopes, where the surface soil is scarcely more than a foot in depth, are covered with small plats, ending only with the summits and reminding one of the 'box gardening' characteristic of Japan."

Note: This is the earliest document seen (March 2014) that mentions Mitsui (a major Japanese trading company and conglomerate) in connection with soybeans and Manchuria.

66. *Kansas City Star* (*The*) (*Kansas City, Missouri*). 1907. Bean cheese of the Orient: recipe for making a dish which is liked in Japan, China and Korea. May 20. p. 2.

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• ***Summary:*** "From the New York Tribune:

"Bean cheese, or bean curd, as it is sometimes called, is especially popular in Japan, China, and Korea, where it is often peddled in the streets. It is a thick white substance, of a jellylike consistency, and is called tofu in the Orient.

"The recipe for making it which is given herewith was taken from an agricultural report issued by the United States government. 'Soy beans (the most important of the Japanese legumes–the white or yellow variety) are soaked in water for twelve hours, then brushed [sic, crushed] between millstones of a uniform consistency. The mass is then mixed with three times its bulk of water and boiled for about an hour, after which it is filtered through a cloth. By this process nearly 30 per cent of the total proteine of the bean is dissolved and contained in the filtrate ready to be precipitated as tofu. The filtrate is white and opaque, somewhat resembling milk. To this is added with constant stirring about 2 per cent of the concentrated mother liquid obtained from the manufacture of salt from sea water, whereupon the albumenoid material is precipitated in combination with calcium and magnesium salts. After the liquid is filtered off the precipitate, which is tofu, is pressed in a wooden frame and then cut into cakes usually about ten centimeters broad, two thick and twenty-five long.

"'The residue from the boiled and filtered bean is known as kara [okara], or tofu cake, and contains a large quantity of proteine and carbohydrates. It is very good for material being used by poor people as an ingredient of miso soup.

"'If the milky filtrate mentioned above is boiled a sort of film [yuba] forms on the surface This film consists largely of coagulated albumenoids and fat and is sometimes prepared in large quantity. When dried it us used as an article of food known as yuba.

"'Tofu is generally prepared every day, and it is eaten in the fresh condition, with a little shogu [sic, shoyu], or soy sauce (a dark brown, moderately thick liquid very popular for use in cooking and as a relish or condiment; in odor and taste it is not unlike beef extract; prepared from soy beans, wheat or barley, salt and water, fermented), though it is also frequently cooked in shogu [sic, shoyu] or miso soup. Fried tofu, aburaage, is also a popular article for food. Tofu may be prepared for preservation and transportation. It is then cut in smaller pieces, frozen and then dried in the oven.

"Tofu is used extensively by all classes in Japan. Where fish cannot be obtained, it is an important source of proteine, and for Buddhist priests a popular and indispensable article of food.'"

67. Ebony: New U.S. domestic soybean variety. Synonym: Black Beauty (Piper & Morse 1910). 1907. Seed color: Black.

• ***Summary:*** Sources: Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No 98. 28 p. May 27. See p. 11, 13, 15-16. "Classification–Key to the varieties (p. 11): I. Black seeded: 2B. Seeds small, 4 to 6 or 7 mm long, round or broadly elliptical, pods about 1 inch long. Medium late, 115 to 120, 20 to 26 inches tall, long-branched, seeds elliptical, distinctly flattened = Ebony." "The very small-seeded variety known as Ebony is not to be had on the market, and it has apparently been obtained abroad but once. The original importation was from Ping-yang [Pyongyang / P'yongyang], Korea. In size of seed and pod it is, with the exception of Kingston, the smallest of all the black soy beans and one of the few very small-seeded varieties of any color... The name has reference to the color of the seeds. Numbers and sources of lots grown: Agrost. No. 1193, S.P.I. No. 6386; Agrost. No. 1541, S.P.I. No. 8492; Agrost. No. 1980, Agrost. Nos. 1193 and 1541, united; S.P.I. No. 6386, 'Black," Korea; S.P.I. No. 8492, grown from S.P.I. No. 6386; S.P.I. No. 9414, grown from S.P.I. No. 8492; S.P.I. No. 17254, grown from Agrost. No. 1980."

Piper, Charles V.; Morse, W.J. 1910. "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 187. 84 p. Dec. 31. See p. 43, 64, 75. Seed color: Black. S.P.I. No. 17254. "From Pingyang, Korea, 1901... Grown nine seasons. This variety was also received from Swatow, China, 1908 (S.P.I. No. 22886). Ebony has proved a valuable variety in southern Illinois and especially through the work of Mr. Ralph Allen, of Delavan, Illinois, has become well known as No. 9414 and also as 'Black Beauty.'"

Etheridge, W.C. 1912. "Report of Division of Agronomy." *North Carolina Agric. Exp. Station, Annual Report* 34:16-18. For the year ended June 30, 1911. Ebony was one of the earliest maturing varieties grown.

Reynolds, Will. 1914. "A crop with many profits: Soy beans are good for fertilizer, for pasture, for hay, for seed." *Country Gentleman.* March 21. p. 9. "Certain varieties of soy beans are better adapted than other to certain uses and conditions. The earlier-maturing varieties may be grown in Northern latitudes with more certainty of the crop's maturing than later ones." One variety that has done well in the North is Black Beauty.

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 163, 164. "Introduced from Pingyang [Pyongyang], China, Chosen (Korea), 1901." "Black Beauty.–The same as Ebony." Note: This is the earliest document seen (Aug. 2004) which states that "Black Beauty" is a synonym for "Ebony."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 10-11. Ebony is in the USDA Germplasm Collection. Maturity group: IV. Year named or released: 1907. Developer or sponsor: USDA. Literature: 01, 03. Source and other information: From Pyongyang, North Korea, in 1901. Prior designation: PI 6386. Address: USA.

68. Haberlandt: New U.S. domestic soybean variety. Dry

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edible variety. Synonym: White (Morse 1948). 1907. Seed color: Yellow (straw), hilum dusky brown.
• ***Summary:*** Sources: Note: The following entry shows that the Haberlandt variety existed by May 1905.

Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No 98. 28 p. May 27. See p. 12-13, 22. "Classification–Key to the varieties (p. 11): V. Greenish yellow seeded: 2. Medium late, about 120 days, 25 to 30 inches high, branches long, pods about 1¼ inches long, seeds medium large, roundish or broadly elliptical, hilum dark brown = Haberlandt." "A plot grown in 1905 at Baton Rouge, Louisiana, had foliage of a very light glaucous green, much resembling a plot of rape in color. The same appearance was also reported for this variety by the Virginia Agricultural Experiment Station... The time required for this variety to reach maturity varies from 110 to 130 days, the average time being somewhere near 118 to 120 days. Two seed yields secured were 12 9/10 and 13 3/10 bushels to the acre, respectively. The Haberlandt is one of the most promising varieties for hay, silage or green manuring, and for a cover crop. From the Tokyo it can be distinguished only by its earlier maturity, rather deeper greenish yellow seed and distinctly brown hilum. This variety was named in honor of Prof. F. Haberlandt, who first brought the soy bean to agricultural notice in Europe. His work was published in 1878 at Vienna. Numbers and sources of lots grown: Agrost. No. 1194, 'White,' S.P.I. No. 6396; Agrost. No. 1539, S.P.I. No. 8495; Agrost. No. 1540, S.P.I. No. 8493; S.P.I. No. 6396, 'White,' Ping-yang [Pyongyang / P'yongyang], Korea; S.P.I. No. 6397, Ping-yang, Korea; S.P.I. No. 8493, grown from S.P.I. No. 6396; S.P.I. No. 8495, grown from S.P.I. No. 6397; S.P.I. No. 9415, grown from S.P.I. No. 6397; S.P.I. No. 17263, grown from Agrost. No. 1539-1; S.P.I. No. 17271, grown from Agrost. No. 1194-1."

Piper, C.V.; Nielsen, H.T. 1909. "Soy beans." *USDA Farmers' Bulletin* No. 372. 26 p. Oct. 7. See p. 11. Haberlandt (Yellow) is one of the best out of more than one hundred sorts tested in the last three years. It is not yet on the market, but will probably be available by 1910.

Piper, Charles V.; Morse, W.J. 1910. "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 187. 84 p. Dec. 31. See p. 47, 75. Seed color: Straw yellow. S.P.I. No. 17271. "From Pingyang, Korea, 1901... Grown nine seasons." "The best varieties of soy beans (p. 75): Medium late–Haberlandt, 17271."

Morse, W.J. 1918. "The soy bean: Its culture and uses." *USDA Farmers' Bulletin* No. 973. 32 p. July. See p. 14.

Piper, Charles V.; Morse, William J. 1923. *The soybean.* New York, NY: McGraw-Hill Book Co. xv + 329 p. March. See p. 165. "Introduced from Pingyang [Pyongyang], Korea, 1901."

Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (USDA). p. 1154-89. For the year 1937. See p. 1187. Origin: Introduction, Chosen [Korea]. Year: 1901. Days to mature: 130. Flower color: Purple, white. Pubescence color: Tawny. Seed coat color: Straw yellow. Germ color: Yellow. Hilum color: Brown. Seeds per pod: 2-3. Seeds per pound: 2,400. Use: Grain, or dry edible beans. Note: This is the first of many documents in which Morse classified the Haberlandt as a "dry edible" soybean, one of a limited number of "edible varieties of soybeans."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 10-11. Haberlandt is in the USDA Germplasm Collection. Maturity group: VI. Year named or released: 1907. Developer or sponsor: USDA. Literature: 01, 03. Source and other information: From Pyongyang, North Korea, in 1901. Prior designation: PI 6396 (also PI 17271). Address: USA.

69. *Monthly Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1907. Asia: Empire of Japan. No. 320. p. 36-39. May.
• ***Summary:*** Japan imported oil cake worth the following amounts: $5,567,500 in 1905 and $7,748,900 in 1906. Japan's biggest trading partners in 1906: Imports (in million dollars): United Kingdom $51.0, United States $33.8, British India $31.4, China $27.7, Germany $21.1. Exports (million dollars): United States $62.3, China $59.9, France $19.5, Hongkong $13.5, Korea $12.3, United Kingdom $10.7. Address: Washington, DC.

70. Griffis, William Elliot. 1907. Corea: The hermit nation. 8th ed. Revised and enlarged. New York, NY: Charles Scribner's Sons. xxvii + 512 p. See p. 270. Illust. Index. 23 cm. 1st ed. 1882. [99* ref]
• ***Summary:*** This enlarged 8th edition is identical to the original 1882 ed. except that 4 pages of front matter (including a "Preface to the eighth edition") have been added, and the recent history of Korea to 1907 and the index have been updated, adding 50 pages to the end. A color fold-out map has been added, facing p. 506; it shows Korea, Tsushima, Shimonoseki, Karatsu, Hirado, Nagasaki, Goto Islands, northwest Kiushiu [Kyushu]. The information on soy remains unchanged, on p. 270. Address: Ithaca, New York. Formerly of the Imperial Univ. of Tokio, Japan.

71. Takenob, Y.; Takeda, G. 1907. Japan Year Book. Tokyo: Japan Year Book Office. 616 p. See p. 325, 327, 467, 584, 602. Third annual issue. [Eng]
• ***Summary:*** A full-page ad near the front of the book (on an unnumbered page) for "Mitsui Bussan Kaisha. (Mitsui & Co. in Europe and America.) Established 1876" states that they are "General Commission Merchants" for the... Import of [Soy] Beans, [Soy] Bean Cakes," etc.

Page 325. A table titled "Manure. Consumption" gives the approximate volume consumed in Japan at the end of

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1905 in 1,000 yen:

Night soil 53,000,000.
Stable manure 47,000,000.
Bean cakes [soy] 13,000,000.
Fish guano 10,000,000.
Artificial fertilizers 8,000,000...

Page 327. Chapter 14, "Agriculture" (p. 320-337) has a section that gives production data on "Soja beans" from 1900 to 1905 in *koku.*

3.562 million *koku* in 1900
4.069 million *koku* in 1901
3.136 million *koku* in 1902
3.647 million *koku* in 1903
3.710 million *koku* in 1904
3.261 million *koku* in 1905.

The same table gives production of "Red [azuki] beans which ranged from a high of 924,573 *koku* in 1901 to a low of 708,712 *koku* in 1902. Thus, in 1901 production of azuki beans in Japan was about 23% of that of soja beans [soy beans].

Page 467. In chapter 28, "Foreign trade" (p. 467-95), is a list for the "New import tariff schedule." "Import tariff," with an entry in Group II (Grains and seeds) for "Beans, soja." The tariff is 0.43 yen per 100 kin. On the next line is an entry for "Beans, red or white (small) (*Phaseolus subtrilobata*).

Page 605. A table gives the amount of ash, animal manure and [soy] bean cake used on cotton fields in Korea.

There is no information specifically on soja beans in the chapters titled Formosa, Karafuto [South Sakhalin Island], or Manchuria. However there are statistics for "Peas & beans" (1901-1905) in tables on pages 584 (Formosa [Taiwan], production in koku) and 602 (Korea, exports, 1902-1906, value in yen). Address: 1. Prof. at Waseda Univ. and Late of the *Japan Times;* 2. Editor of the *Pacific Ocean* and Late of the *Kokumin.* Both: 9, Yariya-cho, Ginza, Tokyo, Japan.

72. Ueno, K. 1908. [Investigation on Korean koji]. *Igaku Chuo Zasshi* (*Central Medical Journal*) 5:1534. March 26. [Jap]

73. Griffiths, E.A. 1908. Japan: Report for the year 1907 on the trade of the consular district of Shimonoseki. *Diplomatic and Consular Reports, Annual Series* (*Foreign Office, Great Britain*). No. 4106. p. 1-15. Aug.

• ***Summary:*** A folded map shows the Consular District of Shimonoseki, comprising the prefectures of Yamaguchi, Hiroshima, Fukuoka, and Oita. Shimonoseki is a seaport city located just north of Kyushu, on the Shimonoseki Strait, in Yamaguchi prefecture at the southwest extremity of Honshu. Opposite Shimonoseki, on the northern tip of Kyushu, is the city of Moji. There are also two specially opened ports of Wakamatsu and Hakata–in northern Kyushu. At the center of the map is the Inland Sea, southwest of which is the large island of Shikoku.

In the section on "Imports" under "Manure" we read (p. 6) that the "increase in imports of oil cake "was very large, amounting to 20,732 tons in quantity and 146,052*l."* [British pounds sterling] in value over the figures for 1906. Fish manure was imported from Korea and 9,373 tons of phosphate rock was imported from Christmas Island. "This phosphate rock is manufactured into superphosphates for fertilizing purposes at the phosphate works situated at the western entrance to the Straits if Shimonoseki."

A table (p. 12-13) titled "Return of Principal Articles of Import into the Ports of Shimonoseki and Moji during the Years 1906 and 1907, and Average for the Five Years 1902-06" shows that import of "beans, pulse, &c." decreased 21,719 tons in 1906 to 19,077 tons in 1907, with 85.9% of the value coming from Corea [Korea] and 13.1% from China.

Four types of manure are imported (p. 13): The great majority is "oil cake," followed by fish, phosphates, and other. Imports of oil cake increased from 49,574 tons in 1906 to 70,306 tons in 1907; most of this came from China. Address: British Consul, Shimonoseki, Japan.

74. Hall, J.C. 1908. Japan. Bean oil industry: Sample of oil on view. *Board of Trade Journal* (*London*) 63:184-85. Oct. 22.

• ***Summary:*** Reports that "bean oil in Japan... is very simply manufactured from the soy or soja bean (*soja hispida*), grown there and also largely imported from China and Corea. The beans are thoroughly steamed and immediately pressed by machinery, the resultant oil being run into tanks. There it is allowed to settle and purify, the product being a light yellow oil, suitable as material for food and for industrial purposes. The residue is used as manure and as food for cattle. The total production of oil is about 700 tons per annum, the price averaging about 20 *l.* 4*s.* [£20 4 shillings] per ton. So far this oil has been consumed principally in Japan; recently, however, it has been exported successfully.

"A sample of the oil may be seen on application at the Commercial Intelligence Branch of the Board of Trade, 73 Basinghall Street, London, E.C." Address: I.S.O., British Consul-General, Yokohama, Japan.

75. *Monthly Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1908. Agriculture. Farm crops and methods. Japan. No. 337. p. 95-99. Oct.

• ***Summary:*** "Consul Hunter Sharp, of Kobe, transmits the following review of agricultural conditions in Japan,..." According to the 1906 census, Japan has a population of 48,304,397. "Sixty per cent of the people are agriculturists, and yet on account of the mountainous nature of the country, only about one-sixth of the total area is under cultivation."

"On the land known as rice fields, wheat, barley, or rape

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seed are sown about November, the crop being gathered the following June. Immediately afterwards the rice is planted, and is harvested in October. On the upland fields either wheat, barley, or rape seed is sown and harvested at the same season as above mentioned; after which corn, cotton, beans, panicum miliacum [millet], and various vegetables are sown, maturing at different times."

"Fertilizers freely used:... In 1906 the importation into Japan of oil cake alone amounted to $7,793,766, of which China supplied $7,436,958; ammonium sulphate, $2,637,751, to which Great, Britain contributed $2,543,264, while the United States sent nitrate of soda to the value of $34,236; oil cake, $3,823; and phosphorites, $74,211, aggregating $112,270." Note: We are not told what kind of oil cake the USA exported to Japan, but it was not soya bean cake.

"One year's crop: According to the statistics of 1906 the agricultural products of Japan are given as follows: Rice, the chief crop, has an acreage of 7,104,072, with a production of 229,794,826 bushels; barley comes next, with 3,359,238 acres and a production of 81,407,291 bushels; wheat, the principal crop in other grain-producing countries, occupies only 1,086,118 acres, with a yield of 19,664,325. An average crop for these three is about 30 bushels per acre. Other agricultural products are:" The first two crops shown in this large table are: Soy beans 17,655,973 bushels. Small red [azuki] beans 4,449,408 bushels.

A table titled "Exports of agricultural products" in U.S. dollars for 1902-1906 lumps together "Beans, pease, and pulse," which grew from $45,903 in 1902 to $76,051 in 1906. Exports of peanuts decreased from $175,585 in 1902 to $150,102 in 1906. Japan's largest agricultural export, tea, accounted for about 90% of total exports (worth $5+ million) during this period.

A table titled "Imports of agricultural products" in U.S. dollars for 1902-1906 lumps together "Beans, pease, and pulse," the second largest import category, which grew from $2,881,780 in 1902 to $4,839,708 in 1906. Most of these beans are supplied in about equal proportions by China and Korea. Japan's largest agricultural import, rice, accounted for about 70% of total imports (worth $13 to $39 million) during this period.

"Agriculture in Formosa and Sakhalin:... Japanese Sakhalin has a total area of 12,582 square miles, of which 89,296 acres can be cultivated, and in 1906 the population was 8,569. The agricultural products are barley, wheat, rye, oats, potatoes, peas, kidney beans, soja beans, red beans, hemp, flax, and vegetables. Of these the most successful are potatoes, barley, rye, oats, and wheat, and in a lesser degree peas, hemp, and flax." Soy beans are not mentioned under Formosa. Address: Washington, DC.

76. *Natal Agricultural Journal.* 1908. Oil from the soy bean. 11(11):1371. Nov. 27. [1 ref]

• ***Summary:*** An excerpt of almost the entire article by Mr. J.C. Hall (British Consul at Yokohama, Japan) from the *Board of Trade Journal* (*London*) of 22 Oct. 1908, p. 184-85. It describes the production and use of oil and meal from the soy bean (*Glycine hispida*), which is grown in Japan and also largely imported from China and Corea. Address: South Africa.

77. *USDA Bureau of Plant Industry, Inventory.* 1908. Seeds and plants imported during the period from July, 1906 to December 31, 1907. Nos. 19058 to 21730. No. 13. 192 p. Dec. 4. Also titled USDA Bureau of Plant Industry, Bulletin No. 132.

• ***Summary:*** Soy bean introductions: Glycine hispida.

19183/19184/19186. "From Manchuria. Received through Mr. F.N. Meyer, agricultural explorer, August 28, 1906. A collection of seeds as follows:

"19183. From Newchwang. '(No. 255a.) A small variety of the black soy bean. Used to make bean oil from, the remaining expressed material, known as bean cake, being exported to Japan and southern China as a very valuable fertilizer.' (*Meyer.*)

"19184. From Newchwang. '(No. 256a.) A large variety of the black soy bean. This is a very rare variety and is used for food: also for making a superior oil.' (*Meyer.*)

"19186. From Newchwang. '(No. 258a.) A medium-sized, greenish soy bean. This variety is the one most commonly used to extract bean oil from, the remaining yellow material, in the form of large, flat cheeses [actually cakes], being exported to different parts of Japan and especially to southern China as a very valuable fertilizer.' (*Meyer.*)" [Note: Piper and Morse (1910, p. 52) state that this variety was later named "Morse." They list no variety named "Virginia." But I. Cunningham (1984) states that this variety was later named "Virginia."]

19980-19987. "From Yokohama, Japan. Received through L. Boehmer & Co. [seedsmen], March 19, 1907.

"19980. Received under the name of '*Fuiri Mame,* the speckled soja bean.' [The scientific name is listed as Phaseolus vulgaris; the common name as bean. Clearly this is not a soy bean.]

"19981. Received under the name of '*Shiro Mame,* the white soja bean.'

"19982. Received under the name of '*Kuro Mame,* the black soja bean.'

"19983. Received under the name of '*Daizu* or *O-mane, Dolichos soja.*'

"19984. Received under the name of *Wase* or *Natsu Mame,* early summer bean.'

"19985. Received under the name of '*Nagate Mame,* middle late bean.' Note: Later referred to as Haberlandt.

"19986. Received under the name of *Okute Mame,* 'late bean.'

"19987. Received under the name of *Kuro-Teppo Mame,*

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round, middle-late bean.'

20011. "From Ko-bau, northern Korea. Received through Mr. Frank N. Meyer, agricultural explorer, February 20, 1907. '(No. 318a, Aug. 12, 1906.) A green variety of soy bean growing at high elevations. This variety is eaten as a food and is mostly grown in broad strips between buckwheat; a very late ripener. Seems to be the most northerly variety of soy bean seen yet and will do well in cool climes.' (*Meyer.*)"

20405-20412/20414. "From Siberia. Received through Mr. Frank N. Meyer, agricultural explorer, February 28, 1907. A collection of seeds, as follows:

"20405. From Khabarovsk. '(No. 643a, Nov. 15, 1906.) Round, yellow soy beans purchased in the market at Khabarovsk. The Chinese let these beans sprout and use the sprouts all winter as a vegetable. Oil is also extracted from this variety, and the cakes thus formed make a very nutritious food for horses.' (*Meyer.*)

"20406. From Khabarovsk. '(No. 644a, Nov. 15, 1906.) A yellow soy bean purchased in the market at Khabarovsk.' (*Meyer.*)

"20407. From Merkoechofka. '(No. 645a, Oct. 25, 1906.) A brown-black variety grown in eastern Siberia; does not scatter [its seeds] when ripe and is very late in ripening, as it is harvested in the last half of October. Is used for food, being boiled with millet. This variety seems to have come originally from more southern regions, as the season here is somewhat short for it.' (*Meyer.*)

"40408. From Khabarovsk. '(No. 647a, Nov. 8, 1906.) Black soy beans obtained from Mr. V.T. Kovaleff, in charge of the experiment station at Khabarovsk. These seeds came originally from Manchuria in 1899 and are ripening here to perfection, while the light and dark yellow varieties do not ripen well at all. Are used for food for domestic animals when boiled, and are also sometimes fed in the green state.' (*Meyer.*)

"20409. From Merkoechofka. '(No. 648a, Oct. 25, 1906.) Very small, brownish beans obtained from a farmer in Merkoechofka; said to have come originally from Manchuria.' (*Meyer.*)

"20410. From Merkoechofka. '(No. 649a, Oct. 25, 1906.) Very small, black beans obtained from a farmer in Merkoechofka; said to have come originally from Manchuria.' (*Meyer.*)

"20411. From Merkoechofka. '(No. 650a, Oct. 25, 1906.) Very small, dull-black beans obtained from a farmer in Merkoechofka; said to have come originally from Manchuria.' (*Meyer.*)

"20412. From Merkoechofka. '(No. 651a, Oct. 25, 1906.) Brown soy beans found mixed with No. 645a (S.P.I. No. 20406).' (*Meyer.*)

"20414. From Merkoechofka. '(No. 653a, Oct. 25, 1906.) Small, black soy beans obtained from a farmer in Merkoechofka; said to have come originally from Manchuria.' (*Meyer.*)"

20629/20699.

"From northern Europe, Siberia, and eastern Asia. Seeds collected by Prof. N.E. Hansen, of the agricultural experiment station, Brookings, South Dakota, in 1906 while traveling as an agricultural explorer for the Department of Agriculture on an extended trip through Scandinavia, Russia, Siberia and returning through China and Japan. Received March 1907.

"20629. From Manchuria. '(No. 109.) Variety *Hoo-an-dooh.* Used for human food and for fodder in Manchuria and brought from that country by a Russian student-soldier after the Russo-Japanese war.' (*Hansen.*)

"20699. From Ussurie [Ussuri] province, Pacific coast section, Siberia. '(No. 179.) From the farm of Mr. Fick, near Nicolsk.' (*Hansen.*)"

20797/20798. "Received through Mr. Frank N. Meyer, agricultural explorer, April 3. 1907.

"20797. From Shanghai, China. '(No. 722a.) *Black* soy beans obtained through Dr. S.P. Barchet, of the U.S. consulate at Shanghai. These beans come from Chin-hua-fu, Chekiang province, and are used apparently as a second crop on low-lying rice fields, and may as such be very valuable for the Southern States. They are mainly used as a food for domestic animals. It seems that they are sown broadcast after the sowing of the rice crop; specific details are not obtainable just now.' (*Meyer.*)

"20798. From Shanghai, China. '(No. 723a.) *Brown* soy beans obtained through Dr. S.P. Barchet, of the U.S. consulate at Shanghai. These beans come from Chin-hua-fu, Chekiang province, and are used apparently as a second crop on low-lying rice fields, and may as such be very valuable for the Southern States. They are mainly used as a food for domestic animals.' (*Meyer.*)"

20854. "From Harbin, Manchuria. Received through Mr. F.N. Meyer, agricultural explorer, April 11, 1907. '(No. 675a, Dec. 15, 1906.) Green soy beans; Chinese name *Ta shing toa.* These are boiled and used as food, and the sprouts of the germinated beans are also used as a vegetable throughout the winter months.' (*Meyer.*)"

20892/20893. "From Kobe, Japan. Presented by Hon. Hunter Sharp, American consul, who purchased them from J. Ikeda & Co., Tokyo, Japan. Received March 25, 1907.

"20892. White.

"20893. Green."

21079/21080. "Received through Mr. Frank N. Meyer, agricultural explorer, June 21, 1907.

"21079. From Tiëling, Manchuria. '(No. 693a, Jan. 18, 1907.) A light green soy bean; Chinese name *Shing toa.* This bean is used to produce bean oil and bean cake. The variety is very rarely seen.' (*Meyer.*)

"21080. From Tiëling, Manchuria. '(No. 694a, Jan. 18, 1907.) A dark green soy bean; Chinese name *Li dau shing.* This bean is used as a vegetable throughout the winter months, being eaten boiled after it has sprouted slightly.

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This variety is the most expensive of all the soy beans and is eaten by the better classes of Chinese; sent also from Harbin under No. 675a (S.P.I. No. 20854.)' (*Meyer.*)" Note: This is the earliest English-language document seen (Oct. 2004) that uses the term "dark green" to describe the color of a soybean.

[Notice the large number of seeds introduced by Frank Meyer during this period.]. Address: Washington, DC.

78. Agricultural Bureau, Department of Agriculture and Commerce. 1908. Agriculture in Japan. Tokyo: Agricultural Bureau, Department of Agriculture and Commerce. x + 455 p. See p. 225-29, 434, 439, 448, 453-54. No index. 23 cm. [Eng]

• ***Summary:*** A table of moneys, weights and measures (p. x) includes British equivalents of the following Japanese units: Money–*yen, sen, rin.* Length: *ri, chô, ken, shaku, sun.* Area: *cho, tan, sé, bu* or *tsubo, kô* (*9.724 tan*). Capacity / volume: *koku, tô, sho, go.* Weights: *kwan or kwamme, kin, momme.*

In Chapter 6 titled "Agricultural products," in section 2 on "staple food stuffs" is a subsection titled "Soja beans" (p. 225-29) which begins: "In point of production and use, soja beans occupy an important position among the various beans, they are extensively cultivated from the Hokkaido in the north to Formosa in the south. They find a congenial soil to prosper, the acreage for 1906 was 460,895 *cho* (1 cho = 2.45 acres) which with the exception of the acreage of barley (503,498 *chô*) is equalled by no other products from the upland fields. Their use is quite extensive. They are eaten boiled, baked and powdered while *soy, miso* and *tofu* (bean curd) made out of beans, are found even in the remotest villages. They are found on the table both of high and low. In making *soy* [*sauce*], a by-product in a shape of soy-cakes is obtained and may be used as excellent manure, while in making *tofu*, the remaining ingredients [okara] may be used as a subsidiary diet and as food for cattle. Soja beans may also be pressed, and its oil used for the purpose of diet and for various technical uses, while the residue forms excellent manure. The fresh stalks of soja beans may be used as forage or as effective green manure. In short, soja beans, either as an article of Japanese diet, or as agricultural manure or as food for cattle are indispensable.

Note 1. This is the earliest document seen (Nov. 2017) that contains the term "technical uses".

"The cultivation of beans under the circumstances was developed from ancient times, and numerous varieties are most extensively cultivated while by its peculiar nature of root, it absolves nitrogen from air so that high priced nitrogenous manure may be dispensed with, and therefore the cultivation of beans like other agricultural products do not exhaust the productive power of the soil, but on the contrary, it operates favourably to improve the soil. As for rotation of crops of wheat, millets, corns and potatoes, beans are indispensable. Seeds are sown early in the beginning of May."

Tables show: (1) Output of soja beans in Japan, 1897-1906." For each year is given the area (in *chô*), the production (in *koku*) and the yield (in *koku* per *tan*) (1 *koku* = 4.962 bushels; 1 *tan* = 0.245 acres). The area increased from 435,605 *chô* in 1897 to a peak of 482,044 *chô* in 1898, then slowly fell to a low of 446,844 *chô* in 1904, then rose to 460,895 *chô* in 1906. Production increased from 3,100,973 *koku* in 1897 to a peak of 4,069,619 *koku* in 1901, then slowly dropped to 3,557,592 in 1906. The yield in 1897 was 0.712 *koku* per *tan*, rising to a peak of 0.830 in 1904. Hokkaido has the largest area (43,924 *chô*) and production (392,140 *koku*). The principal soja bean producing districts are Ibaraki (33,000 *chô*), Saitama (29,000 *chô*), Iwate (26,000 *chô*), Nagasaki (26,000 *chô*), Kumamoto (26,000 *chô*), Niigata (22,000 *chô*). There is no prefecture where the production does not exceed 10,000 *koku.*

(2) "As mentioned above, soja beans are used either boiled, baked or powdered or as material for *tofu* (bean curd), frozen *tofu, soy* and *miso* (bean-cheese), and particularly the latter two products besides meeting with domestic demands, are exported abroad in large quantities, as may be seen in the following table." This table shows amount and value (in *yen*) of miso and soy [sauce] exported from Japan each year from 1903 to 1907, inclusive. Miso exports increased from 1,670,092 *kin* (1 *kin* = 1.322 lb) in 1903 to a peak of 5,199,957 *kin* in 1907 (a 3.1 fold increase in 4 years), while soy [sauce] exports increased from 1,974,119 *shô* (1 *shô* = 1.9 quarts) in 1903 to 4,403,851 *shô* in 1907 (a 2.2 fold increase). The total yen value of these two exports rose from 489,213 *yen* in 1903 to 1,354,517 *yen* in 1907 (a 2.8 fold increase). In American units: Miso exports increased from 2.20 million lb (worth $347,647) in 1903 to a peak of 7.50 million lb (worth $132,652) in 1905, dropping to 6.86 million lb (worth $135,833) in 1907.

Shoyu exports increased from 5.92 million lb (worth $204,959) in 1903 to 13.21 million lb (worth $541,425) in 1907. Note that in 1907 shoyu exports are worth about 4 times as much as miso exports.

(3) Because of increasing exports, Japan now needs to import soja beans from abroad. This table (p. 227) shows the amount and value of soybeans imported by Japan for the years 1903-1907, inclusive. They rose from 146,971 tons (worth $3.18 million) in 1903 to a peak of 193,479 tons (worth $4.92 million) in 1905, dropping to 177,365 tons (worth $4.79 million) in 1907. They are mostly imported from Manchuria and Korea. "While a greater portion of these imports is used as material for *soy and miso*, it is also used in making bean-cakes and is sown for obtaining green manure, or used as manure or for feeding cattle."

(4) This table (p. 228) shows the quantity and value of [soy] bean-cakes imported into Japan for the years 1903-1907, inclusive. The cake was used mostly for fertilizer. Cake imports rose from 216,198 tons (worth $3.81 million and representing 57.8% of all fertilizers) in 1903 to 367,210

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tons (worth $8.71 million and representing 44.8% of all fertilizers) in 1907. (5) This table (p. 229) shows acreage and production (output) of [soy] beans in Formosa [today's Taiwan]. Acreage doubled in 3 years from 11,226 *kô* in 1901 to a peak of 22,641 *kô* [53,886 acres] in 1904, then decreased slightly to 21,220 *kô* in 1906. Note 2. 1 *kô* = 9.724 *tan*, and 1 *tan* = 0.245 acres. Therefore 1 *kô* = 2.38 acres.

Production in Taiwan increased more than 3-fold from 44,661 *koku* in 1901 to 135,271 *koku* in 1904, then decreased slightly to 100,803 *koku* in 1906.

Note 3. This is the earliest document seen (May 2014) that gives soybean production or area statistics for Formosa / Taiwan.

Note 4. Production of soja beans in Formosa in 1904 was only 3.6% as much as production of soja beans in Japan in 1904.

The next section, titled "Red-beans" (p. 229-30) gives similar detailed statistics on acreage, production, and yield for azuki beans in Japan. *Sarashi-an* (the powdered red bean) is made in Osaka, Tokyo, Niigata, and Aomori. A second table gives annual imports of red [azuki] beans to Japan from 1903 to 1907. They are imported mainly from China, Korea, and British India.

In Chapter 9, titled "Agricultural products in commerce," section 2 is on imports to Japan. A table (p. 433-34) gives imports of the following grains and seeds (in quantity / piculs and value / yen) from 1903 to 1907: Italian millet, soja beans, red beans [azuki] (small white), and sesame seeds. Another table (p. 438) titled "Miscellaneous" includes imports of "bean's oil cake" for the same period. An explanation titled "Soja-beans" (p. 439) states: "Not only as foodstuffs, but also as a manure a large quantity of beans are consumed each year, as that from China and Korea a considerable amount is imported. Besides beans, bean-cakes are imported from China in large quantity." Imports of sesame seeds, rice, wheat and rape-seed are also discussed on the same page. In this same chapter, section 3 is on Exports and imports in Formosa. Soy is mentioned on pages 434, 439, 442, 448, 453-54. "Beans, Soja: The demand for soja beans in Formosa is enormous and as the Formosan product was not sufficient to meet the demand, a large amount is imported from abroad. Soja beans produced in Manchuria, and Chin-kiang [Chinkiang, Zhenjiang] are imported from China and Hongkong." "Oil, Beans [soybean oil]: This is principally produced in Manchuria and is brought here through China and Hongkong. Originally it was used as an [sic, for] illumination, but the demand has greatly increased as it is used in making cut tobacco" [to keep it moist]. Ground-nut oil is used for the same purpose (p. 453-54).

Note 5. The preface, by Chuzi [Chuji] Shimooka, explains that this book was compiled for the International Agricultural Association meeting to be held in Italy in the autumn. The compiler did not have time to explain all the terms [and units] adequately. Address: Tokyo, Japan.

79. Allen, Horace Newton. 1908. Things Korean: A collection of sketches and anecdotes, missionary and diplomatic. New York, Chicago, Toronto, London, Edinburgh: F.H. Revell Co. 256 p. See p. 74. Illust. (black and white photos). No index. 19 cm.

• ***Summary:*** Page 74: "Products.–The great product of Korea is rice, which is the staple of diet. Next come [soy] beans, which are largely used as a food for man and beast, being mixed with rice in the human dietary or used in the form of curd or cake [tofu], while they are indispensable for making the sauce so highly prized in Asia, and which is shipped abroad in vast quantities for the preparation of a celebrated English sauce as well as others, since it is the foundation for most of our sauces. Any one who patronizes a Chinese restaurant will be familiar with this bean sauce. Millet, rye, barley, oats, wheat and some poor corn, together with cotton and vegetables, form the chief farm crops raised in Korea after rice and beans."

Note 1. By "bean sauce" the author probably means "soy sauce," but he might also mean soybean jang (Korean-style soybean miso).

Note 2. The term "celebrated English sauce" clearly refers to Worcestershire sauce.

Preface: The author lived for 22 years "in China and Korea, including practically the whole period of the latter's diplomatic intercourse with the outside world,..." He spent 3 years in Korea as a medical missionary, 3 years in the Korean service, and 15 years in the diplomatic service of the United States government, "beginning as secretary of legation and ending as minister plenipotentiary." The poor Koreans are in desperate straits but opposition by them to their situation "seems at present to be unavailing if not suicidal." Sadly, the United States "deserted them in their time of need and ignored the solemn agreement we had entered into with them as an inducement for their abandoning the centuries-old position of exclusion and non-intercourse and emerging into the dazzling glare of treaty relations. Our treaty with Korea of May 22, 1882, in its first article, makes the following promise: 'If other Powers deal unjustly or oppressively with either government, the other will exert their good offices on being informed of the case, to bring about an amicable arrangement, thus showing their friendly feeling."

The U.S. disregarded this solemn pledge at the time of the Portsmouth convention; we violated our sacred covenant.

Chapter 16, "Political changes and probabilities."

1884–The "haughty Chinese drove the then inconspicuous Japanese so precipitately from the land that they left their dead in the streets to be devoured by the dogs" (p. 243); the Chinese continued their traditional domination of Korea.

1894-1895–First Sino-Japanese War, over domination of Korea; the Japanese won and in Oct. 1895 the treaty of Shimonoseki was signed. During this war the world got

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its first intimation of the excellence of Japanese military organization and power. But diplomatic mistakes in Korea by Japan, after her victory, enabled Russia to gain the upper hand. Yet Russia too made diplomatic blunders while for 10 years Japan prepared for another war over Korea.

1904-1905–Russo-Japanese war; Japan won, gained control of Korea, and drove Russia from the entire area except in the vicinity of Vladivostok. During the 20 previous years when Korea could have fortified the country, it "played at all manner of silly pastimes." Now Korea is Japan's to exploit for herself. The U.S. position in the area has been weakened. Japan's next great objective will surely be China; it is only a matter of time. Address: Toledo, Ohio; M.D., Late Envoy Extraordinary and Minister Plenipotentiary of the United States.

80. Colby, Frank Moore. ed. 1908. The new international year book: A compendium of the world's progress for the year 1907. New York, NY: Dodd, Mead and Company. [6] + 860 p.

• ***Summary:*** The section titled "Manchuria" (p. 475-76) states: "By the treaty of Portsmouth (September 1905) Manchuria was practically divided into a northern or Russian sphere of influence, and a southern or Japanese sphere of influence. The Russian section is crossed by the Trans-Siberian Railway, which runs from east to west for a length of 960 miles over Manchurian soil until it reaches Vladivostok; and by the Central Manchurian Railway, which runs southward from Harbin, on the Trans-Siberian, to Changchun, with a branch line of 70 miles from Changchun to Kirin. The Japanese section is crossed by the continuation of the Central Manchurian line from Changchun to Port Arthur and Dalny, now known as the South Manchurian Railway [sic], which was surrendered by Russia to Japan; by the new Japanese line from Antung to Mukden, 187 miles long... Extensions of the Chinese Northern Railways are permitted by Japan only on condition that the capital, if not Chinese, be borrowed from the South Manchuria Railway Company."

"The leading exports are [soya] beans, bean cake, and bean oil, raw wild silk, maize, and millet. Newchwang and Dalny are the principal ports (p. 476).

"History–Reorganization of the Province: On April 20, 1907, an Imperial Chinese edict reconstituted the government of Manchuria. Instead of three provinces governed by three separate Tatar rulers, the whole country was placed under one viceroy, with a governor in each province."

The long and interesting section on Japan (p. 420-30) contains a map of the country. The section on agriculture states: The percentage of land owned by the tillers of the soil is 50.21 in rice field and 60.93 in upland. The rest is rented by tenants. In 1905 the production of soya beans was 3,261,881 koku and of red beans [azuki] was 804,485 koku (1 koku = 4.66 bushels). There is also detailed information on: Population (47 million in 1903) and immigration, fisheries, religion, education, mining, forestry, number of establishments [businesses] and employees, manufactures (incl. vegetable oils; "The Japanese Government is the greatest employer of labor in the country"), foreign commerce, shipping, railways, post and telegraph, banks and money, government (a constitutional monarchy; the Imperial Diet consists of a House of Peers and a House of Representatives; in 1904, 1.67% of the population could vote), finance (in 1907-08 projected internal revenue taxes on alcoholic beverages, soy [sauce] etc. totaled 96,331,881 yen), army, navy. History: Political parties, relations with the United States (incl. persecution of Japanese in San Francisco, California), relations with Great Britain, with France, with Russia, navy and military development, territorial expansion (retention of some troops in Manchuria as "railway guards," gradual absorption of Korea, and conquest of interior portions of Formosa, expansion of lumbering along the Yalu river, opening of 16 cities and towns in Manchuria as 'places of international residence and trade').

81. Crowe, E.F. 1908. Japan: Report for the year 1907 on the trade of Japan. *Diplomatic and Consular Reports, Annual Series* (*Foreign Office, Great Britain*). No. 4026. p. 1-86.

• ***Summary:*** "Export of soy (p. 35): This sauce was again sent in large quantities to those countries where the number of Japanese residents is on the increase. A new kind, said to have many advantages, and prepared by a lately-invented process, was put on the market during the year."

Annex I (p. 64-65) shows imports of "Beans, peas and pulse" to Japan (mainly from China and Corea) from 1902 to 1907.

Annex II (p. 76-77) shows "Return of principle articles of export from Japan during the years 1907 and 1906." Exports of soy [sauce] were worth £97,000 in 1906, increasing to £110,500 in 1907. The average value for the 5 years 1902-06 was £65,300; no quantities are given. Other leading exports were tea, cotton undershirts and drawers, saké, and fish. Address: Commercial Attaché to His Majesty's Embassy, Tokyo.

82. Tebbitt, -. 1908. China: Report for the year 1907 on the trade of Newchwang. *Diplomatic and Consular Reports, Annual Series* (*Foreign Office, Great Britain*). No. 4000. p. 1-14.

• ***Summary:*** A map shows South Manchuria, Corea [Korea], the Yellow Sea, and the Gulf of Pe-Chi-Li, with major rivers (Liao, Yalu), railroads, ports (Newchwang, Tiaren [Dairen]) and cities (Mukden, Antung, Kuan Cheng Tzu [K'uan Ch'eng Tzu], Seoul).

Table C shows the quantity and value of the principal exports from Newchwang during the years 1906-07. In order of export value in 1907, the leading exports are: Bean cake

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(£1,434,233 for 4,453,380 cwts.) [1 cwt = hundredweight = 112 pounds], beans, all kinds (£484,225 for 1,408,778 cwts.), [soy] bean oil (£236,481 for 287,402 cwts.), millet, tall and small (£229,967), silk, raw, wild (£193,787), ginseng (£45,279). The leading export, [soy] bean cake, is used for manure and sold mostly to Japan (78% of the total) and South China. Because of the increasing shallowness of the Liao River, especially in its upper reaches, the percentage of beans carried in junks is decreasing, while that carried by railways is increasing. Address: Acting Consul.

83. *USDA Bureau of Plant Industry, Inventory.* 1909. Seeds and plants imported during the period from January 1 to March 31, 1908. Nos. 21732 to 22510. No. 14. 64 p. Jan. 9. Also titled USDA Bureau of Plant Industry, Bulletin No. 137. • ***Summary:*** Soy bean introductions: Glycine hispida (Moench) Maxim. [Note the first use of this terminology in this publication.]

21754-21757. "From Paris, France. Purchased from Vilmorin-Andrieux & Co. Received January 3, 1908.

"21754. Yellow seeded.

"21755. *Ogemaw.* Extra early, brown seeded.

"21756. Black seeded.

"21757. Extra early, black seeded."

21818. "From Paris, France. Purchased from Vilmorin-Andrieux & Co. Received January 17, 1908. *Ito San.* Called by the French, *Yellow Etampes.*

21825. "From Hokkaido, Japan. Presented by Mr. K. Hashimoto, Kuchchau Agricultural Society, Abutagun. Received January 14, 1908. *Amherst* (?). 'Used in the manufacture of "soy," "miso," "tifu" [tofu], etc.' (*Hashimoto.*)"

21830/21831. "From Hokkaido, Japan. Presented by the Yokohama Nursery Company, Yokohama, Japan. Received January 24, 1908.

"21830. *Butterball.* Japanese name *Akita.*

"21831. Japanese name *Rumoi.*"

21946. "From Buitenzorg, Java. Presented by Dr. M. Treub, director of the Department of Agriculture. Received February 11, 1908. *'Zwarte kadelee'"* [black soybeans].

21999. "Received through Mr. F.N. Meyer, agricultural explorer for this Department at the Plant Introduction Garden, Chico, Cal., February 12, 1908. From Boshan, Shantung, China. '(No. 799a, Sept. 18, 1907.) A rare variety of soy bean, sparsely grown near Boshan. Chinese name *Ta ha tau.* Used by the higher classes as a vegetable in soups.' (*Meyer.*)"

22311/22312. "From Shanghai, Kiangsu, China. Presented by Rev. J.M.W. Farnham, Chinese Tract Society. Received March 11, 1908.

"22311. Black. 'Similar to *Nuttall* but larger.' (*Nielsen.*)

"22312. Yellow."

22317-22322. "From Erfurt, Germany. Purchased from Haage & Schmidt [seedsmen]. Received March 16, 1908.

"22317. Probably *Butterball.*

"22318. *'Giant Yellow.'* Probably *Amherst.*

"22319. Brown.

"22320. *Samarow.* Like No. 17260.

"22321. Probably *Cloud.*

"22322. *'Early Black* from Podolia [Ukraine].' Probably *Buckshot."*

22333-22337. "Grown at Arlington Experimental Farm, Virginia, season of 1907. Received March 19, 1908.

"22333. *Baird.* 'This variety was mixed with *Brownie* when received from Pingyang [Pyongyang / P'yongyang], Korea. This mixture was given S.P.I. No. 6414. The two varieties were grown together under these numbers, 9417, 17256, and Agrost. No. 1542, respectively. The two varieties were separated in the 1907 seed from Arlington Farm, and *Baird* given the above new number, *Brownie* remaining as No. 17256.' (*Nielsen*).

"22334. Flat black. 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois. The original source of the seed is not known. It is quite similar in growth to *Nuttall*, but the seed is not the same shape, being flatter and larger.' (*Nielsen.*)

"22335. Yellow. 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois, where it was grown as *Illinois Medium Yellow.* It is very similar to *Hollybrook*, and perhaps is the same, but appears different on account of having been grown farther north.' (*Nielsen.*)

"22336. *Guelph.* 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois. Original seed was procured from the Agricultural Experiment Station, Wooster, Ohio.' (*Nielsen.*)

"22337. *Guelph.* 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois. Original seed was procured from the Agricultural Experiment Station, Fayetteville, Arkansas' (*Nielsen.*)."

22379-22381. "From Canton, Kwangtung [province], China. Presented by Dr. J.M. Swan, Cooks Hospital. Received March 20, 1908.

"22379. Yellow.

"22380. Black.

"22381. Green mixed with yellow and a few brown."

22406/22407. "From Hongkong, China. Presented by Mr. S.T. Dunn, Botanical and Forestry Department. Received March 26, 1908. [Note: It is not clear whether or not they were ever cultivated in Hongkong. These two soybeans (#22406 and #22407, both black seeded) were later given the names "Hongkong" and "Nigra" respectively, and introduced to the USA in about 1910].

"22406. Yellow.

"22407. Black."

22411-22415. "From Naples, Italy. Purchased from Dammann & Co. Received March 25, 1908.

"22411. *Samarow.*

"22412. Black. 'Similar to *Cloud.*' (*Nielsen.*)

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"22413. Brown.

"22414. Yellow. 'Similar to *Acme.'* (*Nielsen.*)

"22415. Giant yellow."

"Glycine soja Sieb. & Zucc." [Note the first mention of this species.] 22428. "Grown at Arlington Farm, Virginia, season of 1907, under C.V.P. No. 0474. Received March, 1908. 'Original seed presented by the Botanic Gardens, Tokyo, Japan. A near relative to the soy bean, but a spreading or decumbent plant, abundantly provided with large root nodules. Has considerable promise as a cover or green manure crop.' (*Piper.*)"

22498-22501. "From Hangchow, Chehkiang, China. Presented by Dr. D. Duncan Main, through Mr. J.M.W. Farnham, Shanghai, China. Received March 26, 1908.

"22498. Yellow. Similar to No. 18619.

"22499. Yellow.

"22500. Green. Similar to No. 17857.

"22501. Black."

22503-22507. "From Yokohama, Japan. Purchased from L. Boehmer & Co. Received March 31, 1908. The following seeds with Japanese names quoted; varietal descriptions by Mr. H.T. Nielsen:

"22503. *'Teppo Mame.'* Yellow, similar in appearance to *Amherst*, No. 17275.

"22504. *'Kaze Mame.'* Green.

"22505. *'Gogwatsu Mame.'* Yellow, similar to *Haberlandt*, No. 17271.

"22506. *'Maru Mame.'* Yellow.

"22507. *'Vieuri Lei.'* Green, similar to *Yosho*, No. 17262." Address: Washington, DC.

84. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1909. Trade of Dalny. Both imports and exports show large increases. No. 3382. p. 12-13. Jan. 16.

• ***Summary:*** "Consul Roger S. Greene transmits a statement of the trade of Dalny for the half year ended June 30, 1908, compiled from the returns published by the Kwantung government-general, which he summarizes: The export trade for the half year amounted in value to $7,048,742, as compared with $4,381,441 during the first half of 1907."

"The following is a summary of the exports and imports at Dalny (Dairen), during the half years ended June 30, 1908 and 1907, by countries of destination and origin:" A table shows exports to and imports of all goods from Japan, China, Korea, and America and Europe. Imports from Japan were larger than exports to Japan.

"The largest items of export for the first half of 1908 were bean cake, amounting to $3,021,392, against $1,575,741 for the same period of 1907; beans, $2,462,862, against $1,863,670; and raw wild silk, $1,126,723, against $17,700." Address: Washington, DC.

85. Austin: New U.S. domestic soybean variety. 1909. Seed color: Yellow (olive).

• ***Summary:*** Sources: Piper, C.V. 1909. Re: Sending you a list of 186 varieties of soybeans we grew at Arlington Farm last season. Letter to Prof. H.A. Morgan, Director, Tennessee Experiment Station, Knoxville, TN, March 17. "Previous to the issuing of Professor Mooers' bulletin we had named the greenish-yellow seeded variety, #17263, Austin, retaining the Haberlandt for our #17271, Number 17263 you have as Agrostology #1539, while #17271 you have under Agrostology #1194. If it were not for the fact that we have already used these names I would reverse them in favor of the conclusion that Professor Mooers has reached, but under the circumstances it seems to me that it will make less confusion if our conclusion here is adopted. Of these two varieties, the Austin is decidedly superior under Arlington Farm conditions, and we had intended to grow it in quantity for distribution. It is, therefore, very interesting to note that at Knoxville you consider #17271, Haberlandt, as better than the Austin."

Piper, C.V. 1909. Re: Soybean varieties. Letter to Prof. A.T. Wiancko at Experiment Station, Lafayette, Indiana, April 2. 1 p. "A year ago I sent you the following list of varieties of soybeans: #16789. Brooks. 17252. Flat King. 20854. Tashing. 17263. Austin. 17862. Sherwood. 19186. Morse. "I am anxious to learn the results you secured..."

Piper, C.V.; Nielsen, H.T. 1909. "Soy beans." *USDA Farmers' Bulletin* No. 372. 26 p. Oct. 7. See p. 11. "Austin (Greenish Yellow): The Austin is a vigorous though not coarse medium-late variety, growing 3 to 4 feet high, with numerous branches but none close to the ground. It can be easily harvested with machinery and is an excellent seed producer." This variety is one of the best out of more than one hundred sorts tested in the last three years. It is not yet on the market, but will probably be available by 1910.

Piper, Charles V.; Morse, W.J. 1910. "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 187. 84 p. Dec. 31. See p. 45, 75. Seed color: Olive yellow. S.P.I. No. 17263. "From Pingyang, Korea, 1901... Grown nine seasons. This variety was also distributed under Agrostology No. 1539." "The best varieties of soy beans (p. 75): Medium late–Austin, 17263."

Hall, J. Ed. 1914. "Soy bean a profit maker: Missouri farmers should give this new crop a trial." *Missouri Ruralist* 13(6):7. March 20. "Since making a two-year test of 10 varieties, we have decided that the Austin and Perley's Mongol are best adapted to central Missouri conditions. The Austin is a rank grower, producing large amount of well filled pods. One great advantage the Austin has over other varieties is the fact that they do not shatter so badly. The beans are of a rich green color."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 8-9. Austin is in the USDA Germplasm Collection. Maturity group: V. Year named or released: 1909.

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Developer or sponsor: USDA. Literature: 02, 03. Source and other information: From Pyongyang [P'yongyang], North Korea, in 1901. Prior designation: PI 6397. Address: USA.

86. Saito, Kendo. 1909. Preliminary notes on some fermentation organisms of Corea. *Botanical Magazine* (*Tokyo*) 23(268):97-98. May. Summarized in Zentralblatt fuer Bakteriologie. II. 26:92. [Eng; ger]
• ***Summary:*** Discusses the moulds in Corean [Korean] koji (mostly *Aspergillus oryzae, Rhizopus tritici,* and *Rhizopus tamari?*), and yeasts in the mash of Corean alcoholic beverages. The koji moulds or fungi possess, "as regards starch, strong saccharifying power, so that the saccharification of starch contained in the raw material can be accomplished by them." For one of the yeasts he proposes the name *Saccharomyces coreanus.* Address: Botanical Inst., Tokyo Univ., Japan.

87. *Revue Indochinoise.* 1909. Fabrication de l'huile et du tourteau de fève Soja [Production of soy oil and soybean cake]. 11:1046-47. Oct. [Fre]
• ***Summary:*** The extraction of oil from the soybean (*L'extraction de l'huile de la fève Soja*)–*Soja hispida*–which is found in Japan and which is imported to Japan in large quantities from China and Korea, is a very simple operation. The beans are steamed then crushed in mechanical presses; the oil flows out and is collected in reservoirs. It is allowed to stand for a while and is then refined. The result is an oil with a clear yellow color which can be used for the table or for industry. The remaining cake can be used as fertilizer or as a feed for animals.

Total production of the oil is about 700 tonnes per year and the average price is about 20 pounds sterling and 4 shillings per tonne. Up to the present, this oil has been consumed mainly in Japan, however recently it has been exported with success.

Note: This is the earliest French-language document seen (Sept. 2003) with the word *tourteau* or the term *tourteau de fève Soja* in the title, used to refer to soybean cake.

88. Meyer, Frank N. 1909. Re: Resumé of work as a USDA agricultural explorer. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. See p. 811-13. Letter of 2 Nov. 1909 from Berlin, Germany.
• ***Summary:*** Meyer filled out this form for USDA as he was passing through Berlin on the way to his second expedition, which started in Russia. "Salary: $1,600 per annum. 1. Education: An ordinary school education up to 14 years of age. After that much private tuition in Foreign languages, in Botany, Drawing (mechanical and landscape), Arithmetic and Measuring, Principles of plant propagation, etc.

"2. Experience: From 14th to 16th years as a pupil in the Botanic Gardens of Amsterdam, from 16th to 23rd year as an gardener and assistant to Prof. Hugo de Vries in his special experimental garden. From 23rd to 25th year as a gardner in commercial nurseries in England, especially having learned the culture of fruits and vegetables under glass and the culture of fruit trees against walls and fences as is practiced in the countries of Northern Europe.

"3. Departmental Service: From October 23, 1901 to August 31, 1902, as a gardener in the Department greenhouses at Washington D.C. Resigned September 1, 1902. September 15, 1902, re-entered Departmental service again in the Plant Improvement Garden at Santa Ana, California. Worked there as a propagator and all-around gardener. Resigned on account of very unsatisfactory conditions at the garden and improper treatment by Mr. P. Pierce, in charge, on April 1, 1903. Worked as head gardener in a carnation and palm nursery in Montecito, California, from April 1903 until March 15, 1904. Made journeys of study in California, Mexico, and Cuba from March 16, 1904, until August 1, 1904. Worked in the St. Louis Botanical Gardens from August 1, 1904 until July 1, 1905, as a propagator of mainly herbaceous plants. Was also member of the Jury on Forestry at the World's Fair in St. Louis during September 1904. Re-entered Department service for the third time on July 10, 1905, as an agricultural explorer. Left Washington, D.C. on July 27, 1905, and returned to the same city July 7, 1908, having visited in these three years parts of Japan, Korea, Eastern and Northern China, Manchuria and Eastern Siberia and collected nearly 2000 numbers of various plans and seeds.

"4. Results accomplished: Valuable varieties of Chinese fruits, vegetables, cover crops and ornamental plants introduced. From February 1909 until July 1909 having written his observations on Chinese agri- and horti-culture in a series of four bulletins which are in course of publication.

"5. Special qualifications. These questions can hardly be answered by the undersigned himself."

"8. Value. To be answered by those in charge."

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer.

89. Carson, John M. 1909. Soya bean and products: Japan (Document part). *Special Consular Report* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*) No. 41. Part 5. p. 13-16. Erroneously numbered Special Consular Reports, Vol. XL.
• ***Summary:*** Vice-Consul-General E.G. Babbitt of Yokohama writes: "The soya bean, or soja bean, as it is known here (Common Japanese name 'daidzu' [daizu]), is cultivated throughout the Empire of Japan. The total area of cultivation is in the neighborhood of 1,200,000 acres, or about 3.8 per cent of the total area devoted to the cultivation of rice and other cereals and grains. The soya bean is often cultivated, not in fields by itself, but in rows along the edges of rice or

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wheat fields. These edges are, as a rule, very soft, for they have been previously plowed, and little labor is required in planting... In harvesting the plants are uprooted, and, after being dried in the sun for several days, flails are used to separate the beans from the pods. The flails are of a very primitive type, with bamboo handle and of light weight. Female and child labor is invariably employed in flailing.

"The kinds of fertilizers used differ by districts. In the prefecture of Miyagi, for example, straw ashes and superphosphate of lime are commonly employed, while in the prefecture of Akita wood ashes, superphosphate of lime, and horse dung are used."

The average yield of soybeans in Japan over the past 10 years is 15.30 bushels per acre. For the year 1907 the highest yield is from Ishikawa prefecture, 21.62 bushels/acre, whereas the lowest yield is from Okinawa prefecture (Loochoo Islands, south of Kiushu [Kyushu]), 8.48 bushels/acre. During 1908 huge amounts of soya beans (3.3 million piculs; 1 picul = 132.277 pounds weight) were imported to Japan from China, Kwantung, and Korea, with small amounts coming from Asiatic Russia. Large amounts of soya-bean cake (7.760 million piculs) were imported from China and Kwantung, with small amounts coming from Asiatic Russia and none from Korea. "The total imports of bean oil in 1908 amounted to only 49,993 pounds, valued at $1,325."

"The soya bean is one of the most important articles of food in Japan. The beans are cooked in various ways, while in brewing soy (shoyu), in the manufacture of miso (pea or bean cheese), tofu (bean curd), koya-tofu (frozen bean curd), and natto (steamed beans) they are the chief ingredient. They are also manufactured into flour and make up the principal part of many Japanese sweetmeats. All these foodstuffs are daily used in Japanese homes.

"To a limited extent soya beans are used as horse or cattle food, being sometimes boiled and mixed with straw, barley, bran, etc."

The vice consul of Kobe states that in 1908 Japan produced 18,812,228 bushels of soya beans. Small amounts are exported "to Hawaii, the United States and Canada for use by the Japanese resident in those countries as an article of food." Three factories in the Kobe district make bean cake, largely from imported, lower-cost soya beans. "The beans are first crushed flat, then put into a big container and steamed, after which they are put into a steam press to extract the oil and to be made into cakes. The cakes come in circular pieces, a yard in diameter and an inch thick, each weighing about 50 pounds. The oil is used for lubricating machinery. The cake is used only as a fertilizer and is not fed to animals as it causes their hair to fall off."

Note 1. This is the earliest document seen (Feb. 2004) stating that soya bean oil can be used as a lubricant.

Note 2. This is the earliest English-language document seen (April 2013) that uses the term "koya-tofu" to refer to dried-frozen tofu.

Note 3. This is the earliest document seen (Aug. 2011) in *Chemist and Druggist* in which the toxicity of a soy product is discussed or alleged, namely soya cake "is not fed to animals as it causes their hair to fall off." Address: Chief of Dep.

90. Lewkowitsch, Julius. 1909. Chemical technology and analysis of oils, fats, and waxes. 4th ed. Entirely rewritten and enlarged. 3 vols. London: Macmillan and Co., Ltd. See vol. II, p. 122-24. [7 ref]

• ***Summary:*** The section titled "Soja bean oil (Soy-bean oil, Bean oil, Chinese bean oil)" (Vol. II, p. 122-24) gives details about the soja bean, "a plant indigenous to China, Manchuria, Korea, Japan, Formosa, and Indo-China,... The seeds contain 18 per cent of oil and about 30-40 per cent of proteins. The industry of the soja bean forms one of the most important manufactures of Manchuria and Japan."

In Manchuria, the expressed meal is made into bean cakes (Chinese *Téou-fou-tcha*) which are exported in large numbers. The Japanese make shoyu and miso from soja beans. "Efforts have been made to ship soja beans to Europe, but on account of the deterioration which they undergo on the long voyage [through the tropics and especially through the Red Sea], as also on account of the difficulty of disposing of the cakes, attempts in this direction have been abandoned."

Two tables give physical and chemical characteristics based on the investigations of: (1) Morawski and Stingl; (2) De Negri and Fabris; (3) Shukoff (from seed grown in an experimental station in South Russia); (4) Lane (who found 80.26% of liquid fatty acids).

Vol. II also discusses many other major and minor oils including: Linseed oil (p. 39-60), hemp seed oil (p. 76-77), sesamé oil (beniseed oil, gingelli oil, teel oil, p. 167-79), almond oil (p. 233-40), and arachis oil (peanut oil, earthnut oil, ground nut oil, p. 244).

Julius Lewkowitsch lived 1857-1913. Address: Ph.D., M.A., F.I.C., Consulting and analytical chemist, and chemical engineer, examiner in "soap manufacture" and in "fats and oils" to the City and Guilds of London Inst.

91. Jones, W.J. 1910. Manchurian development: The railways and the beans (Continued–Document part II). *Grey River Argus* (*West Coast, New Zealand*). Jan. 3. p. 4.

• ***Summary:*** (Continued): "The process of distribution. The bean, which is commonly known as the Sakura oil bean in South Manchuria, and the Soja bean in Vladivostock [Vladivostok], has the appearance of the wild pea. It is now principally grown in the districts from Ta-shih-chao to the immediate south of Harbin for practically the whole breadth of the country, along the Antung route, and in many parts of Korea. The Kwancheng-tzu district has the distinction of being the greatest bean-producing centre and Chang-

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chun exists entirely for and upon beans. The processes through which the crop goes after leaving the hands of the producer are particularly interesting. The beans are taken by the farmers in Chinese carts to the nearest villages and are there exchanged with the innkeepers, who are also the storekeepers, for cloth and the ordinary requirements of housekeeping, a certain percentage of the purchase-money being received in cash. The innkeepers take the beans to the larger towns, and there effect a bargain with the merchants, receiving in return supplies to replenish their stock. The merchants in their turn convey the produce to the principal distributing centres, such as Tiehling, Changchun, and there sell it to the innkeepers, who own large yards where, the beans are stored. The proportions of the business may be gauged from the fact that these yards are 20 or 30 acres in extent. The receptacles are curious bins called tuns, constructed of straw, each 120 ft high and capable holding 150 tons. The last pre-export stage of all is reached when they are sold to the local merchants in Dairen or Newchwang at so much per *dan* (480 1b). The currency in which the farmer deals is the *tiao* (equal to from 5*d.* to 6*d.*). The dealers in the ports pack their produce into gunny bags holding 187 1b, and the consignment is then ready for steamer.

"What the bean produces: The first process in the treatment of the bean is the extraction of the oil. The Chinese, with their loyalty to primitive methods, use a hand press which is not so satisfactory as the efficient machinery of the European merchants, and the latter obtain not only 6 per cent more oil, but from 3 to 4 per cent of butter-fat, which is used in the manufacture of confectionery. From 9 to 10 per cent of oil is extracted by the hand-press and 15 to 16 by machinery. The oil is of various samples, the refined article almost equalling in quality fine olive oil, while the crude article is used by the Chinese for food and lighting. From about forty-eight pounds of beans forty pounds of bean cake and between four and five pounds of oil are obtained, the extra weight being released during the steaming process in manufacture. The beans cost in Manchuria about 5*s* per picul (133 1/3 pounds). The oil is sold at 17*s* per picul and the bean cake at 2*s* 3*d* to 2*s* 6*d* per picul.

"The future of the beans: Towards the end of last season the railway carried 6,000 tons per day to the ports, and it is estimated that this year the amount will be increased by 1,000 tons daily. This looks like business and the merchants would tell you that the prospects are promising. The bean cake is an excellent fertilizer, and an inexpensive one, and might find its way in increasing thousands of tons into countries to which it has not hitherto been exported. But there are difficulties to contend with and possibilities to consider which make trading in beans somewhat of a gamble. The fluctuations in the price of silver may cause a difference in values of as much as 40 per cent in the short period elapsing between sale and delivery. There is also a lack of confidence, consequent upon there being so many rivals on the market as oil-producing seeds. These are problems which may be solved to the satisfaction of bean merchants, and if so, there is a great future for beans and their by-products in Europe and other parts of the world. So far as China and Japan are concerned it is certain that their demand will increase annually by material quantities, at any rate this would appear to be the belief of those interested in the business, judging from the extension of the area placed under cultivation."

92. Saito, Kendo. 1910. Notizen ueber einige koreanische Gaerungsorganismen [Notes on some Korean fermentation organisms]. *Zentralblatt fuer Bakteriologie. Series 2.* 26(13/15):369-74. Feb. 23. [4 ref. Ger]
• ***Summary:*** Mentions the molds *Aspergillus oryzae* and *Rhizopus Tamari.* Address: Botanical Institute, Tokyo.

93. Sagnier, Henry. 1910. Le soja et ses produits [The soybean and its products]. *Journal d'Agriculture Pratique* 74(1):307-10. March 10. [4 ref. Fre]
• ***Summary:*** The soybean was a curiosity in Europe until 2-3 years ago, when large amounts started to be imported. The prince A. d'Arenberg, president of the Suez Canal Society, told the National Society of Agriculture, that prior to 1908 no soybeans had passed through the Suez Canal, yet in that year 35,000 tons passed through it. It seems that the new commerce has been stimulated by the expansion of the crop in Manchuria and Korea, under Japanese influence. Most of the imports have gone to England and northern Europe. In England, the oil is used to make soaps and the cakes are fed to livestock.

Recently it was announced that the Chinese government, preoccupied with the expansion of exports, would have manifested the intention to prohibit these exports in view of preventing a shortage of soybeans in the interior of the country.

"The Chinese are now greatly expanding their efforts to make known in Europe the advantages to be gained from soya and from the products that can be extracted from its seeds. I recently had the occasion to present to the National Agricultural Society of France a study written by Mr. Liyuying [Li Yu-ying], delegate of the government of China for several missions. It was titled *Le soja, utilisation alimentaire, thérapeutique, agricoles et industrielle.* This study was accompanied by samples of yellow and black soybean seeds, and by the principal products which can be extracted from this plant: flour, bread for diabetics, cake (*gâteau*), seasoning sauce (*sauce condimentaire*), confections (*confitures*), raw milk (*lait cru*), cooked and sweetened milk (*lait cuit et sucré*), cake for livestock feed, (*tourteau pour l'alimentation du bétail*), fresh cheese (*fromage frais* [tofu]), and smoked cheese (*fromage fumé* [smoked tofu]).

"These products originated from processing imported soybeans. They have been prepared at a test factory (a photo,

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p. 309, shows the interior) set up just outside of Paris, at Vallées, near Asnières. Li Yu-ying's study gives complete details on these products" which are made from imported soybeans. This factory, named *Caséo-Sojaine*, "has been established by the agents of a civil society constituted in China under the name of *Société biologique de l'Extrême-Orient* (Far Eastern Biological Society). Made up of physicians, scholars (men of letters), and businesspeople, this society would seem to have as its principal goal/object to make known and have used in Europe the pharmaceutical and agricultural products of the Far East [East Asia]."

Note: This is the earliest document seen (May 2011) that mentions the Far Eastern Biological Society (*Société biologique de l'Extrême-Orient*)

The author concludes by discussing soymilk (*lait de soja ou lait végétal*), soybean cakes (*les tourteaux d'huilerie*), and a brief history of the soybean in France.

Illustrations (p. 308, both from Li Yu-ying 1910, p. 11-12) show: (1) Mature soy bean plant with pods. (2) Close-up of soy bean pods and seeds.

Photos (p. 309, from Li Yu-ying 1910, p. 36-38) show: (1) A partial view of the interior of Li Yu-ying's soyfoods manufacturing plant at Vallées (Seine). (2-3) Soy milk and soy flour viewed under a microscope.

94. Japan, Bureau of Agriculture (Norinsho, Nomukyoku), Dep. of Agriculture and Commerce. 1910. Outlines of agriculture in Japan. Tokyo: Agricultural Bureau, Department of Agriculture and Commerce. 132 p. March. Illust. No index. 23 cm. [Eng]

• ***Summary:*** This book was compiled to acquaint foreigners with agriculture in Japan. Company name with diacritics is: Nôrinshô, Nômukyoku. A map near the front shows Japan and its empire (incl. Korea, Formosa, Kwantung, Karafuto, and the Kurile Islands, with an inset pie chart showing the value of Japan's agricultural products). Oval photos show Japan's six top agricultural officials, including Baron K. Oura, Minister of the Dept. of Agriculture and Commerce, C. Shimooka, Director of the Agricultural Bureau, and Dr. Y. Kozai, Director of the Imperial Experiment Station.

A full-page table shows the moneys, measures and weights of Japan with English equivalents.

Contents of the first part of the book: Introduction: Geographical location, area, population, topographical position, climate. 1. General remarks. 2. Condition of farmers. 3. Condition of agricultural land.

The section titled "Upland fields" (p. 18) states: "Upland fields are those portions of land being located in high and dry places which by wanting means of irrigation could not be converted into paddy fields. The utilization of these fields is commonly made by the rotation system and crops are raised twice a year. The commonest instance is that barely, naked barely, and wheat are raised as the first crop in winter whereas soja beans, sweet potatoes and millets are raised during the summer as the second crop." The profits from upland fields are generally smaller than from lowland / paddy fields. The average yield of soja beans over the past 10 years is given in Japanese units (p. 19).

In Japan only cows and horses are kept as work animals. In 1907 Japan had 1,008,922 cows and 2,204,031 horses. But they were used more for their manure than for plowing.

A table (p. 28) shows the value (in yen) of the principal commercial fertilizers in Japan from 1905 to 1907. "Soja bean cakes" (a key source of nitrogen) is by far the largest, averaging 12.9 million yen for these three years, followed by superphosphate of lime, mixed manure, rape-seed oil cakes, herring cakes, bone dust, and cotton-seed oil cakes. Note 1. This is the earliest English-language document seen (July 2016) that uses the term "cotton-seed oil cakes" (plural or singular) to refer to cotton-seed cakes.

A table (p. 37) gives the cultivated area (in 1,000 *cho*) of major Japanese crops in 1887, 1892, 1897, 1902, and 1907. In 1907 rice had by far the largest area (2,906), followed by naked barley (694), barley (658), soja bean (471), wheat (444), mulberry tree (390), sweet potato (288), Indian millet (202), rape seed (143), small red bean ([azuki], 135). Soja bean area remained almost unchanged between 1887 (466) and 1907 (471).

A table (p. 39) gives average yield (in *koku/tan*) of the same major Japanese crops for the same years shown in the previous table. Yield of soja beans rose from 0.698 in 1887 to 0.777 in 1907. Since 1 *koku* = 4.963 bushels and 1 *tan* = 0.245 acres, the 1907 yield is 15.74 bushels/acre.

A table (p. 40) gives the production (in 10,000 koku) of the same major Japanese crops for the same years shown in the previous table. Production of soja beans rose from 325 in 1887 to 366 in 1907. Since 1 *koku* = 4.963 bushels, and 10,000 *koku* = 49,630 bushels, then 366 *koku* is 18.164 million bushels. The next table (p. 42) shows the value (in yen) of each of these agricultural products in 1905-07, and a table (p. 46) compares the cultivated area of each of these crops with rice; soja beans are 16.2% of rice.

In the section on "Food crops" (p. 47+) is a detailed discussion of each. Concerning "Soja bean" (p. 50-51) we read: "The use of this bean is extremely extensive since they are used for the purpose of supplying to the people low priced starchy food by being made into *miso* (pea cheese), soy, *tofu* (bean curd), and other food-stuffs required by the Japanese. The residue obtained from making these food-stuffs from the bean is used for the purpose of feeding cattle or of pressing oil while as manure it is highly valued. Soja bean is easily cultivated requiring less amount of manure and labour. It is therefore cultivated all over the country and occupies the principal position among summer crops of upland fields. Within recent years the demand for it has considerably increased at home and also the export of various food-stuffs prepared out of bean has shown some increase so that no small amount of bean is imported either

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from China [Manchuria] or Korea. The amount imported actually reaches 10,000,000 *yen.* Over and above these, the import of bean cakes is approximately figured at 20,000,000 *yen* so that the domestic output has somewhat been affected."

Also discusses: Barley and naked barley. Indian millet, Barnyard millet and sorghum. Small red bean [azuki] ("A large amount of small red bean is used as a material for cakes [confections], Hokkaido being the principal producing district." p. 51). Flax and hemp. Green manure crops, incl. *genge* (*Astragalus sinicus, umagoyashi* (*Medicago denticula*)), soja beans, etc.

Note 2. This is the earliest English-language document seen (March 2006) that uses the term "small red bean" to refer to the azuki bean.

Chapter 4, titled "Animal industry and poultry" (p. 69+) contains many statistics which may be of interest to vegetarians. Japanese traditionally ate fish rather than meat. "Even at present, the amount of meat consumed per capita a year does not exceed 1.7 pounds while that consumed in America is 150 pounds and in England 118 pounds per capita." etc.

Page 70 contains 4 tables with statistics about the number of cattle, horses, swine, sheep and goats, from 1897 to 1907. The number of slaughter houses decreased from 2,163 in 1897 to 938 in 1907. During this same period the number of slaughtered horses increased from 41,049 to 65,655 and the number of slaughtered swine increased from 107,034 to 177,351.

Note: An excellent history of meat eating in Japan, by Zenjiro Watanabe, is available online at http://www.kikkoman.co.jp/kiifc/foodculture/pdf_09/e_002_008.pdf.

In 1906 the government perceived the necessity for developing a poultry industry in Japan so it established a poultry plant as a branch of the Imperial Stock Breeding Farm in the suburbs of Tokyo (p. 75).

A table (p. 85) shows imports of principal agricultural products (quantity and value) each year from 1906 to 1908. Imports of soja beans increased from 286 to 352 (x 10,000 piculs) during this period, while imports of [soja] bean cake increased from 433 to 776. Both were imported mainly from China. However "the output of *soy* [sauce] and *miso* made of soja bean is exported to the amount of 1,200,000 yen, while bean cake forms the principal fertilizer in Japan" (p. 86).

Page 95: The Imperial Agricultural Experiment Station, with its headquarters near Tokyo, under the direct control of the Minister of Agriculture and Commerce, "originated in 1886 and the system was practically completed in 1893." Address: Tokyo.

95. Brenier, Henri. 1910. La question du soja [The soya question]. *Bulletin Economique de l'Indochine* (*Hanoi*) 13(83):105-28. March/April. Series 2. [22 ref. Fre]

• ***Summary:*** This is an in-depth look at the relevance of the soybean to France, both now and in the future. It is prompted by the rapid growth of soybean imports to Europe from Manchuria. The author has a good knowledge of the literature on soybeans and a familiarity with the crop in the field in French Indochina and China.

Contents: 1. Soybean cultivation: Species and varieties, major soybean producing countries (China, Japan, Korea, Indochina), other countries (Java and the Dutch East Indies, France, USA. The Imperial Institute of London is conducting trials in the Cape of Good Hope and Natal [South Africa], in British West Africa, and in Gambia), methods of cultivation and yield. 2. Commerce: Exports of soybeans and soybean cake (beancake, *tourteaux de soja*) from China and especially Manchuria (Newchwang, Dairen/Dalny, Antung, Ta tung kow, Suifenho {Suifenhe / Sui-fen-ho}), importing countries in 1908 in descending order of amount imported (Russian ports on the Pacific [Vladivostok], for re-export to Europe). Exports. Prices 3. Soybean utilization: Chemical composition, use as a forage plant and for improving the soil, use in human foods (tofu, shoyu, Worcestershire sauce, tuong [Annamite soy sauce], miso, natto, soymilk), the soybean as an oilseed (yield of oil from various oilseeds), soybean cakes. Conclusions.

Page 109 discusses soybeans in Indochina, according to information received from M. Crevost, Curator of the Agricultural and Commercial Museum of Hanoi, and from the article by Bui-quang-Chiêu (Dec. 1905). The names of the soybean are different in the various parts of Indochina. In Cochin China (especially in the provinces of Chaudoc and Baria), in Annam (sporadically), and in Tonkin it is called *dau-nanh* or *dau-tuong* (*Tuong* is a sauce made with soybeans, described later under "Uses"). In Cambodia (*Cambodge*) it is called *sandek sieng.* The variety most widely cultivated in Indochina seems to be one with a yellowish-white color, more oblong than round, a little flattened (*soja platycarpa* of Harz [1880, 1885] (?)), different therefore from the fine (*belle*) varieties of Manchuria and Japan that are well rounded and pure yellow.

A table (p. 112) shows soy bean grain exports (in 1,000 metric tons) from different Manchurian ports for the years 1905-1908. The author notes that Indochina could be exporting soybeans to France. One factor that stimulated the large exports of soybeans from Manchuria in 1908 (besides an excellent harvest in 1907) was a program to suppress the cultivation of opium by expansion of soybean acreage (p. 113). The author uses the scientific name *Phaseolus radiatus* to refer to the *petit haricot vert* (probably mung bean). He observed soybeans planted in mixed culture in Szechuan.

Page 115: In 1908 tables show total exports to foreign countries were as follows: Soybean seeds (*Soja en graines*)*:* 285,180 tonnes (metric tons). Soybean cakes (*Tourteaux de soja*)*:* 469,800 tonnes. Total: 754,900 tonnes, worth 78 million French francs.

Page 115: In 1908 official statistics are first given for exports to Europe (in tonnes): Great Britain 69,200, France

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21,390, Holland 7,290, Italy 4,140, Belgium 1,760, Germany 670, Russian ports on the Pacific [such as Vladivostok] (for reexport to Europe, primarily to England it seems) 100,000. Total: 204,440 tonnes.

Page 116 notes that the rise of soybeans in Manchuria is due in part to the power of the Japanese commercial house Mitsui Bussan Kaisha and the large English oil mills, which joined to develop an industry that had not previously existed. At the end of 1906, Mitsui, which had a dominant commercial role in Southern Manchuria, sent one or two trial shipments of soybeans to England. Mitsui was followed mainly by the British trading houses (Samuel & Samuel, Jardine, Matheson), then by the Germans (Otto Reimers, Arnhold Karberg & Co), and the Russians. Continued suppression of opium growing led to further expansion of soybean cultivation.

A table (p. 117) gives the price of soybeans (per picul of 300 catties = 180 kg), soybean cake (per 10 cakes of 53 catties each or 318 kg for the 10), and soybean oil (per picul of 100 catties = 60 kg) in New chwang [Newchwang] taels and in French francs in the average year from 1882-1891, and in the year 1897. Prices were up in 1897.

Page 124 states: "A factory was recently founded near Paris (at Saint Germain en Laye), with Chinese capital, for the preparation of a series of products derived from soya: milk, *"caséo-sojaïne,"* cheese [tofu], sauce, and sweet soya preserves (*confiture* (*?*) *de soja*)*."* A footnote states: "I owe this curious piece of information to the amicability of the secretary of *Ecole française d'Extrême-Orient,* Mr. Ch. Maybon, who pointed it out in the January 1910 issue of the *Bulletin de l'Association amicale franco-chinoise.*

A table (p. 125) shows that the soybean gives the lowest yield of oil of all major oilseeds: copra (from coconut) yields 67-70% oil, sesame seeds 50-56%, poppy seed (*pavot*) 43-50%, castor oil plant 42-50%, rapeseed (colza) 42-45%, linseed 43%, peanuts 35-47%, cottonseed 21-26%, soybeans from Manchuria 16-18%.

Note: This is the earliest document seen (March 2000) that describes *caséo-sojaïne* as a product. Yet this may well be a mistake since its source of information is given as *Bulletin de l'Association Amicale Franco-Chinoise* (Jan. 1910)–which uses the term to refer to a business name. Address: Inspecteur-Conseil des Services Agricoles et Commerciaux de l'Indochine.

96. *Times* (*London*). 1910. The soya bean: Its importance in Manchuria. July 19. p. 63, col. 4.

• ***Summary:*** This is part of a 96-page Times Supplement on "The Empire of Japan." Contents: Introduction–The bean trade in Manchuria. Its introduction to European markets. The growth of exports. The home consumption remains large. Efforts to secure foreign markets. A word of caution. The trade in England (Total: 2,500 words).

"The history of the growth of the bean trade in Manchuria is as captivating as the story of the rise of Jack's famous beanstalk of our nursery days. It reads more like a fairy tale than a page from the Board of Trade Returns. Only after one has travelled through the region where the Soya bean reigns supreme, and has seen the wharfs and the warehouses, the stations and the platforms laden with bags of beans, and noted the thousands of queer looking stacks with pagoda-like roofs with which the country is dotted, and that serve as temporary storehouses for the produce whilst awaiting shipment, does one realize that it is not a fable, but a veritable fact in the history of international commerce. Nevertheless, more than the ordinary amount of imagination is required to grasp the fact that the first commercial consignment of soy beans was sent to Europe in 1906 and the requirements for the coming season are estimated at a million tons. At the minimum price of £6 10*s.* per ton, this means a business of £6,500,000, or something like 70 millions of silver dollars. That an industry of such vast proportions should at a time like this spring up in a few years indicates that all the opportunities of commerce are not closed to those who have courage and foresight enough to search for new openings for trade.

"Its introduction to European markets: The development of the Soya bean is of such recent date, and has been so intimately connected with Japanese enterprise, that a few facts in regard to its rise and progress may be of interest in this issue of *The Times.* The credit for the introduction of this useful article of commerce is undoubtedly due to Messrs. Mitsui and Co., the well-known Japanese financial and industrial firm, who sent their first trial shipment of beans to England in the winter of 1905-06. This consignment was not successful owing to imperfect packing. A second shipment met with better results and led to a succession of large orders. The beans were found to be valuable both for the extraction of oil and also in the shape of cake for feeding cattle."

Note 1. This is the earliest document seen (March 2021) stating that Mitsui and Co. sent soybeans to Europe in 1906.

"Excellent biscuits have also been made out of one variety of these beans. The United Kingdom was at once able to take advantage of this newly-found import because of its admission free of duty, the high tariff on such produce precluding the Soya beans from access to Germany, France, and other Continental countries. So great was the demand that by the end of the season of 1908, the Mitsui Company had exported to Europe 200,000 tons of these beans, and both this concern and the Yokohama Specie Bank, operating in conjunction, are said to have made very handsome profits on these transactions. In the season of 1909 the sales to Great Britain alone are stated to have reached 400,000 tons and several other important firms have entered the field, including the well-known firm of Samuel Samuel and Co. The Liverpool Chamber of Commerce estimates the consumption value of a ton of these beans in London at £6

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10*s.*, and a British Consular report concludes that England alone will in the future be able to take one million tons of beans annually.

"The growth of exports: However this may be, figures supplied me by Messrs. Mitsui give the total exports for the season of 1908-1909 (from the three ports of Dairen, Newchwang, and Vladivostok) at 788,916 tons and of bean cake (94 per cent. of which went to Japan) at 681,446 tons. Of the beans, 397,156 tons, or 51 per cent., went to Europe, 30 per cent. to China, and 19 per cent. to Japan. That the export of these beans continues to increase is shown from some data furnished to me when in Japan by the Statistical Department of the South Manchuria Railway Company, which indicate that for the year ended March, 1910, the export of beans from Dairen reached 622,000 tons, and that of bean cake 22,000 tons. These figures show that the export of the first consignment of beans to England in 1906 has secured for Manchuria an extensive international trade. The same authority estimates the bean crop 'of all kinds' in Manchuria for the year ended November, 1909, at 1,700,000 tons and the supply of bean cake at 900,000 tons.

"The home consumption remains large: Whilst the Soya bean has thus suddenly come into international fame, its uses and virtues have long been known in the Far East. The oil of the bean has been used throughout China as an article of food and for other purposes. The cake is valuable as a fertilizer for rice and sugar cane fields, and the figures given above show the enormous quantities of the cake exported to Japan, a country which, according to Government estimates, is obliged to spend £12,000,000 annually on fertilizers of various kinds. In Manchuria the Soya bean is primarily used for the extraction of oil and for the manufacture of cake; it is also made into vermicelli and similar articles of food. Manchuria seems to have a natural monopoly in the growing of this bean for export. The other producing countries, Japan and Korea, require all they are able to raise for domestic consumption, whilst the production of the French possessions in Asia, of Asia Minor, and of West Africa is said to be neither large nor promising enough to be of much account for export. Down to the present time, the Soya bean has not been successfully produced elsewhere, though experimental efforts to grow this particular bean in other parts of the world are in progress."

Note 2. This is the earliest document seen (March 2021) suggesting that soybeans may be growing or have been grown in Asia Minor [which is today the large eastern part of Turkey], or the Middle East. A similar and earlier, but weaker, suggestion appears in an article titled "The Ubiquitous Bean," in the *Manshu Nichi Nichi Shinbun* (Dairen) of 25 Nov. 1909. That article states that "Asia Minor... produced something like Beans" [perhaps Soya Beans]. Continued.

97. *Times* (*London*). 1910. The soya bean: Its importance in Manchuria (Continued–Document part II). July 19. p. 63, col. 4.

• ***Summary:*** Continued. "Efforts to secure foreign markets: The Treaty Port of Manchuria half a century ago began the exports of beans, bean oil, and bean cake. It is strange that the potency of the little green bean–it looks more like a dried pea than the bean grown in England–which is furnishing three railway systems with freight, hundreds of vessels with cargoes, three ports with business, and starting up new industries in the North of England should have remained so long undiscovered by Europeans. Even now its advantages appear to have been forced upon the attention of England by a Japanese merchant who, failing his first efforts, made a second attempt to introduce the Soya bean into Europe.

"These beans raised by industrious Chinamen toiling incessantly for a few pence a day are generally brought to the river in carts and shipped in junks in the summer time, while in the winter they are often brought for miles along very bad roads by cart to Newchwang.

"After the building of the railways it was natural that these exports should gravitate more and more to the maritime outlets of these lines at Dairen, Vladivostok, and, to a lesser extent, to Newchwang, which last port, as will be seen in an article elsewhere in this issue, is still receiving the bulk of its consignments by means of junks and by carts. The Newchwang exports consisted of oil and cakes which were manufactured by the aid of numerous crude Chinese oil presses worked with mule power–the oil going to China and the cakes to Japan.

"As soon as the bean assumed an international importance, Newchwang lost its monopoly of the trade. As recently as 1907 almost all the beans available for export–namely, 120,000 tons–were exported *via* Newchwang. Of the 800,000 tons exported last year half went by way of Dairen, and the remainder from Vladivostok and from Newchwang. In the export of bean cake Newchwang still holds the first position because of her numerous Chinese oil presses, together with one modern factory. Extensive up-to-date factories capable of extracting a greater percentage of oil are however being established–of these, two are at Dairen–and unless Newchwang shows more enterprise than one observes in a visit to the city, she will soon lose the first place in the bean cake trade.

"The quantity of oil in the Soya bean varies from 16 to 17 per cent., and by some chemical processes I believe even 19 per cent has been extracted. Of course nothing like this amount is obtained even in the excellent mills which I visited at Dairen. To what extent the extraction of practically all the oil would impair the value of the cake as a fertilizer is difficult to say. These are questions which will have to be dealt with in the future. For the present, the industry is still in its infancy, so far as the application of applied chemistry and modern methods are concerned.

"A word of caution: In case the story of the rise of the

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Soya bean industry should prove too alluring to British merchants of a speculative turn of mind, and not provided with a knowledge of the methods of doing business in the Far East, it may be well to mention that it would be quite useless to start an office at some point like Dairen or Changchun in order to buy beans in the local market. The only way is to travel into the interior, to visit the country markets and to buy in small quantities for silver coins of low value, that is, 20 or ten cent pieces. The Chinese silver dollar is only worth 85 *sen* Japanese money, or 1s. 9d. [1 shilling, 9 pence], and 5 of the 20 cent silver pieces are worth about 2½*d.* less than the Mexican or Chinese dollar. The Japanese by purchasing the beans with the little silver coins obtain them cheaper than would be possible for an English firm which was paying for them in silver dollars. For some unaccountable reason, the Chinese producer prefers the small coin though its value is 10 per cent. less. This is not generally known, for one naturally assumes that ten 10 cent silver coins or five 20 cent coins make equally one silver dollar–but I discovered that such was not the case in the bean district of Manchuria.

"The trade in England: The soya bean now constitutes an important part in the Hull import trade, and has provided a new source of revenue for the shipping industry. It is estimated, indeed, that already the cost of the freight to British ports has reached over a million sterling. The imports into Hull last year were about 200,000 tons. Good judges are of opinion that the rapidly increasing import trade into Europe must ultimately have a serious effect upon the seed industry, and is likely to particularly affect the imports of cottonseed.

"The bulk of the soya beans imported into Hull are the yellow beans, and those engaged in the seed trade in the Hull district have a good opinion of the new bean. It is to the cattle grower, rather than to the oil trade, that the advent of the soya bean into this country is of importance, for the cake is cheaper than cottonseed cake and is at the same time richer in those constituents for which cake is used. The value of soya oil is also being widely recognized by soap manufacturers, and there is a notable tendency to employ it in preference to cotton oil.

"The beginnings of an export trade from Hull with the Continent are now in evidence. A considerable quantity of soya cake has already been exported from Hull, and if some further reduction in the price of the cake could be brought about a large export trade would undoubtedly be created. Continental dairy farmers are now employing soya meal, with which, apparently, experience has been quite satisfactory. Inquiries made at Hull show that the mills have had their capacity severely taxed by the advent of the soya bean, and imports during the present year have been on a constantly growing scale. With the breaking down of the prejudice of British farmers, which is gradually coming about, a real boom in the soya bean trade would appear to be imminent."

98. Crowe, E.F. 1910. Japan. Report for the year 1909 on the trade of Japan. *Diplomatic and Consular Reports, Annual Series* (*Foreign Office, Great Britain*) No. 4511. 86 p. July.
• ***Summary:*** "Imports of manures.–The question of manures forms one of the most interesting items of 1909. A detailed table showing the quantities and values imported during the past three years will be found in Table 1 (B), page 61. Bean cake, of course, heads the list as regards value. The total amount imported in 1909 was 575,180 tons, worth £2,283,700, or £3 19*s.* 4*d.* a ton, as compared with 461,950 tons, worth £2,220,000 in 1908, or an average of £4 16*s.* 1*d.* a ton.

"Next comes the sulphate of ammonia, but in this item there was a big drop from 66,445 tons, valued at £898,000, to 45,835 tons, worth 604,700, while in the case of both phosphate rock and fish guano there was a decrease of about £100,000. Nitrate of soda made a small gain.

"It is a well-known fact that bean cake has for years occupied the position of the most popular imported fertiliser in Japan. Now, however, that the United Kingdom, and the Continent of Europe and America to a lesser extent, have become purchasers of Manchurian beans the questions arises as to whether Japan will be able to continue to buy bean cake in huge quantities if the price rises appreciably. In studying this question two factors should not be lost sight of; one is that Japan is herself a large grower of soya beans, having, according to the latest available returns (1908) over 1,200,000 acres under cultivation, producing annually some 19,000,000 bushels of beans, while the other is that Japan imports very large quantities of soya beans from China and Corea [Korea].

"The greater part of these beans is used for the purposes of human food, *i.e.*, the making of "soy," "miso," and bean curd, but a portion, by no means small, is used also as a fertiliser.

"The Russo-Japanese war had such an effect in curtailing the supplies of beans and cake that to arrive at a just appreciation of the position it is necessary to go back a good many years." A table (p. 18) shows imports of [soy] beans and bean cake (in piculs; 1 picul = 132.27 lb), the value of each, and the average price of silver each year from 1900 to 1909. Imports of [soy] beans increased from 1,575,022 piculs in 1900 to a record 3,623,377 piculs in 1909. Imports of bean cake increased from 2,280,687 piculs in 1900 to a record 9,663,036 piculs in 1909. The average price of silver fell by about 16% during this period. "Should the price in future be forced up very high in consequence of British and other demand, the presumption is that Japan would turn to sulphate of ammonia if the cost per unit of nitrogen therein were to be less than in the bean cake. On the other hand it must be remembered that the removal of duty on sulphate of ammonia in the United States of America means that that country will probably absorb large quantities

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of the British output and that Japan will have to pay a bigger price if she wants a share of this fertiliser.

"Thus the outlook for nitrate of soda becomes a good deal brighter and now that, owing to the subsidised Japanese line which runs to South America, it is possible to get cheap direct rates of freight, it looks as though the nitrate of soda will be a serious competitor to the other nitrogenous fertilisers, except in the matter of wet rice cultivation."

Page 31 shows the shares of principal countries in the import and export trade of Japan during the years 1908 and 1909. Japan's biggest imports came from the United Kingdom, followed by the USA, then China. The biggest customer of Japan's exports was the United States, followed by China then France (p. 31). Japan's biggest port (in terms of value of imports and exports) was Yokohama, followed by Kobe than Osaka (p. 37). Japan's population at the end of 1909 was estimated at 49,769,704 (not including Formosa or Karafuto [Japanese Sagalien]). Japan's most valuable exports in 1909 were tea, followed by rice then fish. Exports of "Soy" [sauce] rose from £110,500 in 1907 to £111,100 in 1909.

Summarized in *J. of the Board of Agriculture* (*London*), Aug. 1910, p. 410.

Note: This is the earliest document seen (Oct. 2017) that gives statistics concerning industrial utilization of soybeans–in this case soybean meal used as a fertilizer in Japan. Address: Attaché, British Embassy, Tokio [Tokyo].

99. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*). 1910. Japanese trade notes. 13(36):499. Aug. 15.

• ***Summary:*** "Consul-General Thomas Sammons, of Yokohama, furnishes the following notes concerning Japanese trade... Japanese 'soy' [sauce] is exported chiefly to the United States, Hawaii, Port Arthur and Dalny [Manchuria], and Korea, each taking approximately 400,000 gallons annually."

"Of Japan's total exports of peanuts the United States takes two-thirds."

"Korea leads in the consumption of Japan's national beverage, sake, taking 1,400,000 gallons a year; the United States consumes about 250,000 gallons annually." Address: Washington, DC.

100. Ott de Vries, J.J. 1910. Der Milchertrag und die Beschaffenheit von Butter und Kaese bei Sojakuchenfuetterung im Vergleich zur Leinkuchenfuetterung [A comparison of the effects of soybean cake and linseed cake rations on the yield of milk and the properties of butter and cheese]. *Molkerei-Zeitung* (*Berlin*) 20(35):409-10. Aug. 27; 20(36):421-22. Sept. 3. English-language summary in Experiment Station Report, p. 581. [Ger]

• ***Summary:*** [Subtitle in Dutch:] Enrichment for Exploitation at a Trial Dairy Farm in Horn [a town in the Netherlands]. Report from 1909. (*Bereeiniging tot Exploitatie eener Proefzuivelboerdrij te Horn. Verslag over het Jaar 1909**) (* Footnote: The plan for these experiments was designed by Dr. K. H. M. von der Zande and the trials were also carried out at the beginning under his leadership.)

For several years, a concentrated feed has experienced strong sales on the feed markets. It is obtained from the soybean (*Sojabohne*), which is native to East Asia: the so-called "soybean cake" (*Sojakuchen*). As a result of its low price with a high content in nutritional components, it has found its way specifically into the fodder for dairy cows. For that reason, it has been suggested to study the influence of these feed cakes on the milk yield and on the qualities of the butter and cheese.

"The soybean (*Glycine L., Soya hispida*), which is native to East Asia, thrives in Japan and China as well as on Java and in British India, and it is occasionally also found in Europe and North America. While those with a good knowledge of this plant differentiate more than two hundred varieties of it, among which are found seeds with every sort of color, in China and Japan only two or three varieties of this bean are planted at the agricultural level. In recent years, the cultivation of this crop has spread across nearly all of tropical and subtropical Asia. Its use is very multifaceted in Asia. When prepared in a variety of ways, it serves as a food for humans, in a certain preparation as the soy sauce (*Sojasauce*) which is esteemed everywhere as a seasoning for dishes, and finally the famous plant cheese [probably tofu] of the East Asians is prepared from it. During the Russo-Japanese War, the soybean first and foremost made it possible for the Japanese administration to feed the men and the horses. On the part of some, the soybean was recommended as a food for those with diabetes because of its low starch content. But the most distinguished use that is made of this crop is the obtaining of oil. The fat content amounts to between 13 and 26 pct., with an average of 19 pct. Incidentally, in moderate latitudes the fat content appears to be lower than in the hot zone. Otherwise, the average composition of the soybean is as follows: 10 pct. water, 33 pct. protein, 5 pct. ash, 4.5 pct. cellulose, and 27.5 pct. carbohydrate.

With regard to the preparation of oil, the soybean currently forms an important export article for East Asia. Last year in Vladivostok, the price amounted to 4 [British] shillings 8 pence for 50.8 kg. In England, the price for 100 kg of beans amounts to approximately 13 [German] marks. The primary export is directed toward England, but other European countries also already receive important quantities. When the oil has been pressed out of the beans, approximately 7 pct. fat remains behind in the cakes. Upon extraction with a fat-dissolving agent, such as petroleum ether, the so-called "soybean meal" (*Sojamehl*) is obtained with approximately 2 pct. fat content. The oil serves various

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purposes, but principally for the preparation of soap. Even in its homeland, above all else in Manchuria, it seems that the beans are used primarily for the obtaining of oil. The cakes serve as livestock feed there, but also as fertilizer in tea plantations or as export to Europe, where they of course frequently arrive in spoiled condition. England imports such large quantities (150,000 [metric?] tons in the last two years) that the Japanese government has had its attention drawn to this export article and has ordered the building of large oil mills in Manchuria and Korea. For that reason, the transport of such overseas soybean cakes (*Sojakuchen*) ought to already multiply greatly in the coming period. It can only be hoped that with the shipping, greater care is used than has been thus far. According to its chemical composition, soybean cakes are approximately at a level with sesame cakes in terms of the ranks of the best concentrated feeds. According to Nils Hansson (*Värdet af Sojakakor och Sojamjöl vid Utfodringen af Mjölkkor* [The Value of Soybean Cakes and Soybean Meal with the Feeding of Dairy Cows], Stockholm 1909), the average composition is 11.1 pct. water, 43.3 pct. crude protein, 6.1 pct. crude fat, 34.0 pct. carbohydrate, and 5.5 pct. ash, while as the average of 25 analyses in 1909 at the trial station in Hoorn [a town in the Netherlands], the following figures were found: 12.7 pct. water, 40.6 pct. crude protein, and 7.7 pct. crude fat. O. Kellner found the nutrients in soybeans in Japan to be digestible as crude protein at 89 pct., crude fat at 90 pct., carbohydrates at 69 pct., and cellulose at 36 pct. If the digestibility of the nutrients in the cakes is reckoned as being the same as that of the beans, and if a reduction factor for the digestion work is assumed to be 98 pct., then according to the Dutch analyses, soybean cakes contain: 36.1 pct. digestible protein and 6.9 pct. digestible fat. And according to the Swedish studies, they contain 23.5 pct. digestible starchy components, from which a starch value of 71.8 pct. results, while Kellner indicates a starch value of 71.8 pct. for linseed cakes and 77.5 pct. for peanut cakes. It can therefore be assumed that soybean cakes possess approximately the same fodder value as linseed cakes, provided that they do not differ through specifically favorable or unfavorable effects.

As far as the value of soybean cakes is concerned as fodder for dairy livestock, trials were carried out in Ungarisch-Altenburg [today's Mosonmagyaróvár, Hungary] in which those cakes were compared with malt sprouts. The result of these trials was that more milk was obtained from the soybean cakes, and on top of that, it was of a better quality. These trials, which were not very detailed, provided the impetus at the last annual meeting of the Association for the Support of a Dairy Farming Trial Station (*Vereinigung zur Unterhaltung einer milchwirtschaftlichen Versuchsanstalt*) in Hoorn to set up detailed studies on the value of soybean cakes as fodder for dairy cows in comparison to the linseed cakes that were most common.

At this point, we will pass over the very comprehensive analysis material of this work that comprises seventy pages of reports. And we will limit ourselves to providing the results that were achieved with the group feeding of ten selected cows that were each of the same variety with regard to the content of the milk and the quality of the butter and cheese that were made from it. The trials were divided into three periods: the pretrial period, the trial period (equal to the main period), and the post-trial period.

During the actual trial period from January 10 to March 28, the cows of Group 1 received 3 kg of soybean cakes instead of 3 kg of linseed cakes that they had received up until then, while the cows of Group 2 continued to receive the same quantity of linseed cakes. Since the soybean cakes were just as gladly received by the cows as the roughly broken-up linseed cakes, the transition to the main trial began after a short pretrial period from January 3 to 10.

The Total Yield of the Two Feed Groups of Ten Cows Each

During the entire duration of the trial, the state of health of the cows was excellent, and disorders that were caused by the soybean cakes as had supposedly been observed at other locations did not appear. A laxative effect that has been ascribed to the oil could not be perceived. With the soybean group (*Sojagruppe*), the manure in general did in fact appear to be somewhat softer than with the linseed cake group, but it was only in one week that the barn attendants noticed thin manure only with the soybean group. That may perhaps be in relation to the fact that extremely moldy hay had to be fed which, in connection with the soy oil (*Sojaöl*), caused the mild diarrhea.

[Note: A series of tables follows comparing the group of cows fed only with linseed cakes and the group transitioned to be fed with soybean cakes, providing the raw data and then the conclusions from those data. The tables compare average daily milk yield, drop in milk yield over the course of the trial, a statistical analysis thereof, the total yield in milkfat and dried substance, the drop in the yield of fat over the course of the trial, the statistical analysis thereof, the average fat yield, the average daily yield in dry substance, the drop in the yield of dry substance over the course of the trial, and the statistical analysis thereof. On the whole, the tables indicate lower yields with the cows in the soybean cake group.]

[Conclusion drawn from the last table:]

The same difference exists here as with the milk yield by quantity, namely, a greater inclination of the soybean group to a reduction with respect to the pretrial and post-trial periods, while during the first half of the main period, this group provided more dry substance than the linseed cake group. A loss of 0.4 pct. can be reckoned with for the soybean cake feeding (*Sojakuchenfütterung*) in comparison to the linseed cake feeding.

(Conclusion to follow.) Address: Horn Society for Experimental Dairy Farm Operation, Netherlands.

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101. *Nature* (*La*) (*Paris*). 1910. Fromages végétaux [Vegetable cheeses]. 38(2, Supplement):134. Sept. 24. [Fre]
• ***Summary:*** A vegetable cheese is prepared from potatoes by the peasants of Saxony and of Thuringia [both in eastern Germany; Sachsen and Thueringen in German]. The "natto" of the Japanese (*Le "natto" des Japonais*) is made from soybeans. This type of beans (*haricots*) is boiled for about 5 hours then placed in little packets of straw. The packets are placed in a cave, in the middle of which a fire is lighted. The cave is closed and after 24 hours the little cheeses are ready to eat. Since the soybean contains a rather large quantity of legumin, or vegetable casein, natto is rich in nitrogen, the same as real cheese (it contains 7.3 to 7.5% nitrogen).

"The truth requires us to close by adding that we have tried to make these cheeses [natto] without complete success. The natto is easy to prepare, contains the usual quantity of nitrogen, and has a suitable consistency. But it may be because we used seeds imported from Korea, that is to say rather old ones, that it has a very strong flavor, like (by the way) the soybean itself, that a European palate would not be able to tolerate." Address: France.

102. Takahashi, Teizô. 1910. Yamasa Shoyu Jozosho (The "Yamasa" brand soy brewery.) Main office: Choshi, Chiba Prefecture (Document part). In: Japan's Industries: And Who's Who in Japan. 1910. Osaka, Japan: Industrial Japan. vi, iii, 687 p., iv p. See p. 156-58. Undated. Translated from unpublished Japanese manuscripts. 29 cm. [Eng]
• ***Summary:*** "History: The Hamaguchi Soy Company, which was formed in 1906, with a capital of ¥500,000, is the continuation of a very old firm founded 265 years ago [i.e., in about 1641] by the brothers Kichiyemon and Gihei Hamaguchi, ancestors of the present Mr. Kichiyemon Hamaguchi, the proprietor of the firm. These two brothers, natives of what is now Wakayama Prefecture, settled down in Chôshi, and opened a soy brewery, which has gone on progressing from that day to this. In 1825, the Yamasa brand was one of those accorded the privilege of being called 'The Best Soy' by the Tokugawa Shogunate.

Note: This is the earliest document seen (Feb. 2012) which states that a brand of soy sauce named Yamasa existed as early as 1825. The name of the company that makes this brand is not clear. Nor does this article state when the present company, Yamasa Shoyu Jozosho, was founded. We believe this company was founded in 1928.

"Mr. Goryo Hamaguchi, the father of the present proprietor, after a visit to Europe and America, in 1833, introduced some radical changes in the brewing of soy in his brewery, by an application of the most scientific principles. Mr. Kichiyemon Hamaguchi, the present head of the firm, continued the same enterprising policy of his father, and the business began to extend very much in consequence. In 1894 the firm was appointed supplier of soy to the Imperial Household by special warrant. On being transformed into a partnership concern, the business of the firm increased considerably, while experts were engaged to conduct scientific investigations. Dr. Kendo Saito, the well-known scientist, was entrusted with the study of soy fermentation.

"At present the firm owns two breweries, installed with steam plants, and employing over 600 hands. The annual output is approximately 8,000,000 gallons. Tokyo, Yokohama, and other large business centres, consume great quantities of the 'Yamasa' brand, and much of it is exported to Great Britain, the United States, Germany, Australia, China, Korea, Hawaii, and Vladiovstock. The soy which goes abroad is contained in bottles of artistic appearance, well packed in boxes. The Hamaguchi Company was the pioneer in the export trade of soy, this being due to Mr. Goryo Hamaguchi's tour in 1883, when he made a special study of the foreign taste for the Japanese sauce.

"As above mentioned, 'Yamasa' brand soy is supplied to the Imperial Household by special warrant. A great honour was done the firm when His Highness Prince Kan-in, the President of the Fifth National Industrial Exhibition, paid a visit of inspection to the brewery. In 1907 their Imperial Highnesses, Princes Kitashirakawa and Higashikuni went over the brewery, and made some observations highly complimentary to the proprietor. In the same year a further honour was done the proprietor, when he was appointed supplier of 'Yamasa' soy to His Imperial Highness the Crown Prince of Korea.

"Space does not permit of a full list of the prizes won by the company at various exhibitions. 'Yamasa' brand soy was awarded a first prize at every one of the five National Exhibitions which have been held in Japan. Abroad, either a gold medal or the Grand Prix was awarded at each of the following Exhibitions: Chicago [Illinois / Columbian] International Exposition, 1893; Paris International Exhibition, 1899; The Asia Exhibition (Hanoi, French Indo-China), 1903; St. Louis [Missouri] International Exposition, 1904; Milan Exhibition [Italy], 1905; and Seattle Exhibition, 1909.

"Mr. Kichiyemon Hamaguchi, the President of the company, was born in Wakayama Prefecture in 1862, and was educated at Keio University. In 1900 he made a tour round the world, and since his return has done much to assist in extending the nation's commerce and industry. In order to enlarge his business he converted it into a company, and owing in great part to his energy and enterprising spirit, the company has proved a conspicuous success. Indeed, the whole soy industry has profited by his labours. A gentleman of excellent character and reputation, he has sat in both Houses of the Legislature. Mr. Hamaguchi has been ably assisted in his work by Mr. Kichibei Hamaguchi, a director, and Mr. Tetsujiro Midzushima, the superintendent of the works, as well as by an industrious and efficient staff."

Photos show: (1) Yamasa soy in casks and bottles. (2)

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Angled aerial view of "The 'Yamasa' Brand Soy Brewery;" smoke rises from two tall smokestacks. Address: PhD in Agriculture (*Nogakuhakushi*), Prof. at Tokyo Imperial Univ., Japan.

103. Takahashi, Teizô. 1910. Higeta Shoyu Jozosho (The "Higeta" brand soy brewery.) Main office: Choshi, Chiba Prefecture (Document part). In: Japan's Industries: And Who's Who in Japan. 1910. Osaka, Japan: Industrial Japan. vi, iii, 687 p., iv p. See p. 152-53. Undated. Translated from unpublished Japanese manuscripts. 29 cm. [Eng]

• ***Summary:*** History: The 'Higeta' is one of the brands of soy made in Choshi. The concentrated kind of soy from which it is derived was first brewed in the second year of Genna (1616) by a brewer named Gemba Tanaka. After the quality had been greatly improved, a new variety of the brand was made in the second year of Bunsei (1819), known as 'Horai.' When the metropolis was moved from Kyoto to Tokyo in 1868, the firm was honoured by being appointed supplier of soy to the Imperial Household. Since then the business has greatly increased. In 1898 the firm, in conjunction with the Iwasaki and Hamaguchi concerns, started an experimental laboratory, under superintendence of Dr. Ryojun Tawara, and a staff of experts, in which a study was made of soy fermentation. As a result of the investigations, much improvement was effected in the quality of soy generally. In that year, 1898, the Imperial Household ordered a special supply of the 'Higeta' brand, and this fact, coupled with the improved methods of salt refining, greatly extended its sale. When the grand military manoeuvres were held in the vicinity of Kumamoto in 1902, attended by His Majesty the Emperor, an order was placed with the firm to supply the army with bottled soy; to commemorate this honour the brewer has sold bottled soy ever since.

"During the Russo-Japanese war, 'Higeta' soy was used by the Army Department for seasoning canned foods sent to the front. In 1905 a new kind of soy bottle, with a screw stopper, was made for the troops. Soy was afterwards sold to the public in this form. Since then the firm has gone on flourishing, nothing being left undone to maintain the quality of the brand, and improve it if possible.

"The firm possesses two breweries, fitted up with steam engines, and employing altogether 320 workmen. The 'Higeta' brand soy is used all over the country, especially at Tokyo and Yokohama. It goes also to the United States, Canada, Siberia, China, Korea, Hawaii, the Philippine Islands and the Straits Settlements [later Singapore], being much appreciated in all these markets.

"In addition to being suppliers to the Imperial Household, the brewer has been honoured in other ways. At the Milan Exhibition of 1906, the 'Higeta' brand, which was selected by the Japanese Department of Agriculture and Commerce as a typical soy, was awarded the highest order of the Grand Prix; besides this, the soy was presented to Their Italian Majesties by the Japanese Commissioner for the Exhibition, and they are reported to have expressed to him their high appreciation of its flavour. The following are the principal honours conferred upon the firm by various exhibitions:

"A First Prize at each of the five National Exhibitions.

"The Grand Prize at the Chicago [Illinois] Exhibition, 1890.

"A Gold Medal at the Asian Exhibition (Hanoi, French Indo-China), 1903.

"The highest Grand Prize at the St. Louis [Missouri] Exposition, 1904.

"The Grand Prize of Honour at the Seattle Exposition, 1909.

"Mr. Gemba Tanaka, the proprietor, who was born in 1871, studied political economy at Keio University. On succeeding to the business of his ancestors, he entered into his work with enthusiasm, and by his strenuous exertions did much to extend the sale of the 'Higeta' brand. Owing to the esteem in which he is held in the district, Mr. Tanaka has been elected to represent the highest taxpayers of his prefecture in the House of Peers."

A large photo shows "the interior of a Choshi soy brewery."

Note: This is the earliest document seen (April 2001) concerning Higeta Shoyu. Address: PhD in Agriculture (*Nogakuhakushi*), Prof. at Tokyo Imperial Univ., Japan.

104. Takahashi, Teizô. 1910. Kushigata Shoyu Jozosho (The "Kushigata" brand soy brewery.) Main office: Noda, Chiba Prefecture (Document part). In: Japan's Industries: And Who's Who in Japan. 1910. Osaka, Japan: Industrial Japan. vi, iii, 687 p., iv p. See p. 165-67. Undated. Translated from unpublished Japanese manuscripts. 29 cm. [Eng]

• ***Summary:*** "History: As will be seen by the accompanying articles, most of the soy brewers of Noda are distinguished by the surname of Mogi, and the family of Mr. Hichizayemon [Shichizaemon, Hichizaemon] Mogi, proprietor of the firm of 'Kushigata' brand soy is, in fact, the head and originator of all these distinguished so brewing firms of the same name. One of the ancestors of the Mogi family was a distinguished Samurai in the service of the celebrated warrior and statesman–Toyotomi Hideyoshi–and his daring and deeds of valour are matters of history. With the overthrow of the Toyotomi family he laid aside his sword and entered the field of business. It was 290 years ago that the founder of the firm, the ancestor of Mr. Hichizayemon Mogi settled in Noda as a soy brewer. His distinguished personality and lineage gained for him the deep respect of the inhabitants and he was appointed the headman of the place, thus being called upon to engage in public business as well as his own. At this period, soy was brought over from Osaka to Tokyo, the capital of the Tokugawa Shoguns. The quality of this sauce, however, was very inferior and in view

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of this Mr. Mogi instructed a member of this branch of the family–Mr. Saheiji Mogi–to brew the 'Kikkôman' soy as an experiment. The results having proved very satisfactory, that brand was brewed on a large scale, and Mr. Mogi subsequently inaugurated the brewing of the 'Kihaku' brand, the two firms being allowed to engage in the brewing of so-called Noda Soy on an extensive scale. These two brands of soy having proved very well suited to the tastes of the citizens of Yedo, the demand increased to such an extent that the output was hardly sufficient to meet the demand. Such being the case, Mr. Hichizayemon Mogi himself engaged in the brewing of soy also. The ripe experience gained by supervising the work of the branch firms in brewing superior varieties of soy proved very valuable to him, and his business also proved a very great success, the name of the new brand of soy 'Ichiyama' becoming quite celebrated within a comparatively short period of time. However, another new branch of the Mogi family's firm being inaugurated under the proprietor-ship of Mr. Yuyemon Mogi, the brand 'Ichiyama' was transferred to the new firm so as to ensure its prosperity and the brand 'Kushigata,' at present in use, was then adopted. Such proceeding may appear somewhat strange, but it was in compliance with the legacy left by the ancestors of the Mogi family that the various branches should unite for the general sharing of profits in their business undertakings. At the time when the fame of the 'Kushigata' brand was at its height, in 1871, the whole premises of firm were unfortunately destroyed by fire. This proved a great blow to the fortunes of the firm but the present proprietor, by dint of sheer energy and perseverance, succeeded in retrieving the lost fortunes of the firm, the yearly output at present far exceeding the former production. Although the yearly output of the main house of Mogi ('Kushigata' brand soy) is below that of the branches, namely the 'Kihaku' and other brands, it has been entirely owing to the good will of the former that the latter firms have been enabled to attain their present prosperous state, the outcome of the traditional legacy of the Mogi family having been carried out by the head of the house

"Present conditions: The firm has at present two factories, the number of hands employed being 600. The factories are provided with two sets of boilers and steam engines for motive power. The firm produced about 5,270,000 gallons of soy per year, of which about 336,000 gallons are exported to foreign countries, the places of destination being Hawaii, Australia, China, Korea, Canada, British Columbia, the United States, the Philippine Islands, and the Straits Settlements [today's Singapore]. The export trade shows a tendency to increase year by year.

"Honours Awarded: The following are some of the principal prizes and medals awarded to the 'Kushigata' brand soy at the various exhibitions where the firm's products have been shown:–The National Industrial Exhibition from the First to the Fifth. First Prize on each occasion. International [Columbian] Exposition held in Chicago [Illinois], 1893. Gold Medal. International Exhibition held in Paris, 1899. Gold Medal. St. Louis International Exposition [Missouri], 1904. Grand Prix. Alaska-Yukon International Exposition at Seattle, 1908. Grand Prix.

"Proprietor: The present proprietor of the famous firm of the 'Kushigata' brand is Mr. Hichizayemon Mogi, who is the eleventh of the line. Although he is yet young, he places business before pleasure, strictly adhering to the precepts of his ancestors and is devoting his entire energy to the development of his business and the improvement of the particular brand for which the firm is responsible. Having selected a most favourable locality he is, at present, constructing a new factory with the producing capacity of 2,000,000 gallons per year, which promises to be the best equipped factory of its kind in Japan. The machinery employed is to be of the latest pattern, and it is intended that electricity be used as the motive power."

A photo (p. 166) shows "The pumping machinery of soy." Around the pump are many brick walls. Address: PhD in Agriculture (*Nogakuhakushi*), Prof. at Tokyo Imperial Univ., Japan.

105. Gilbert, A.W. 1910. Soy beans and fertilizer question. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*) 13(79):55. Oct. 5. [1 ref]

• ***Summary:*** The following is an extract from the *National Review,* of Shanghai, China: "It is well known that soy-bean cake has for years been the most popular fertilizer in Japan. Now, however, that the United Kingdom, and the Continent of Europe and America to a less extent, have become purchasers of Manchurian beans, the question arises whether Japan will to be able to buy bean cake in huge quantities if the price rises appreciably. In studying this question two factors should not be lost sight of: One is that Japan is herself a large grower of soy beans, having according to the latest available returns (1908) over 1,200,000 acres under cultivation, producing annually some 19,000,000 bushels of beans, while the other is that Japan imports very large quantities of soy beans from China and Korea. The greater part of these beans is used for the purpose of human food–i.e., in making of 'soy,' 'miso,' and bean curd–but a portion by no means small is used also as a fertilizer.

"The Russo-Japanese war had such an effect in curtailing the supplies of beans and cake that to arrive at a just appreciation of the position it is necessary to go back a good many years. In making such a review it will be noted that, both in the case of beans and of cake, the amounts imported in 1909 were record importations, but that the average price was the lowest since 1903. Should the price in the future be forced up very high in consequence of British and other demands, the presumption is that Japan would turn to sulphate of ammonia, if the cost per unit of nitrogen

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therein were less than the cost of bean cake. On the other hand, it must be remembered that the removal of the import duty on sulphate of ammonia in the United States of America means that the United States will probably absorb large quantities of the British output, and that Japan will have to pay a higher price if she wants a share of this fertilizer. Thus the outlook for nitrate of soda becomes a good deal brighter, and now that, owing to the subsidized Japanese line to (South) America, it is possible to get cheap freight rates, it looks as though (Chilean) nitrate of soda will be a serious competitor to the other nitrogenous fertilizers, except in the matter of wet rice cultivation.

"There is a point which, though obvious enough to those intimately connected with the trade, is sometimes overlooked in general discussions on the subject of bean cake, viz., that the British farmer can afford to pay a proportionately higher price for cake than the Japanese farmer, the reason being that in the United Kingdom the cake, after serving for provender, turns into a fertilizer, whereas in Japan it is employed as a fertilizer directly, without any intermediate use.

"As regards rock phosphate, most of the supplies have hitherto come from Ocean and other islands. Owing, however, to the new fertilizer law which prohibits any admixture in Japan of earth and sand with rock, it will probably be found that the phosphate from the above-mentioned islands, being pure and expensive, will be displaced by the cheaper varieties of rock from Tennessee and Algiers, which are naturally mixed with impurities." Address: Vice-Consul, Nanking.

106. *Los Angeles Times.* 1910. Fertilizers for Japan. A scarcity of soy beans makes a market for Tennessee rock phosphate. Oct. 13. p. I13.
• ***Summary:*** "It is well known that soy-bean cake has for years been the most popular fertilizer in Japan. Now, however, that the United Kingdom, and the Continent of Europe and America to a less extent have become purchasers of Manchurian [soy] beans, the question arises whether Japan will continue to be able to buy bean cake in huge quantities if the price rises appreciably.

"In studying the question, two factors should not be lost sight of: One is that Japan is herself a large grower of soy beans, having according to the latest available returns (1908) over 1,200,000 acres under cultivation, producing annually some 19,000,000 bushels of beans, while the other is that Japan imports very large quantities of soy beans from China [Manchuria] and Korea. The greater part of these beans is used for the purpose of human food–i.e., in making of 'soy' [sauce], 'miso,' and bean curd [tofu]–but a portion by no means small is used also as a fertilizer.

"The Russo-Japanese war had such an effect in curtailing the supplies of beans and cake that to arrive at a just appreciation of the position it is necessary to go back a good many years." In 1909 Japan imported record amounts of beans and cake, but "the average price was the lowest since 1903. Should the price in the future be forced up very high in consequence of British and other demands, the presumption is that Japan would turn to sulphate of ammonia, if the cost per unit of nitrogen therein were less than the cost of bean cake."

The "British farmer can afford to pay a proportionally higher price for cake than the Japanese farmer," since in the UK the cake, "after serving for provender [feed], turns into a fertilizer [manure], whereas in Japan it is employed as a fertilizer directly, without any intermediate use. "

107. *Oil, Paint and Drug Reporter.* 1910. The soya bean and the fertilizer question. 78(17):41. Oct. 24. [1 ref]
• ***Summary:*** "An extract from the *National Review of Shanghai*, regarding the relation of the soya bean to the fertilizer question, has been sent to the Department of Commerce and Labor by Vice-Consul A.W. Gilbert from Nanking. The discussion of the subject by the Review is as follows:" There follows a long excerpt.

108. *Times* (*London*). 1910. Soy bean as a fertilizer. Nov. 21. p. 14, col. 6.
• ***Summary:*** "Several subjects of importance to this country are discussed in the *Daily Consular and Trade Reports* published by the Bureau of Manufacturers, Department of Commerce and Labour, Washington [DC]. A note upon soy beans as a land fertilizer is particularly noteworthy in view of the doubt expressed in this country last year as to their manurial value."

There follows a summary of: Gilbert, A.W. 1910. "Soy beans and fertilizer question." *Daily Consular and Trade Reports* (U.S. Bureau of Manufactures, Department of Commerce and Labor). Oct. 5. p. 55.

109. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies. *USDA Bureau of Plant Industry, Bulletin* No. 197. 84 p. Dec. 31. Includes 8 plates showing plants, pods, and seeds, and an excellent 6-page index. [27 ref]
• ***Summary:*** Contents: Botanical history and identity of the soy bean. Botanical classifications of soy-bean varieties. Varietal characteristics of soy beans: Habit of growth, foliage, pubescence, flowers, pods, seeds. Frost resistance. Period of maturity (soybeans were planted at the Arlington Experimental Farm, near Washington, DC, from 3 June 1905 to June 1909). Changes in life period (soybeans were planted at the Arlington Farm in 1902). Pollination and hybridization. Mutations. Nomenclature and classification. Early agricultural history in the United States. Varieties introduced in the United States independently of the Department of Agriculture or previous to 1898: Enumeration, Ito San, Mammoth, Buckshot, Guelph, or Medium Green, Butterball, Kingston, Samarow, Eda, Ogemaw, or Ogema.

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Varieties grown in Europe (p. 32-33; Early history, Samarow, Etampes, Chernie [from Khabarovsk, Siberia], "Yellow Riesen," Buckshot, "Yellow," "Brown," Butterball, S.P.I. No. 5039. European seed companies carrying soybeans include Dammann & Co., Naples, Italy; Haage & Schmidt, Erfurt, Germany; Vilmorin-Andrieux & Co., Paris, France).

The soy bean in Asia (p. 34-35): Asiatic sources of soy beans, list of varieties with SPI numbers from each of the following countries and places: Siberia (South Usuri [Ussuri], Khabarovsk, Merkoechofka), Manchuria (Newchwang, Harbin, Tieling), Korea (Pinyang, Ko-bau), Japan (Tokyo, Kobe, Yokohama, Hokkaido, Anjo), China (many places), Formosa (Taihoku), Cochin China (Saigon), India (Darjiling [Darjeeling] and Khasi Hills–Assam; Pithoragarh–Kumaon Dist.; Safipur, Hasangani, Ranjitpurwa–Unao, Uttar Pradesh; Etawah, Manipuri–Uttar Pradesh; Cawnpore, Dehra Dun, United Provinces; and Poona Bombay), Java (Buitenzorg), Celebes (Macassar).

Desirable characters in soy-bean varieties (p. 36-37): Considerations governing choice, habit of the plant ("Erectness of stem with upright or ascending branches is a prime requisite of a desirable variety. A tall habit is also important, as dwarf varieties usually bear pods very close to the ground, so that many will be left on the stubble..."), coarseness (a coarse, woody stem makes mowing difficult. However slender varieties often have small pods and seeds, often with vining tips and a tendency to lodge), ability to retain leaves, color of the seed ("Yellow or green seeds are preferable to darker colors, as the shattered seeds are more easily found by hogs pasturing the field or stubble"), shattering, resistance to disease ("In sections where nematodes and cowpea wilt occur most soy-bean varieties are seriously affected by both these diseases"), nonfilling of pods. Synopsis of the groups (plants bushy vs. twining). Synopsis of the varieties (within each group lists the total number and acquisition numbers of varieties with various colored seeds and germs: Group I–190 varieties (seeds straw-yellow, germ yellow–71 varieties; seeds olive-green, germ yellow–45 varieties; seeds chromium-green, germ green–17 varieties; seeds brown to olive, germ yellow–28 varieties; seeds black, germ yellow–18 varieties; seeds black, germ green–7 varieties; seeds bicolored, germ yellow–4 varieties). Group II–4 varieties. Group III–8 varieties. Group IV–76 varieties. Group V–7 varieties.

Of the 285 varieties in the five groups, 152 varieties (53.3%) have yellow (straw-yellow or olive-yellow) seeds, 55 varieties (19.3%) have black seeds, 44 varieties (15.4%) have brown seeds, 24 varieties (8.4%) have green seeds, and 10 varieties (3.5%) are bicolored).

Catalogue of soy-bean varieties (by S.P.I. number, from no. 480 in 1898 to no. 27,501 in 1909; p. 39-74). In 1908 USDA acquired soybean seeds from Vilmorin-Andrieux & Co. (Paris, France), Haage & Schmidt (Erfurt, Germany), and Dammann & Co. (Naples, Italy) (p. 57-60).

The best varieties of soy beans (p. 75, in 7 groups from very early to very late). Explanation of plates. Index.

The "Catalogue of soy-bean varieties" (p. 39) is "a complete list of soy beans imported by the United States Department of Agriculture, arranged chronologically in accordance with the sequential S.P.I. (Seed and Plant Introduction) numbers assigned to them by the Office of Foreign Seed and Plant Introduction." These numbers start at #480 (imported from South Ussuri, Siberia, in 1898) and end at #27501 (imported from Shanghai, Kiangsu, China, in 1909). Concerning No. 21825 (p. 58): "From Hokkaido, Japan, 1908... This variety is said to be used principally in the manufacture of 'soy,' 'miso,' 'tifu' [sic, tofu], etc. It has also been obtained again from the same place and grown under Nos. 21830 and 21831."

"The best varieties of soy beans" (p. 75) lists 35 varieties, each with a name and S.P.I. number, arranged in seven groups based on time to mature, from "Very early.–Ogemaw, 17258" to "Very late.–Barchet, 20798; Riceland, 20797 (In 1908 at Biloxi, Mississippi, it displayed astonishing diversity)." This list is "based primarily on the results at Arlington Experimental Farm [in Virginia], but those obtained in cooperation with various experiment stations have also been given due consideration:

"Very early.–Ogemaw, 17258.

"Early.–Early Brown, 25161 (from Indiana Agric. Exp. Station, 1909); and Vireo, 22874.

"Medium early.–Chernie, 18227; Auburn, 21079 A; Merko, 20412 (from Merkoechofka, Siberia); Elton, 20406; Chestnut, 20405 B.

"Medium.–Ito San, 17268; Medium Yellow, 17269; Tashing, 20854; Shingto, 21079; Swan, 22379; Brindle, 20407; Sedo, 23229; Lowrie, 22898 A.

"Medium late.–Brooks, 16789; Flava, 16789 A; Cloud, 16790; Ebony, 17254; Haberlandt, 17271; Peking, 17852 B; Wilson, 19183; Taha, 21999; Austin, 17263.

"Late.–Mammoth, 17280; Edward, 14953; Acme, 14954; Flat King, 17252; Tokyo, 17264; Hope, 17267; Hollybrook, 17278 (from Arkansas Agric. Exp. Station, 1904); Farnham, 22312.

"Very late.–Barchet, 20798; Riceland, 20797."

Note 1. Matsuura (1929 and 1933) cites this as the world's earliest publication on soybean genetics: "Recording segregation of seed- and flower-color in its natural hybrids."

Page 11 notes that soybeans named "New Japan peas" were obtained from Norway (Source: Martens 1869). Page 20 notes that the Ogemaw variety of soybeans, which takes 92-97 days to mature, was obtained in 1908 from the Idaho Agricultural Experiment Station, where it had been grown for several years. Note 2. This document contains the earliest date seen for soybeans in Idaho, or the cultivation of soybeans in Idaho (about 1906).

Page 20 also notes that Buckshot variety of soybeans, which takes 92 days to mature, was obtained in 1908 from

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the Minnesota Agricultural Experiment Station, where it had been grown for several years. This is the second earliest document (April 2004) seen concerning the cultivation of soybeans in Minnesota. "Potomac Flats" is not mentioned in this report.

Concerning "Habit of Growth" (p. 12-13), the author states: "All soy beans are strictly determinate as to growth; that is, the plants reach a definite size according to the environment and then mature and die. The great majority of the varieties are erect and branching, with a well-defined main stem (Plates I and III)... In other varieties the stems and branches, especially the elongated terminals, are more or less twining, and usually weak, so that the plant is only suberect or even procumbent (Plates I-III)."

Photos show: (1) Plants of a wild soy bean grown in a greenhouse in a pot. (Fig. 1) (2) Plants of a wild soy bean from Soochow, China, grown at the Arlington Experimental Farm.

(3) Plants of a soy bean from Cawnpore, India. (4) Rows of different varieties of soy beans at Arlington Farm.

(5) Plants of seven varieties of soy beans, showing types of habit: Meyer 17852, Peking 17852 B, Austin 17263, Pingsu 18259, Unnamed 22504, Hollybrook 17278, Haberlandt 17271. (6) The same seven varieties shown in plate 4 after hanging in a dry room for 6 months.

(7-8) Eleven soy bean pods, ranging in size and shape.

(9) 36 varieties of soy bean seeds, showing variation in size and form.

Note 3. This is the most important document ever published on early soybean varieties in the USA.

Note 4. This is the earliest document seen (Dec. 2018) that uses the word "determinate" to describe the growth habit of soybeans. Determinate plants terminate main stem elongation at, or soon after, the onset of flowering. Indeterminate cultivars continue main stem elongation several weeks after beginning flowering. Determinate / indeterminate is a genetic trait.

Note 5. This is the earliest publication see (Aug. 2011) written jointly by Piper and Morse, two of the most influential early advocates of the soybean in the USA. It is also the earliest document by or about Morse in connection with soybeans. Morse graduated from Cornell University, New York, on 20 June 1907 and 2 days later reported for duty at the Bureau of Plant Industry in Washington, DC, to work under Dr. C.V. Piper.

Note 6. This is the earliest document seen (Feb. 2004) in which Piper or Morse mention miso, tofu, or the use of soy beans as a coffee substitute.

Note 7. This is the second earliest document seen (July 1998) that uses the word "shatter" (or "shattered" or "shattering") in connection with soybeans. The earliest document (in 1854) used the word "shatter" in a very general sense. This document uses it more precisely, as the title of a section and for comparing varieties (p. 36): "When grown for grain alone, shattering is a serious fault. Some varieties, like Guelph, shatter inordinately; others, like Peking, scarcely at all... As a rule the varieties with large pods and seeds shatter much worse than those with small pods and seeds..."

Note 8. This is second the earliest English-language document seen (Oct. 2004) that uses the term "germ" to refer to a part of a soy-bean seed. The germ or embryo is the part of the seed inside the seed coat.

The section titled "Seeds" (p. 15) states: "The germs or embryos of soy-bean seeds are yellow, except in the green-seeded and part of the black-seeded sorts, in which they are green." Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

110. Hosie, Alexander. 1910. Manchuria: Its people, resources, and recent history. Boston, Massachusetts: J.B. Millet. x + 320 p. Illust. Index. 25 cm. Oriental Series Vol. 14

• ***Summary:*** This book is similar in many ways to the 1901 edition with the same title except: (1) It contains 25 more total pages. (2) Chapters 7-10 in the 1901 edition have the same titles, are in the same order, and contain most of the same information as chapters 4-7 in the 1910 edition. (3) Most of the information on soybeans and soyfoods in this 1910 edition is identical or similar to that in the original 1901 ed, but usually on different pages. For example, the long, excellent section on tofu and related products on pages 183-84 in the 1901 edition is identical to that on pages 78-79 in this 1910 edition. And the description of how a traditional crush-stone mill and wedge press are used to make bean-cake and bean-oil, on pages 218-24 of the 1901 edition is identical to that on pages 121-27 of this 1910 edition. Many more such examples could be cited. (4) There is extensive and very interesting new information on railways, which are discussed at great length in this 1910 ed.; they are found in a separate record in this database as a "document part."

Editorial note by Charles Welch (p. ix-x): The whole world is now closely linked together as newspapers keep us informed of the events in far-of lands. Manchuria was practically unheard of until the last two wars which Japan had to fight there against China (1894-1895) and Russia (1904-1905). Port Arthur fell easily when held by the Chinese, but its strong defense by the Russians "turned the eyes of the world to the citadel which lay at the point of the far Eastern peninsula called Manchuria." The Trans-Siberian Railway, started in 1889, ran east-west, eventually connected St. Petersburg (the capital of Russia from 1712 to 1918) to the Pacific Ocean port of Vladivstok–a distance of 5,772 miles. The Chinese Eastern Railway, started in 1897, ran north-south, connecting Mukden and Port Arthur. The building of these two railroads has shown to the world the great wealth of Manchuria, a province of China.

The war between Japan and Russia was fought in large

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part because Russia claimed special exclusive rights to mining, timbering, etc. in Manchuria. Japan fought for an "open door" policy in this wealthy region, the right to trade and commerce in Manchuria. Sir Alexander Hosie has been a resident of China for practically 40 years.

The Chinese call Manchuria the Tung-san-shêng (Three Eastern Provinces); it "is an agglomeration of petty Tartar or Manchu principalities, lying to the north-east of China Proper" (p. 3).

Soy beans or [soy] beans, bean oil, bean cake, or soyfoods are mentioned or discussed on the following pages of this 1910 edition: 69 (outer leaves of kao-liang or tall millet are woven into mats used for packing loads of grains and beans), 71 (barley in large amounts is ground with peas or beans as a ferment in the distillation of native spirit {*Shao chiu*} from tall millet / kao-liang), 75-80 (beans are the most important agricultural crop for external trade, and the second most important article of cultivation after kao-liang. The most important bean, considered together with its products bean-cake and bean oil, is the soy bean–*Glycine hispida;* discusses the many varieties of soy beans and soy bean products), 82 (Mao-Tou, soy beans cultivated as a garden bean for food), 84 (soy bean is one of six plants grown in Manchuria whose seeds yield oil), 101 (each skein or hank of silk is dipped in bean-flour water), 121-28 (how the oil is expressed from soy beans; Recent prices of soy beans and products. 1896 bean oil factory driven by steam), 142 (how boats carry soy beans and other export crops down the Liao River each spring after the ice breaks up), 146-47 (value of exports of soy beans and products; total value in Manchuria), 168 (the flourishing bean-oil and bean-cake industry at Dalny started in 1908, practically speaking), 172 (the 1907 depression in Manchuria's soy bean market), 174 (the 1907 depression is now over and the outlook for American goods in Manchuria is hopeful), 181-84 (value and amount of exports of soy beans and products from Dalny and other ports, mostly in 1908; ports of destination and uses at each), 196 (the matting, woven by hand from the outer sheaths of millet stalks, that rises high around every large cart carrying loads of loose beans and millet), 208-11 (city of T'ieh-ling on the Liao and its growing importance in the soy bean trade; met 1,000 carts heavily laden with produce from the interior), 216 (a large cart carrying beans and pulled in an ongoing sort of race by mules or ponies, has overturned, and the beans are scattered all over the roadway; such accidents are taken as a matter of course, and the way is cleared so that traffic can resume), 234 (Yi-t'ung [pinyin: Yitong, in central Jilin province] Chou, like T'ieh-ling [pinyin: Tieling], is a great storehouse for beans and grain, and there is extensive trade between the two cities), and 237 (met several caravans laden with empty "bean-oil boxes." Beans are carried from Newchwang by boats when the river is open and by carts when it is closed by ice).

Also discusses (see index): Job's tears or pearl barley. *Phaseolus radiatus* (the ray-fruited dwarf bean [azuki] which is red or white). Hemp (*Cannabis sativa*) and Abutilon hemp, the true hemp plant, *Abutilon avicennæ,* both valuable fiber crops. Sesamum seed. Ground-nuts [peanuts] (*Arachis hypogæa,* L.) Seaweed. Address: British Consul-General at Tientsin [Tianjin, China].

111. Hosie, Alexander. 1910. Manchuria: Its people, resources, and recent history. Railroads (Document part). Boston, Massachusetts: J.B. Millet. x + 320 p. Illust. 25 cm. Oriental Series Vol. 14

• ***Summary:*** Railroads in Manchuria are discussed at great length in this book. These include the Chinese Eastern Railway Co., the Siberian Railway (incl. the Trans-Baikal and the Southern Ussuri sections), South Manchuria Railway, Trans-Manchurian Railway, and the Trans-Siberian Railway.

The South Manchuria Railway, the newest, is discussed in the most detail, especially in Chapter 7, titled "Trade of Manchuria" (p. 138-191). Page 145: "In addition to the purely foreign imports, however, there should be mentioned an item of $10,000,000 worth of railway materials imported from the United States by the South Manchuria Railway Company, on which no duties were paid, and which was omitted from the Chinese Customs Returns."

Page 149: "Although considerable interest in the mineral deposits of Manchuria has been evinced by American, British, and German engineers during the year, but little has been accomplished by them toward the development of the country's mineral resources. The South Manchuria Railway Company, on the other hand, has pushed forward development work on the Fu-shun (pinyin: Fushun) coal mines with great energy, and extensive additions to the equipment of the mines have more than doubled the output" daily during the year from 500 tons the beginning to 1,200 tons by the end of December. The Fu-shun coal mines constitute one of the chief assets of the Company."

Page 153. "Railway developments: The South Manchuria Railway has been standardised and the installation of new rolling stock has greatly increased the road's carrying capacity. Under the narrow-gauge regime the line's daily carrying capacity was about 2,000 tons, whereas at the present time, with its standard gauge, new American rolling stock, and improvement in its freight service, the capacity is more than 6,000 tons. Similar improvement has been made in the passenger service."

Page 154: "These trains are thoroughly modern in every respect, the cars and locomotives being of the latest designs of American make. Each train is composed of a mail car, a Pullman sleeper, a diner, and a combination day coach and baggage car. In addition to these improvements the South Manchuria Railway Company has established a weekly steamship service between Dalny and Shanghai, which shortens the time of travel between the latter city and Manchuria by two to five days, and will also bring about a

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reduction of freight rates. The Company is already issuing through bills of lading between Shanghai and Manchurian points."

Page 162: "The net increase of the Japanese population in Manchuria for the year 1908 was 14,149, of whom 5,296 settled in the leased territory and 8,853 scattered throughout the country, mostly along the line of the South Manchuria Railway. A conservative estimate of the number of Chinese immigrants during the year would place the figure at 25,000, the majority of the newcomers being of the agricultural class, who have come to Manchuria to find permanent homes and have settled in the fertile regions surrounding Fakumen and Chengchiatun. Should the plans of the Government for the settlement of waste lands meet with success, the number of Chinese arrivals will rapidly increase."

Page 165: "The general plans sanctioned by the management of the South Manchuria Railway provide for a northern terminal at Suchiatun, a station on the main line of the South Manchuria Railway some 10 miles south of Mukden. Suchiatun is already the junction of the branch line to the Fu-shun collieries, having the necessary yards and transshipping facilities. By making Suchiatun instead of Mukden the terminal of the line the company will obviate the necessity of bridging the Hun River and at the same time will save several miles of track."

Page 169-70: "First place in the import trade of Dalny is held by goods from Japan, which were valued by the customs last year at $6,824,440, but which Japanese figures place at $8,429,393. This total is made up of a large variety of articles, from lumber and railway material to notions and a great part simply represents the supplies of food, clothing, furniture, etc., drawn from Japan by Japanese residents in Manchuria for their own use. Of the staple goods for the Chinese market, the most important are cotton goods and cigarettes."

"The United States is second in the import list, with $3,762,653, according to customs figures, or about 32 per cent. This was almost entirely trade with the Japanese in Manchuria, and was made up mainly of supplies for the South Manchuria Railway Company. The figure seems to be too small, as the value of railway supplies ordered in America and received during 1907 and 1908 was approximately $10,409,000, of which much less than half came in during 1907. The explanation may be that entries of duty-free goods for the railway or for general consumption in the leased territory are less carefully prepared, as to details, by the consignees."

Page 171: "The domestic goods brought in from Chinese ports were valued at $1,310,622. The rails, locomotives, bridge work, and most of the cars purchased on the first orders for supplies for the South Manchuria Railway were bought in the United States and delivery was completed in 1909. Of the new purchases under this head, the most important were an order placed in Russia for some 6,600 tons of steel rails worth about $250,000, a new electric-power outfit costing $135,000, ordered in the United States; rails, cars, and trucks for the Dalny street railway, ordered in Germany and England and costing approximately $277,000; and a gas-generating plant and distributing pipes, purchased in Germany and Great Britain, respectively."

Page 182-83: "Coal seems destined to become an important item among the exports, but the business is still in an experimental stage. In 1908 shipments to foreign countries amounted to 4,686 long tons. Already the South Manchuria Railway Company has a contract for furnishing coal to the mail steamers of the Osaka Shosen Kaisha, which come here twice a week from Osaka and Kobe. The price has not been made public, but it would seem to be not far from $2.75 to $3 per ton delivered on board, and at this low cost it is said to be quite satisfactory. With the exception of $239,828, representing the customs valuation of [soy] beans shipped to England, and $1,209 for exports to Korea, the entire foreign export trade of Dalny is with Japan, the total value of exports to that country being $4,574,057."

Page 186: "In August, 1908, the South Manchuria Railway Company began a weekly freight and passenger service between Dalny and Shanghai, and while little business offered at first, both the number of passengers and the freight tonnage seem to be steadily increasing, as the railway company is making special efforts to develop this line by selling through tickets and by offering through bills of lading to interior stations at moderate rates.

"The trade to South China ports continues in the hands of two leading British coasting lines, whose business has greatly increased of late, so that they have had as many as eight ships in port at one time loading cargo or waiting for berths." Address: M.A., F.R.G.S., Once Acting British Consul, Tamsui; Now at Aberdeen (Scotland or Hong Kong).

112. Clerget, Pierre. 1911. La question du Soja [The question of the soy bean]. *Revue Generale des Sciences* (*Pures et Appliquees*) 22(3):100-01. Feb. 15. (Chem. Abst. 5:1637). [2 ref. Fre]

• ***Summary:*** Contains a brief description of the soybean and discusses its commercial importance, distribution, soil requirements, the value of the oil and its uses, and the composition and commercial value of the cake. During the past 2 years, the large amounts of soybeans exported from Manchuria to Europe have called attention to this plant. It is cultivated all over China, but especially in Manchuria (in the Liao Valley, where it is the second most important crop after sorghum), Japan, Korea, and Indo-China. In China it is often cultivated with maize; it demands a great of work, care, and good soil. The main exports come from the Manchurian ports of Newchwang and Dairen, and from Vladivostok. In 1908 some 859,200 tonnes of soybean and cake were exported from Manchurian ports, up from only 88,900 tonnes in 1905. Until 1908, Japan was the principal outlet for Manchurian

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soybeans (615,900 tonnes), but at the start of that year, exports to Europe began: 69,200 tonnes to Great Britain, 21,390 tonnes to France, 7,290 tonnes to Holland, etc.–for a total of 204,440 tonnes.

According to chemical analyses made at the Colonial garden of Nogent-sur-Marne, Manchurian soybean seeds contain 17.64% oil and 33.5% protein; yellow varieties contain more oil than black varieties. The soybean is used as a forage plant and for soil improvement, but its most important role in China and Japan is as a human food among people who consume little meat. According to Bloch (1908), it is most widely used in making a sauce [soy sauce] and a cheese [tofu]. It is also used to make numerous pastes and a sort of soymilk (*lait de soja*).

It also has industrial uses, thanks to its oil content of 16-18%. Indigenous mills can obtain only 8-10% oil, but modern hydraulic presses can obtain 12-14%. The oil and cake have made the soybean rise so rapidly on European markets. The oil, which has an agreeable smell and taste, is widely employed for culinary purposes in Manchuria. In England, as in France, it is used in making soap and margarine. It is more drying than cottonseed oil and can likewise be used in making paints. Soybean cakes (*Les torteaux de soja*) would give the same results as cottonseed cakes in terms of milk yield from dairy cows. As a fertilizer, they are used throughout Japan and on the sugarcane plantations of southern China.

The soybean could be introduced to Indo-China where, even if it has to compete against Manchurian soybeans, it could be service locally for soil improvement in the rice fields and as a food in the densely populated districts where there is hardly any room for animals, or where the animals have been decimated by disease. Address: Professeur à l'Ecole supérieure de Commerce (Graduate School of Commerce) de Lyon [France].

113. Bontoux, Emile. 1911. Le Soja et ses dérivés [The soybean and its products]. *Matieres Grasses* (*Les*) (*Paris*) 4(36):2195-99. April 25; 4(37):2239-43. May 25; 4(39):2326-29. July 25; 4(40):2364-66. Aug. 25; 4(41):2405-07. Sept. 25. [48 ref. Fre]

• ***Summary:*** Contents. Introduction. The plant: origin and history, species and varieties, culture, and production: USA, Japan, Manchuria, France, England, China, Korea, Indochina (it is cultivated for the needs of the population in Cochin China {especially in the provinces of Chaudoc and Baria}, Annam, Tonkin, Cambodia), Formosa, Java, India, Africa. The soybean–a food plant: The plant, the seed, large table showing many analyses from many countries of the chemical composition of many soybean seed varieties.

Introduction to food products made from soybeans in East Asia. Shoyu [soy sauce] (and koji). Miso. Natto (from Japan). Le Tao-yu (a Chinese condiment also widely used in Japan. It is a thick, clear liquid [sometimes] made from black-seeded soybeans) Tao-tjiung (doujiang, from China). Tuong (from Annam). Tofu. Li Yu-ying. Table showing composition of powdered soymilk, fresh tofu, and soy flour.

The soybean–an oilseed plant. The soybean as an oilseed in the Far East. Table showing exports of soybean cake and oil from various Manchurian and Chinese ports in 1908 and 1909. The soybean as an oilseed in Europe and the United States. Table showing imports of soybeans to various British ports in 1909 and 1910 (the leading port by far is Hull, followed in 1909 by Liverpool, London, Bristol Channel, Scotland, and Other ports {Rochester, etc.}). Table showing exports of soy oil from Great Britain in 1910: To Germany, Austria, Australia, USA, Belgium, Denmark, Egypt, France, Holland, Italy, the Indies (*Indes*), Norway, Russia, Sweden, other, total (115,372 barrels, each weighing 175 kg). Discussion of soy oil and cake in most of the above countries.

Trade in soybean seeds: Mitsui Bussan, Manchuria, England, China, Japan. Soybean cake.

Soy oil: Physical and chemical properties. Applications and uses as food and in industry: Margarine, for illumination, soaps, as a drying oil, paints and varnishes, linoleum, artificial rubber. An extensive bibliography is at the end of the last article in the series.

Note: This is the earliest document seen (March 2021) concerning the cultivation of soybeans in Cambodia. This document contains the earliest date seen for the cultivation of soybeans in Cambodia (April 1911). Earlier documents imply that soybeans were being cultivated in Cambodia by 1900, and it is highly likely that they were being cultivated for at least a century before that time. Address: Ingénieur-chimiste E.C.I.L., France.

114. *USDA Bureau of Plant Industry, Inventory.* 1911. Seeds and plants imported during the period from April 1 to June 30, 1910. Nos. 27481 to 28324. No. 23. 88 p. April 29.

• ***Summary:*** Soy bean introductions: *Glycine hispida* (Moench) Maxim.

"27498-27501. Grown at Arlington Experimental Farm, Virginia, season of 1909. Numbered for convenience in recording distribution, April 14, 1910. Seeds of the following. Notes by Prof. C.V. Piper:

"27498. 'Chromium green; late. Grown under temporary number 0867, from seed found in cowpea No. 23307, from Peking, China.'

"27499. 'Straw yellow; very late. Grown under temporary number 0869, from Mr. W.W. Williams, Ingang, Fukien [Fujian], China.'

"27500. 'Straw yellow; very late. Grown under temporary number 0888, from Rev. J.M.W. Farnham, Shanghai, China.'

"27501. 'Olive yellow; very late. Grown under temporary number 0889, from Rev. J.M.W. Farnham, Shanghai, China.'"

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"27531/27537. From San Giovannia Teduccio, near Naples, Italy. Purchased from Messrs. Dammann & Co. Received April 11, 1910. Seeds of the following:

"27535. Brown."

"27553/27558. From Choon Chun, Korea. Presented by Mr. J. Robert Moose. Received April 4, 1910. Seeds of the following:

"27557. Yellow seeded."

"27704/27713. From Hankow, China. Presented by Mr. A. Sugden. Received April 14, 1910.

"27707. Yellow seeded."

"28048/28058. From Manchuria. Procured by Mr. Edward C. Parker, agriculturist, Bureau of Agriculture, Industry and Commerce, Mukden, Manchuria. Received June 2, 1910. Seeds of the following; descriptive notes by Mr. Parker:

"28049. Large yellow. *'White Eyebrow* soy bean. Chinese name, *Paimei.* A well-known and famous variety of the soy bean grown over large areas on the alluvial bottom lands of the Liao Ho River in Manchuria. This seed sample came from valley lands near Kwangning, 42º north latitude, where the variety has been commonly grown for several centuries. Valuable in America as foundation stock for selecting and breeding improved varieties of oil-producing seeds.'

"28050. Small yellow. 'Small, round soybean. Chinese name, *Chinyuan.* This variety is grown in Manchuria as far as 47º north latitude. This seed sample came from a district northeast of Harbin, Manchuria, 46º north latitude. The beans of this variety, grown in northern latitude, are highly prized because of their heavy weight and large percent of oil. This variety should be especially valuable to plant breeders in the upper Mississippi Valley.'

"28051. Black. 'Black curd bean. Chinese name, *Heitou.* Commonly grown in central Manchuria. This seed sample comes from Mukden, Manchuria, 42º north latitude. These beans are principally used for the production of bean curd. The beans are soaked, ground into coarse meal, and a filtrate formed that is coagulated with salt. The coagulated mass is pressed into a curd with stones. A meal made from these beans is mixed with corn meal for baking cakes.'"

28052 is Adzuki bean (*Phaseolus angularis* (Willd)). "Red bean. Chinese name, *Hungchiangtou.* Commonly grown in Central Manchuria for human food."

28053 is mung bean (*Phaseolus radiatus, Lutou*) and 28054 is hemp. The latter is grown in large quantities in Manchuria for the production of fiber. Address: Washington, DC.

115. *Farben-Zeitung.* 1911. Die Aussichten fuer Sojabohnenoel [The prospects for soybean oil]. 16(50):2810. Sept. 9. [Ger]

• ***Summary:*** The soybean oil industry (*Sojabohnenölindustrie*) has been deemed important enough by the Chinese customs authorities to dedicate a so-called "yellow book" to it. In it, it is indicated that the Changchun-Kirin [today's Jilin City, China] Railway which is currently under construction will have the consequence of opening up the Sungari region [today's Songhua River region] in approximately two years. And when the railroad is extended as far as the border with Korea, then that promises to make extensive new areas available for the cultivation of the soybean (*Sojabohnenkultur*). The competition for this product on the part of Europe shows no traces of letting up, and in North America, as well, a good area for sales ought to open up.

The export of soybean oil (*Sojabohnenöl*) from Dalny [today's Dalian, China] in the first five months of this year massively exceeded that of the same period of 1910, as it reached 24,449 metric tons in comparison with 8,550 metric tons. The price at that port was set at 4.94½ silver yen at the beginning of July, while at the end of the year it amounted to 3.16. There are 42 bean mills in Dalny which can press 22,850 piculs [an Asian measure of weight, equal to around 60 kg each] of beans every day and produce from them 2,050 piculs of oil along with 45,700 pieces of bean cakes. The bean growers in that district are therefore not completely reliant upon the foreign demand. The premium that was recently placed by the Japanese government on exported bean oil may have the consequence of an increase in the bean export to the empire of the Mikado.

Note: Translated by Philip Isenberg (MM, CT), Long Beach, California.

116. Li, Yu-ying; Grandvoinnet, L. 1911. Le soja [The soybean]. *Agriculture Pratique des Pays Chauds* (*Bulletin du Jardin Colonial*) 11(102):177-96. Sept. See also: 11(103):270-94. Oct.; 11(104):360-75. Nov.; 11(105):459-74. Dec.; 12(106):28-38. Jan.; 12(107):120-32. Feb.; 12(108):213-23. March; 12(109):302-08. April. 28 cm. [33 ref. Fre]

• ***Summary:*** This series of articles, published in book form in 1912, is one of the earliest, most important, influential, creative, interesting, and carefully researched documents ever written about soybeans and soyfoods. Contents: Introduction. Origin and history of the soybean. Soybean culture. 1. Species and varieties of soybeans (botanical characteristics, species {vernacular names in Asia}, varieties {from China, Japan, India, Indochina, Hawaii, United States, and Europe}). 2. Needs of the soybean: Climatic (temperature, humidity), geographical area and varieties grown (in Asia [Manchuria, Japan, Formosa, Korea, Indochina], America, Guyane ("En Guyane, le soja mûrit" [ripens or matures]. Note: This probably refers to French Guiana [*Guyane française*], where Sagot and Raoul reported in 1893 that soybeans had been grown successfully), Europe [France, Italy, Russia], Southeast Asia (*Océanie* / Oceania) [Philippines, Java, Borneo], and Africa [Algeria, Tunisia,

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South Africa]), agrological needs of the soybean (physical, chemical).

"Oceania.–The soybean has been cultivated for a very long time in the Philippines, Java, and Borneo" (p. 194).

Illustrations (line drawings) show: Soybean plant with roots (p. 182). Soybean pods and beans (p. 183). A table (p. 191) and a graph (p. 192) show trade of soybeans, soybean cake, and the total of the two from five Manchurian ports (Newchwang, Antung, Ta-tung-ho, Dairen, and Suifenho [Suifenhe]) from 1905 to 1909; all have increased dramatically. Also contains 12 other tables from other sources. Note that this influential series of articles, like its predecessor by Itie in the same journal, were in large part prompted by the huge rise in imports of soybeans to Europe, starting in 1908. The contents of these articles is almost identical to that of the book by the same name, published in 1912, which see. Address: 1. Counseiller de 1ere classe au Ministère de l'Agriculture de la Chine; 2. Ingénieur agricole (G.).

117. Williamson, A.A. 1911. Commerce of the Liaotung Peninsula. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*) 14(255):535-40. Oct. 31.

• ***Summary:*** "The Dalny (Manchuria) consular district comprises the entire territory held under lease by Japan from China, lying at the extreme southern end of the Liaotung Peninsula, and is known and officially designated by the Japanese as the Kwantung Province. Its area is given as 205 square 'ri,' or 1,220.57 square miles, and it has a population of 462,399 or 379 persons per square mile.

"The country is very hilly in the southern part of the Province, the elevation, however, seldom reaching over 900 feet above the sea. Toward the north the surface gradually becomes more level and partakes of the nature of the flat bean fields of north Manchuria."

"Dalny, the chief city and port of Kwantung Province, is said to have the finest wharves in the Far East, vessels drawing up to 28 feet being moored alongside the quay. Goods can be discharged from a ship and placed aboard the freight cars, which run out onto the wharves, in one operation. While ice forms in the protected parts of the bay at Dalny, it never becomes sufficiently thick to interfere with navigation, so that the port is open the year round and, Dalny being the southern terminus of the main line of the South Manchuria Railway, the advantages offered are at once evident."

The export returns for 1910 "show a decided decrease in shipments of beans and bean cake. The causes of this are undoubtedly the (for the farmers) favorable preceding year and the outbreak of plague with which the country was smitten during the export season. The first caused the farmers to sell rapidly in 1909 and to hold back in 1910; the latter, because of isolation and segregation measures, brought traffic to a standstill. Undoubtedly the bean season will, in the end, show no falling off, as the estimates of production which have been obtainable show a considerable increase in cultivation."

The section titled "The export trade" states that "the Chinaman" has a strong hold upon the trade passing through Dalny; a high percentage of the imports came in the shape of native products and "the export trade with native products showed the greatest increase, over 90 per cent." A table shows "the principal articles exported through the Maritime Customs at Dalny during 1909 and 1910 by steamer and by junk." For 1909 and 1910 by steamer: Bean cake 615,252,933 / 526,030,267 pounds. [Soya] beans 981,274,267 / 713,489,867 pounds. [Soya] bean oil 19,021,067 / 31,642,267 pounds. For 1909 and 1910 by junk: Bean cake 22,398,000 / 28,863,733 pounds. [Soya] beans 43,657,007 / 13,827,333 pounds. [Soya] bean oil 2,679,000 / 2,864,133 pounds.

Under "Soya-bean trade," another table shows the destination of these three products (in pounds) during 1910 from the Dairen customs district, as given in the Imperial Chinese Maritime returns: Bean cake: Japan (incl. Formosa) 443,406,267 (99.9% of overseas total). Korea 307,333. Total overseas 443,730134. Chinese ports 111,163,866 (20.0% of grand total). Grand total 554,894,000.

[Soya] beans: Egypt 302,240,800 (#1). Japan 192,499,733 (#2). United Kingdom 59,455,867 (#3). Other: Denmark, Hongkong, Netherlands, Straits Settlements [today's Singapore]. Total overseas 603,120,800. Chinese ports 124,196,400 (17.1% of grand total). Grand total 727,317,200.

Bean oil: Japan 17,208,133 (#1). Belgium 6,097,200 (#2). Other: Denmark, Egypt, Hongkong, Netherlands, Straits Settlements. Total overseas 27,829,333. Chinese ports 9,677,067 (25.8% of grand total). Grand total 37,506,400.

A 3rd table shows prices of the three products month by month in 1910 in U.S. currency as reported by the Manshu Juyo Bussan Yushutsu Kumiai (Manchurian Staple Products Export Association). For bean cake, the price is per 61.33 lb. For soya beans and oil per 133.33 lb.

"There are still no American export and import houses in this district, and until some thoroughly American house opens here, trade with the United States will necessarily remain half-hearted, being in the hands of natural competitors." The main export from this district to the USA is soya bean oil, of which $93,974 was exported in 1910; only $8,532 worth of soya-bean cake was exported. Address: Vice Consul, Dalny, Manchuria.

118. *Queensland Agricultural Journal*. 1911. Soya beans. 27(4):187. Oct. [1 ref]

• ***Summary:*** From Tropical Life: "Last year Corea [Korea] exported £584,500 of Soya beans, mostly to Japan. The Corean bean is said to be superior to its Manchurian rival,

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and so large an increase in its export (£200,000, or more than 30 per cent. over 1909) has released that quantity of Manchurian beans, required for the Japanese manufacturers of soya, &c., and enabled them to be sent to Europe, where the demand is rapidly increasing." Address: Australia.

119. King, F.H. (Franklin Hiram). 1911. Farmers of forty centuries, or permanent agriculture in China, Korea and Japan. Madison, Wisconsin: Mrs. F.H. King. ix + 441 p. Preface by Dr. L.H. Bailey. Portrait. Illust. Index. 20 cm. Reprinted in 1927 by Harcourt & Brace (NY, 379 p.). Facsimile reprint by Rodale Press, 1972.

• ***Summary:*** A superb, classic work which Wendell Berry called "one of the richest sources of information about peasant agriculture... one of the pioneer books of organic farming." Dr. Franklin Hiram King (lived 1848-1911; his portrait photo faces the title page) was former chief of USDA's Division of Soil Management. This is his journal, filled with many fine photos, of a voyage in the early 1900s through coastal China, Korea, and Japan. King was impressed by the productivity and efficiency of Chinese agriculture, and the strength and hardiness of the people.

Page 10: "It was not until 1888, and then after a prolonged war of more than thirty years, generaled by the best scientists of all Europe, that it was finally conceded as demonstrated that leguminous plants acting as hosts for lower organisms living on their roots are largely responsible for the maintenance of soil nitrogen, drawing it directly from the air to which it is returned through the processes of decay. But centuries of practice had taught the Far East farmers that the culture and use of these crops are essential to enduring fertility, and so in each of the three countries the growing of legumes in rotation with other crops very extensively for the express purpose of fertilizing the soil is one of their old, fixed practices."

In Japan: "How the fields are crowded with crops and all the land is made to do full duty... even the narrow dividing ridges but a foot wide, which retain the water on the rice paddies, are bearing a heavy crop of soy beans" (p. 31, photo p. 33).

In China, in printing blue on white cotton calico cloth, a thick paste of lime and freshly-ground soy bean flour was used. A stencil was placed on top of the cloth. "The paste was then deftly spread with a paddle over the surface and thus upon the cloth beneath wherever exposed through the openings in the stencil... The paste is permitted to dry upon the cloth and then the bolt has been dipped into the blue dye the portions protected by the paste remain white. In this simple manner the printing of calico has been done for centuries" (p. 122-23). A photo (p. 123) shows a stone mill, pulled by a blindfolded donkey, "in common use for grinding beans and various kinds of grain."

"Sprouted beans and peas of many kinds and the sprouts of other vegetables, such as onions, are very generally seen in the markets of both China and Japan, at least during the late winter and early spring,..." (p. 134).

In a section titled "Economy of Vegetable Diet" (p. 134-35) the author notes that these people "are vegetarians to a far higher degree than are most western nations, and the high maintenance efficiency of the agriculture of China, Korea, and Japan is in great measure rendered possible by the adoption of a diet so largely vegetarian." From every 100 lb of dry substance (feed) eaten by various kinds of livestock, only 4 pounds of flesh is returned for human food from cattle, only 5 lb from sheep and 11 lb from swine. "In view of these relations, only recently established as scientific facts by rigid research, it is remarkable that these very ancient people came long ago to discard cattle as milk and meat producers; to use sheep more for their pelts and wool than for food; while swine are the one kind of the three classes which they did retain in the role of middleman as transformers of coarse substances into human food."

Pages 145-48 describe how cotton seed is crushed and pressed to make cotton seed oil and cotton seed cake–one of the most common family industries in China. Page 226 notes that small farmers in Shantung province grow wheat, barley, large and small millet, sweet potatoes and soy beans or peanuts. Shelled peanuts are sold in gunny sacks. Pages 256-57 give a similar description for soy beans and peanuts used to make oil and cakes in Shantung, China, with a photo (p. 256) of the large stone mill. The "bean and peanut cakes," also used for fertilizer in Japan and China, are about 18 inches in diameter and 3-4 inches thick.

The section titled "Rotation of Crops" (p. 309) states of Nara, Japan: "To secure green manure for fertilizing, soy beans are planted each year in the space between the rows of barley, the barley being planted in November. One week after the barley is harvested the soy beans, which produce a yield of 160 kan per tan, or 5,290 pounds per acre, are turned under and fitted for rice."

The chapter titled "Manchuria and Korea" notes of Lwanchow [Heibei], Manchuria (p. 348-49): "The planting here, as elsewhere, is in rows but not of one kind of grain. Most frequently two rows of maize, kaoliang or millet alternated with the soy beans and usually not more than 28 inches apart, sharp high ridge cultivation being the general practice." A photo (p. 348) shows carts pulled by donkeys or horses piled high with sacks of soy beans at Lwanchow, Chihli, China, ready for export.

Note: As of 2020, Lwanchow is in Hebei province, in northeastern China.

When King's train reached Sinminfu [Xinmin in Liaoning province on the Mukden-Tientsin railroad] he saw "the first extensive massing of the huge bean cakes for export, together with enormous quantities of soy beans in sacks piled along the railway and in the freight yards or loaded on cars made up of trains ready to move." They soon arrived at "another station where the freight yards and all of

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the space along the tracks were piled high with bean cakes and yet the fields about were reflecting the impoverished condition of the soil through the yellow crops and their uneven growth on the fields.

"Since the Japanese-Russian war [1904-05], the shipments of soy beans and of bean cake from Manchuria have increased enormously. Up to this time there had been exports to the southern provinces of China where the bean cakes were used as fertilizers for the rice fields, but the new extensive markets have so raised the price that in several instances we were informed they could not then afford to use bean cake as fertilizer" (p. 357).

Page 368: King is discussing country life in Korea as seen from the window of his train: "The valley beyond was occupied by fields of wheat where beans [probably soy] were planted between the rows. Thus far none of the fields had been as thoroughly tilled and well cared for as those seen in China, nor were the crops as good."

In Japan (p. 378-79): "Where bean cake is used as a fertilizer, the applications may be at the rate of 496 pounds per acre, carrying 33.7 pounds of nitrogen, nearly 5 pounds of phosphorus and 7.4 pounds of potassium." A table shows that typical fertilization for each crop of paddy rice, in pounds per acre, is: Manure compost 5,291. Green manure from soy beans 3,306. Soy bean cake 397. Superphosphate 198. The soy bean cake provides the most nitrogen (27.8 lb/acre). A photo (p. 420) shows peanuts being grown in the Tokyo plain (Chiba prefecture, July 17). "Peanuts, sweet potatoes and millet were the main dry land crops then on the ground, with paddy rice in the flooded basins" (p. 422). Address: Former Prof. of Agricultural Physics, Univ. of Wisconsin, and Chief of the Div. of Soil Management, USDA, Washington, DC.

120. Porter, Robert P. 1911. The full recognition of Japan: Being a detailed account of the economic progress of the Japanese empire to 1911. London, New York, Toronto & Melbourne: Henry Frowde, Oxford University Press. x + 789 p. See p. 745-57. Maps. Index. 23 cm.
• ***Summary:*** Chapter 47, titled "The Soya Bean," begins: "The history of the growth of the bean trade in Manchuria is as captivating as the story of the rise of Jack's famous beanstalk of our nursery days. It reads more like a fairy tale than a page from the Board of Trade Returns. Only after one has travelled through the region where the Soy Bean reigns supreme, and has seen the wharves and the warehouses, the stations and the platforms, laden with bags of Beans, and noted the thousands of queer-looking stacks with pagoda-like roofs with which the country is dotted, and which serve as temporary storehouses for the produce while awaiting shipment, does one realise that it is not a fable, but a veritable fact in the history of international commerce... And the manifold uses, agricultural and industrial, as well as dietary, to which the bean can be put, invest this generous vegetable with increasing importance, and the future of the Bean crop with romantic mystery."

Maps show: (1) The journey round the world. (2) Chosen (Korea). (3) Taiwan (Formosa). (4) The Siberian railways. (5) The Japanese empire. Japan and Hokkaido. Inset map of Karafuta (Japanese Saghalien). (6) Administrative divisions and chief railways of Japan. (7) The industries of Japan. Address: 108 Banbury Rd., Oxford, England.

121. Takenob, Y. 1911. Japan Year Book. Tokyo: Japan Year Book Office. 800 p. See p. xii, 48, 133, 319-20, 368-69, 390-92, 412, 548, 554-55, 559, 583, 591-92, 606, 695, 723. Sixth annual issue. [Eng]
• ***Summary:*** This issue gives statistics for the Japanese empire: Japan Proper, Korea, and Formosa.

Page 320. In the chapter on "Agriculture." A table shows production of soy beans, potatoes, and sweet potatoes, 1904-1908 (in 1,000 koku). Production of soy beans increased from:

3.710 million *koku* in 1904
3.261 million *koku* in 1905
3.517 million *koku* in 1906
3.667 million *koku* in 1907
3.842 million *koku* in 1908. Address: Japan.

122. Takushoku Kyoku, Japan. 1911. Daizu ni kansuru chôsa [Survey of soybeans]. Tokyo: Takushoku Kyoku. 2 + 6 + 406 p. 23 cm. Series: Takushoku Kyokuhô no. 25. [Jap]*
• ***Summary:*** This survey was conducted in Manchuria, Chosen (Korea), and Japan. *Takushoku* means "colonization," so the survey was conducted and published by the colonization office. Includes bibliographic references.

Note: This is the 2nd earliest known book about soybeans written in Japanese.

123. Morse, W.J. 1912. Re: Promising varieties of soybeans grown at Arlington. Letter to Miss M.G. Austin [USDA BPI], Feb. 10. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "The following list represents some promising varieties of soybeans grown in quantity at the Arlington Experimental Farm and Virginia Agricultural Experiment Station in 1911."

The varieties are 32890 Duggar, 32891 Austin, 32906 Virginia, 32907 Peking, 32908 Chestnut, and 32909 Auburn.

For each a full description is given; the description of Duggar is typical.

"32980 Duggar. Grown under No. 17268 C. at Virginia Experiment Station, Blacksburg, Virginia, 1911. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 17268, Ito San. An olive-yellow seeded variety of medium maturity found especially promising in Alabama and Virginia.

"32891 Austin. The progeny of S.P.I. No. 17263 grown

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under No. 17263 at Virginia Experiment Station, Blacksburg, Virginia, 1911; originally from S.P.I. No. 6397 from Pingyang, Korea. This variety was also distributed under Agrostology No. 1539. A later olive-yellow seeded variety found especially promising in Virginia. Tennessee, and Southern Pennsylvania.

"32906 Virginia. Grown under No. 19186 D. A pure field selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 19186 from Newchwang, Manchuria, 1906. A medium late brown seeded variety of considerable promise

"32907 Peking. Grown under No. 17852B. A pure field selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 17852, Meyer, from Peking, China. A medium late variety with small black seeds. Very prolific and especially promising as a hay variety.

"32908 Chestnut. Grown under number 20405 B. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 20405, Habaro, from Khabarovsk, Siberia, 1906. A medium early brown seeded variety of promise in the more Northern states.

"32909 Auburn. Grown under number 21079 A. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 21079, Shingto, from Tieling, Manchuria, 1907. A black seeded variety of medium maturity found especially promising in Pennsylvania and New York."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Scientific Assistant, Bureau of Plant Industry, USDA, Washington, DC.

124. *Oesterreichische Monatschrift fuer den Orient: Hauptteil 1912* (*Vienna*), *Austria-Hungary.* 1912. Ostasien: Japan [East Asia: Japan]. No. 10. Oct. Page 117, col. 2. [Ger]
• ***Summary:*** According to a communication dated mid-September 1912, in Korea the harvest in soybeans (*Soyabohnen*) was estimated at about 4.12 million *hl* (hectoliters), 7.7% more than in the year 1911.

125. *Grey River Argus* (*West Coast, New Zealand*). 1912. Milk made by machinery: Dairies turned into factories. Germ free and cheaper than cow's milk. Dec. 9. p. 1.
• ***Summary:*** "The familiar sign 'Milk from our own dairies' may soon be supplanted in London by the announcement 'Milk from our own factories.'

"This startling development of man's struggle to improve on nature is the result of the discoveries of Dr. Saner and Dr. Gooseell [sic, Gössel; Goessel], two German scientists, who claim to be able to make by machinery milk that is superior to that supplied by the cow.

"A demonstration of this synthetic milk was given at Dane's Inn House, London, in October, in the presence of medical men and Press representatives. Apart from a sort of clinging taste after drinking it, the synthetic draught passed the palate test. It went a little better with coffee.

"The inventors of synthetic milk have been experimenting in Germany for three years, and they claim they have now produced a perfect substitute for the natural article. Analysts in Germany have reported favourably on the new product.

It is claimed that the new milk is:–Free from bacilli; More wholesome than natural milk; Made in various grades to suit the infant or the adult; Easily standardised; And that it is much, cheaper than the natural article.

"The raw material is said to be purely vegetable, one of the main ingredients being the Soya bean, which is grown in Japan and Corea [Korea], and much used in those countries. As to the process of manufacture. Mr. Faulding stated that various vegetables were put into a machine and subjected to great heat. In plain English the machine does the work of the cow, the raw material, in the scientific sense, being exactly the same as that which supplies the natural article. It takes about seven hours to turn out the finished milk, and it is proposed to 'brew' twice a day.

"The plant is not costly, and taking an average of the various grades of strength the inventors intend to make, the price to the public will be 3*d* per quart. Cheese [tofu] can also be made from synthetic milk, which would be sold for about 3*d* a pound.

"The substitute will not make butter, but it is possible that it may be used in the manufacture of margarine.

"Synthetic milk also gives cream, but it takes longer to make it, as the fat is more evenly distributed than in the case of natural milk.

"Other claims made for synthetic milk are that it is not touched by hand throughout the process of manufacture and that it is not exposed to the atmosphere while being made, except for the brief period required for bottling.

"This, the inventors claim, makes it absolutely free from bacilli [bacteria], and thus, it is claimed, the substitute will greatly diminish consumption [tuberculosis] and other illnesses which are due to or aggravated by, tuberculosis milk.

"It is said that the new milk will keep good twice as long as cow's milk, but as it will be offered for sale in bottles of all sizes, this is not very material.

"If the invention is favourably received it is intended to build a factory in London."

126. Fairchild, David. 1912. Plant introduction for the plant breeder. *Yearbook of the United States Department of Agriculture.* p. 411-22. For the year 1911. See p. 416.
• ***Summary:*** The article begins: "It is now nearly two centuries since the first successful attempt to hybridize plants was made by an English gardener."

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The section titled "Extent of the work of the Office of Foreign Seed and Plant Introduction" states: "To stimulate this research and make it possible for a growing number of enthusiasts to breed plants with intelligence, the Office of Foreign Seed and Plant Introduction has been importing from various parts of the world the wild relatives of our cultivated plants and such promising wild forms as seem to offer a chance for domestication.

"When one canvasses the whole world for the varieties of one of our cultivated plants it is surprising to find how many forms there are. In 1907, for example, when the systematic work of bringing in soybean varieties for the Office of Forage-Crop Investigations first began, there were known in this country only 23 varieties. In a recent bulletin of the Bureau of Plant Industry 300 are mentioned as having been tested (Footnote: Piper & Morse. 1910. "The soy bean: history, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 197. See p. 24). These forms have been gathered since 1907 from the bazaars of oriental villages or bought from peasants in Japan, India, China, Siberia, Chosen (Korea), and the Dutch East Indies by trained explorers, American consuls, missionaries, or special correspondents." Address: Agricultural Explorer in Charge of Foreign Seed and Plant Introduction.

127. Giles, Herbert Allen. 1912. A Chinese-English dictionary. 2nd ed., revised & enlarged. 2 vols. Shanghai, China: Kelly & Walsh, Ltd.; London: Bernard Quaritch. 33 x 26 cm. Reprinted in 1964, 1978. [4 ref. Eng; chi]

• ***Summary:*** These two massive volumes, each weighing about 9½ lb, contain more than 1,800 pages and 13,848 Chinese characters. Contents of Vol. I: Part I. By the same author (25 books). Dedication. Preface. Extracts from preface to first edition. Dialects (The romanized pronunciation of each character is given in Cantonese, Hakka, Foochow, Wênchow, Ningpo, Peking, Mid-China, Yangchow, and Ssuch'uan {Szechwan} dialects, as well as in Korean, Japanese, and Annamese, each being distinguished by its initial letter). Tables: Insignia of official rank, the family names, the Chinese dynasties, topographical, the calendar, miscellaneous (the Chinese digits, the Chinese decimal system). The 214 radicals. Radical index. Part II. A Chinese-English dictionary (p. 1-1711, in two volumes). Examples of soy-related characters:

*Chiang* (p. 149, No. 1220). "A soy made by mixing salt with bean flour. Sauce." Fourteen compounds using this character are given, including: Bean sauce, soy. Pickled bean curd. Bean sauce. Soy is of two kinds, the clear and the thick. Dry relishes. Soy [sauce] colour–a dark reddish drab. He won't use money for vinegar to buy soy.

*Ch'ih* (p. 249, No. 1996). "Salted fruits, etc., dried and used as relishes." Four compounds incl.: Salted beans. Soy, sauce.

*Fu* (p. 458, No. 3686). "Rotten; putrid; worthless." Eleven compounds and sayings include: Bean curd, see No. 11,417. Bean curd officials–a term of contempt applied to certain of the poorer classes of official servants who are compelled to feed largely on this cheap food. Also explained as flabby or unenergetic officials. A Mongol name for cheese. A kind of milk made from beans (milk + fu) [Note 1. Probably fermented tofu].

*Huang* (p. 635, No. 5124). Yellow. Compounds: Yellow beans.

*Mao* (p. 955, No. 7,679). "Hair, down, feather." But the word *Maodou* ("Hairy beans") = edamame does not appear here.

*Ta* (p. 1,294-96, No. 10,470). "Great." But the word "Great bean" = soybean does not appear here.

*Tou* (p. 1,412, No. 11,417). "Beans; pulse." See also No. 11,412. Thirty compounds, incl.: Bean-sprouts. Bean-curd. A cheap restaurant (a bean-curd restaurant). Like making bean curd–very tedious. A tongue like a knife, but a bean-curd heart (soft). Bean-cake. Bean oil. Big bean, black bean, or yellow bean = the soja or soya bean (*Glycine hispida*, Max.), used for making bean-curd, soy, oil, etc. Ground-nuts.

*Yu* (p. 1,661, No. 13,409). "Oil, fat, grease." 45 compounds incl. Oil, salt, soy, and vinegar = condiments generally. Sesamum-seed oil. Linseed. Wood oil. An oil factory. Oil dregs. But "bean-oil" = soybean oil does not appear here.

Note 2 (see p. vii): Other earlier important Chinese dictionaries are: Morrison (1819, English). Medhurst (1843, English). Williams (1874, American). Giles (1892, English). Giles lived 1845-1935.

Note 3. Unfortunately, the pronunciation of the compounds is not given (as in Mandarin). Address: Prof. of Chinese, Univ. of Cambridge, Cambridge, England; and sometimes H.B.M. Consul at Ningpo.

128. Kawakami, Kiyoshi Karl. 1912. American-Japanese relations: An inside view of Japan's policies and purposes. New York, Chicago, Toronto, London and Edinburgh: Fleming H. Revell Co. 370 p. Index. 22 cm.

• ***Summary:*** The author argues for naturalization rights for Japanese in America. Contents: Introduction. Book I: The Manchurian question (p. 23-142). Book II: The Korean question (p. 143-284). Book III: The immigration question.

In Chapter 4, titled "Chinese diplomacy in Manchuria," Kawakami argues that by defeating Russia in the Russo-Japanese war of 1905, Japan (at great sacrifice) saved China from dismemberment by foreign powers (p. 81): "Suppose Japan had not dared to combat Russia, what would have become of Manchuria, and indeed of China? With the Three Eastern Provinces irretrievably lost to China, other powers would not have hesitated to follow the suit of Russia and slice for themselves such regions as they had fixed their covetous eyes on. The defeat of Russia at the point of the Japanese bayonet, therefore, meant the prevention of

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the dismemberment of China, which would have become imminent had the Muscovite been allowed to stay in Manchuria."

In Chapter 6, titled "Japan's commercial advance in Manchuria and the 'Open Door' (p. 113-20), Kawakami discusses soybeans and Japan's policy in Manchuria. He argues convincingly that, since May 1906, Japan has followed an "Open Door" policy toward Manchuria, "... that China's sovereignty should be respected and the principle of equal opportunity for all nations should be adhered to with the utmost sincerity. In spite of all the harsh judgments passed by foreign critics, I do not hesitate to assert that Japan has been faithful to this fundamental policy sanctioned by the throne." Japan has promoted her own interests in the "Three Eastern Provinces" and allowed other nations to do likewise. Indeed: "Japan has subsidized her steamship lines to Manchuria, installed commercial museums in various important Manchurian towns in order to advertise her merchandise, sent commercial agents to inquire into the Manchurian markets, and, what is more important, has become a most liberal purchaser of Manchurian products, thus establishing close business relations with the native producers and merchants. These, reinforced by the advantage which she enjoys over Western nations in geographical position and the cost of production and transportation, have enabled her to push her trade in Manchuria with remarkable success.

What is the secret of Japan's secret of commercial success in Manchuria? This question Westerners usually answer with the hackneyed two words–cheap labor." This is true, however, the main reason is "that Japan, of all foreign nations, has been the only customer for Manchurian products..."

Kawakami believes that the only man who perceives the crux of the Manchurian question is George Bronson Rea, as described in his article of March 1910 titled "Beans: The solution of the commercial situation in Manchuria," published in his periodical the *Far Eastern Review* (Shanghai).

"The real basis of Japan's success in Manchuria is, Mr. Rea believes, the operation of the fundamental economic law, that the country consuming the major portion of the exports of another country holds the most advantageous position in supplying its necessary imports. Now Japan has for years been the chief consumer of Manchuria's principal export, consisting of [soy] beans and bean cake." Before the Russo-Japanese war, Chinese traders controlled this trade. But since Japan's victory in the war, all that has changed. "Japan began an aggressive campaign to gain control of the Manchurian trade, and success soon crowned her efforts. Says Mr. Rea:

"Under these conditions the foreign merchants and their agents in the interior are placed at a disadvantage from the outset. As they could not penetrate into the interior and purchase beans by an exchange of commodities, they are reduced to selling their wares for cash–the one thing the nation was short on."

"Not a few critics have been at pains to create in Europe and America the impression that Japan discriminates against foreigners in Manchuria in shipping and railway rates. The subsidized shipping of Japan, as one of such critics insinuates, carries Japanese goods at a minimum charge, subject to further rebates as quantities rise, from the place of manufacture to the port of Tairen [Dairen], thence the goods are carried at special rates to their selling place over the tracks of the South Manchuria Railway. In Mr. Rea's opinion, such charges and insinuations fall short of the mark in explaining the loss of the Manchurian market for American and European products, and he sums up the whole situation in these words:

"It is a far cry from high diplomacy to the humble soya bean, yet we hold to the belief that the past and present commercial situation and ultimate solution of the vexatious Manchurian question are bound up in the control of this one product."

In the next sentence, Mr. Kawakami writes: "That really furnishes the key to the Manchurian question."

Note 1. In the index, the soya bean is indexed under "Manchurian bean," and not under "soy" or "soya."

Note 2. Kiyoshi "Karl" Kawakami (1873-1949) was a Japanese Christian journalist who was born in Yonezawa, educated in the law in Japan, and was for a short time involved in newspaper work in that country. In 1901 he came to the United States and studied at the universities of Iowa and Wisconsin. In 1905, engaged in journalism, he traveled extensively in China, Siberia, and Russia. He was a correspondent for leading newspapers in Tokyo and a frequent contributor to American magazines and newspapers. (Continued).

129. Korea. Industrial Model Farm. 1912. Chôsen zairai daizu oomugi komugi awa hinshu chôsa [Survey of common Korean species of soybean, barley, wheat, and millet]. Suigen, South Korea. 140 p. [Jap]
Address: Korea.

130. *USDA Bureau of Plant Industry, Inventory.* 1913. Seeds and plants imported during the period from January 1 to March 31, 1912. Nos. 32369 to 33278. No. 30. 99 p. June 12.
• ***Summary:*** Soy bean introductions: *Glycine hispida* (Moench) Maxim.

"32491-32655. Seeds secured by Mr. C.V. Piper, of the Bureau of Plant Industry. Received November, 1911. Numbered February 1, 1912. Quoted notes by Mr. W.J. Morse, of the Bureau of Plant Industry.

"32491-32598. From Calcutta, India. Received November 17, 1911, from the Economic Botanist.

"32491-32533. 'These are black with small seeds and

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appear identical as to seeds with S.P.I. Nos. 24678 to 24689 received from India in 1909.

"32491. 'Reg. No. 32045. From Purtabghur, United Provinces.'

"32492. 'Reg. No. 32046. From Sultanpur, United Provinces.'

"32493. 'Reg. No. 32047. From Lucknow, United Provinces.'

"32494. 'Reg. No. 31577. From Patna Division.'

"32495. 'Reg. No. 32175. From Nocha, Farukhabad, United Provinces.'

"32496. 'Reg. No. 32176. From Bahadurpur, Farukhabad, United Provinces.'

"32497. 'Reg. No. 32177. From Ismail Digon, Farukhabad, United Provinces.'

"32498. 'Reg. No. 32178. From Pasgawn, Kheri, Oudh, United Provinces.'

"32499. 'Reg. No. 32179. From Bijna, Kheri, United Provinces.'

"32500. 'Reg. No. 32180. From Sansarpur, Kheri, United Provinces.'

"32501. 'Reg. No. 32501. From Chandeswa, Sitapur, United Provinces.'

"32502. 'Reg. No. 32182. From Bhagantipur, Sitapur, United Provinces.'

"32503. 'Reg. No. 32183. From Nimkhar, Sitapur, United Provinces.'

"32504. 'Reg. No. 32184. From Kauta, Unao, United Provinces.'

"32505. 'Reg. No. 32185. From Lalopur, Unao, United Provinces.'

"32506. 'Reg. No. 32186. From Mahanadpur, Unao, United Provinces.'

"32507. 'Reg. No. 32187. From Sanksoha, Basantpur, Futteghur, United Provinces.'

"32508. Reg. No. 32188. From Bahndolpur, Futteghur, United Provinces.'

"32509. Reg. No. 32189. From Khera Khurd, Mainpuri, United Provinces.'

"32510. 'Reg. No. 32190. From Lakhoura, Mainpuri, United Provinces.'

"32511. 'Reg. No. 32191. From Mainpuri, United Provinces.'

"32512. Reg. No. 32192. From Jaimoi, Mainpuri, United Provinces.'

"32513. 'Reg. No. 32193. From Nasipur, Mainpuri, United Provinces.'

"32514. 'Reg. No. 32194. From Tiswahisor, Hurdoi, United Provinces.'

"32515. 'Reg. No. 32195. From Atwa Karsot, Hurdoi, United Provinces.'

"32516. 'Reg. No. 32196. From Sanwaria, Hurdoi, United Provinces.'

"32517. 'Reg. No. 32197. From Aslapur, Hurdoi, United Provinces.'

"32518. 'Reg. No. 32198. From Jaipura, Hurdoi, United Provinces.'

"32519. 'Reg. No. 32199. From Naira, Hurdoi, United Provinces.'

"32520. 'Reg. No. 32200. From Barch, Etawah, United Provinces.'

"32521. 'Reg. No. 32201. From Bhoiya, Etawah, United Provinces.'

"32522. 'Reg. No. 32202. From Karayee, Etawah, United Provinces.'

"32523. 'Reg. No. 32203. From Nangawan, Etawah, United Provinces.'

"32524. 'Reg. No. 32204. From Etawah, United Provinces.'

"32525. 'Reg. No. 32205. From Etawah, United Provinces.'

"32526. 'Reg. No. 32209. From Shikohabad, United Provinces.'

"32527. 'Reg. No. 32210. From Bewar, United Provinces.'

"32528. 'Reg. No. 32211. Lakhimpur, United Provinces.'

"32529. 'Reg. No. 32212. From Langawar, United Provinces.'

"32530. 'Reg. No. 32213. From Panhar, United Provinces.'

"32531. 'Reg. No. 32399. From Jaunpur, United Provinces.'

"32532. 'Reg. No. 32874. *Bhatmas.* From Darjiling' [Darjeeling].

"32533. 'Reg. No. 31565. From Kalimpong, Darjiling.'

"32534-32538. 'Black, speckled with brown. In size and shape the seed is identical with S.P.I. Nos. 32491 to 32533.'

"32534. 'Reg. No 31785. From Poona, Bombay. Black, very similar to *Nuttall,* S.P.I. No. 17253.'

"32535. 'Reg. No. 34013. From Gurwhal, United Provinces.'

"32536. 'Reg. No. 32206. From Chakrata, Dehra Dun, United Provinces.'

"32537. 'Reg. No. 30030. From Kashmir.'

"32538. 'Reg. No. 31704. From Simla, Punjab' [India].

"32539-32541. 'These are brown with medium-sized seed and very similar to S.P.I. No. 20011B.'

"32539. 'Reg. No. 32208. From Chakrata, Tahsil, Dehra Dun, United Provinces.'

"32540. 'Reg. No. 32372. From Kashmir.'

"32541. 'Reg. No. 31702. From Simla, Punjab.'

"32542. 'Reg. No. 31567. From Kalimpong, Darjiling. Brown, similar to S.P.I. No. 24673.'

"32543. 'Reg. No. 32873. From Darjiling; very similar to S.P.I. No. 32542.'

"32544. 'Reg. No. 32032. From Kalimpong, Darjiling. Brown, quite similar to S.P.I. No. 17258.'

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"32545. 'Reg. No. 31701. From Kangra, Punjab [India]. Seed olive yellow, small, much flattened, with burnt-umber hilum.'

"32546. 'Reg. No. 32870. *Bhatmas.* From Darjiling. Olive yellow, medium small with burnt umber hilum.'

"32547. 'Reg. No. 32872. *Bhatmas.* From Darjiling. Straw yellow, medium small, much flattened, hilum russet colored.'

"32548. 'Reg. No. 32543. From Kilburn & Co., Calcutta. Olive yellow, identical with S.P.I. No. 26160.'

"32549. 'Reg. No. 31787. From Poona, Bombay. This sample contains olive-yellow seed, similar to S.P.I. No. 19186, a straw-yellow seed, very similar to S.P.I. No. 17273.'

"32550. 'Reg. No. 32265. From Kachin Hills, Burma. Straw colored with very small flattened seed, and hilum burnt umber.'

"32551. 'Reg. No. 31568. From Kalimpong. Olive yellow with dark-brown hilum; similar to S.P.I. No. 24704 in size and shape'

"32552. 'Reg. No. 31781. From Poona, Bombay. Olive yellow, with slate-colored hilum; similar in size and shape to S.P.I. No. 24704.'

"32553. 'Reg. No. 31790. From Poona, Bombay. Very similar to S.P.I. No. 26160.'

"32554. 'Reg. No. 31782. From Poona, Bombay. Very similar to S.P.I. No. 32552.'

"32555. 'Reg. No. 32406. From a Chinese dealer of Tiretti Bazaar, Calcutta. Very similar to S.P.I. No. 26160.'

"32556. 'Reg. No. 31703. From Simla, Punjab. Quite similar to S.P.I. No. 22901.'

"32557. 'Reg. No. 31617. From Shillong. Straw yellow and brown seed. Identical with S.P.I. No. 24672.'

"32558. '*Bhatmas* Reg. No. 32871. From Darjiling. Straw yellow with very dark-brown hilum; similar to S.P.I. No. 24697 in size and shape.'

"32559. 'Reg. No. 31615. From Bhamo, Burma. Straw yellow, very similar to S.P.I. No. 17269.'

"32560. 'Reg. No. 31779. From Poona, Bombay. Straw yellow, very similar to S.P.I. No. 32560.'

"32561. 'Reg. No. 31778. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 32560.'

"32562. 'Reg. No. 31786. From Poona, Bombay. Straw yellow, seed identical with S.P.I. No. 24702.'

"32563. 'Reg. No. 32405. From Chinese dealer of Tiretti Bazaar, Calcutta. Straw yellow, seed quite similar to S.P.I. No. 17278.'

"32564. 'Reg. No. 31776. From Poona, Bombay. Straw yellow, very similar to S.P.I. No. 24696.'

"32565. 'Reg. No. 31777. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 32564.'

"32566. 'Reg. No. 32583. From Madras Museum, Government farm, Trivandrum. Straw yellow, very similar to S.P.I. No. 24699.'

"32567. 'Reg. No. 31789. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 24699.'

"32568. 'Reg. No. 31780. From Poona, Bombay. Straw yellow, very similar to S.P.I. No. 24699.'

"32569. 'Reg. No. 31783. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 24702.'

"32570. 'Reg. No. 31788. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 24702.'

"32571. 'Reg. No. 31619. From Lashio, Hsenvi State, Northern Shan States, Burma. Straw yellow, very similar to S.P.I. No. 3259.'

"32572. '*Sudawpa.* Reg. No. 31173. From Ruby Mines, Upper Burma. Straw yellow, nearly identical with S.P.I. No. 17269.'

"32573. 'Reg. No. 31784. From Poona, Bombay. Straw yellow. Very similar to S.P.I. No. 14954.'

"32574. '*Pe-nga-pi.* Reg. No. 32043. From Lashio, Northern Shan States, Burma. Straw yellow, with very small seed elliptical in shape and hilum russet colored.'

"32575. 'Reg. No. 32214. From Myitkyina, Burma. Straw yellow, identical with S.P.I. No. 30574.'

"32576. 'Reg. No. 31803. From Naga Hills, Assam. Straw yellow, very similar to S.P.I. No. 14954.'

"32577. 'Reg. No. 31803. From Naga Hills, Assam. Straw yellow, identical with S.P.I. No. 30576.'

"32578. 'Reg. No. 31626. From Tiddim, Chin Hills, Burma. Straw yellow, very similar to S.P.I. No. 24674.'

"32579. 'Reg. No. 31566. From Kalimpong. Straw yellow, identical with S.P.I. No. 24674.'

"32580. 'Reg. No. 31569. From Kalimpong. Straw yellow, very similar to S.P.I. No. 24674.'

"32581. 'Reg. No. 33216. From Myitkyina, Burma. Straw yellow, very similar to S.P.I. No. 32580.'

"32582. 'Reg. No. 31252. *Pyin.* From Maubin, Lower Burma. Straw yellow, with small seeds much flattened and brown hilum.'

"32583. 'Reg. No. 31251. From Katha, Burma. Straw yellow, identical with S.P.I. No. 32582.'

"32584. 'Reg. No. 32075. From Myitkyina, Burma. Straw yellow, with brown hilum, similar to S.P.I. No. 32574, in size and shape.'

"32585. 'Reg. No. 31426. From Nagpur, Central Provinces. Straw yellow, very similar to S.P.I. No. 32582.'

"32586. 'Reg. No. 32217. From Myitkyina, Burma. Straw yellow, very similar to S.P.I. No. 32584.'

"32587. 'Reg. No. 31249. From Thaton, Upper Burma. Straw yellow, very similar to S.P.I. No. 32584.'

"32588. 'Reg. No. 32215. From Myitkyina, Burma. Straw yellow, very similar to S.P.I. No. 32584.'

"32589. 'Reg. No. 31616. From Lower Chindwin, Burma. Straw yellow, similar to S.P.I. No. 32584.'

"32590. 'Reg. No. 32074. From Katha, Burma. Straw yellow, similar to S.P.I. No. 32580.'

"32591. 'Reg. No. 31614. From Mandalay, Burma. Straw yellow, similar to S.P.I. No. 32580.'

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"32592. 'Reg. No. 32592. From Gurhwal, United Provinces. Straw yellow, similar to S.P.I. No. 32580.'

"32593. 'Reg. No. 31574. From Haka, Chin Hills, Burma. Straw yellow, identical with S.P.I. No. 24672.'

"32594. 'Reg. No. 32029. From Kashmir. Straw yellow, identical with S.P.I. No. 22901.'

"32595. 'Reg. No. 32373. From Kashmir. Straw yellow, identical with S.P.I. No. 32594.'

"32596. 'Reg. No. 32012. Yields 12.55 per cent of oil. From Gurwhal, United Provinces. Straw yellow (cloudy), in size and shape similar to S.P.I. No. 32594.'

"32597. 'Reg. No. 31250. *Pe-kyat* or *Pe-bok.* From Mandalay. Straw yellow, very similar to S.P.I. No. 32594.'

"32598. 'Reg. No. 32207. From Chakrata, Tahsib, Dehra Dun, United Provinces. Straw yellow, very similar to S.P.I. No. 32596.'

"32648-32649.

"32648. 'Dull black, identical with S.P.I. No. 16790B, a selection from *Cloud,* S.P.I. No. 16790.'

"32649. 'Straw yellow, very similar to S.P.I. No. 24695.'

"32890-32891. From Blacksburg, Va. [Virginia]. Grown by the Virginia Agricultural Experiment Station. Received February 27, 1912. Seeds of the following; quoted notes by Mr. W.J. Morse:

"32890. '*Duggar.* Grown under No. 17268C at the Virginia Experiment Station, Blacksburg, Va., 1911. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 17268, *Ito San*. An olive-yellow seeded variety of medium maturity found especially promising in Alabama and Virginia.'

"32891. '*Austin.* The progeny of S.P.I. No. 17263 grown under No. 17263 at Virginia Experiment Station, Blacksburg, Va., 1911; originally from S.P.I. No. 6397 from Pingyang [Pyongyang / P'yongyang], Korea. This variety was also distributed under Agrostology No. 1539. A late olive-yellow seeded variety found especially promising in Virginia, Tennessee, and southern Pennsylvania.'

"32906-32909. The following list represents some promising varieties of soy beans grown in quantity at the Arlington Experimental Farm, Virginia, in 1911. Numbered March 4, 1912, for convenience in recording distribution. Seeds of the following; quoted notes by Mr. W.J. Morse:

"32906. '*Virginia.* Grown under No. 19186D. A pure field selection at Arlington farm in 1907 out of S.P.I. No. 19186, from Newchwang, Manchuria, 1906. A medium-late brown-seeded variety of considerable promise.'

"32907. '*Peking* Grown under No. 17852B. A pure field selection at Arlington farm in 1907 out of S.P.I. No. 17852, *Meyer,* from Peking, China. A medium-late variety with small black seeds. Very prolific and especially promising as a hay variety.'

"32908. '*Chestnut.* Grown under No. 20405B. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 20405, *Habaro,* from Khabarovsk, Siberia, 1906. A medium-early brown-seeded variety of promise in the more northern States.'

"32909. '*Auburn.* Grown under No. 21079A. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 21079, *Shingto,* from Tieling, Manchuria, 1907. A black-seeded variety in Pennsylvania and New York.'" Address: Washington, DC.

131. Curtice, Raymond S. 1913. Dairen. *Daily Consular and Trade Reports* (*U.S. Bureau of Manufactures, Department of Commerce and Labor*) 16(177):597-608. July 31. See p. 604-05.

• ***Summary:*** This is part of a larger article on "Commerce and industries of southern Manchuria" (p. 593+). The section on Dairen begins: "The Dairen (Dalny) consular district compromises the southern end of the peninsula of Liaotung, the southernmost part of Manchuria, and embraces the whole of the Kwantung Leased Territory, which was originally leased to Russia by China in 1898. The unexpired term of the lease was ceded to Japan by Russia at the close of the Russo-Japanese War."

The section titled "Bean trade" (p. 604) notes that there has been a marked decrease in the trade of soybeans and products from Dalny. The reasons for this have already been given. A table shows exports for the calendar year 1912 of bean cake, [soy] beans, and bean oil (in tons of 2,000 lb) to various countries. Most of the bean cake (302,402 tons) is sent to Japan. Most of the [soy] beans are also exported to Japan (101,903), followed by Hong Kong (9,694), Great Britain (5,700), Dutch Indies [today's Indonesia] (2,829), and Netherlands (1,108). The largest amount of [soy] bean oil is sent to Belgium (13,550), followed by Japan (7,636), and Great Britain (1,116). Small amounts of beans and/or products are exported to: United States (oil only), Singapore / Straits, etc., Sweden, Germany, France, Russia (Pacific ports), and Chosen (Korea). For bean cake: Total to foreign countries 302,551. Total to Chinese ports 76,172. Grand total (1912) 378,723. For [soy] beans: Total to foreign countries 121,3241. Total to Chinese ports 61,304. Grand total (1912) 182,629. For [soy] bean oil: Total to foreign countries 23,493. Total to Chinese ports 13,973. Grand total (1912) 37,467. Corresponding totals are given for 1910 and 1911. "The fact that the share taken by the Chinese ports was so much greater proportionally in 1912, in all three items, was due to the lessening of the European demand." "It is expected that a new factor in the export trade of bean cake will be introduced when the new chemical process of extracting the oil is put into operation, for the residue, now in the form of bean cake, will be in a powder, and will be capable of shipment through the tropics without decaying. This should open up profitable markets in America and Europe for this article."

The section titled "Bean milling the chief industry" (p. 605) begins: "The industries of this consular district

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center around the [soy] bean trade and the South Manchuria Railway Co. Gives statistics by bean mills on production of bean cake and oil in 1910, 1911, and 1912. The Chinese have 40 [soy] bean mills in operation with a combined capital investment of $528,500, while the Japanese with their six mills of most modern construction total $1,687,000. Although most of the Chinese mills are operated by crude methods, still it is significant that their combined output during the season just past (October–April) was $8,308,098. The output of five modern Japanese mills (one having been destroyed by fire) during the same period was $2,360,170." Address: Vice consul.

132. Keimatsu, Katsuzaemon. 1913. Daizu no ôyô hômen ni tsukite [Problems of application of soy-bean]. *Chosen Igakkai Zasshi* (*Korean Medicine*) No. 8. p. 1-5. Dec. [Jap] Address: Yakugaku Hakase.

133. Takenob, Y.; Kawakami, K. 1913. Japan Year Book. Tokyo: Japan Year Book Office. 702 p. See p. 163-64, 230, 351, 356, 358, 438, 654, 659, 672, 690. Eighth annual issue. [Eng]

• ***Summary:*** In chapter 11, "Agriculture" (p. 155-77) is a table titled "Beans, sweet potato and potato (p. 163) which gives "Soy bean" production in Japan for 1906-1910 (in *koku*).

On page 164 we read: "The three daily articles of diet for all classes, viz. soy [sauce], *miso,* and *tofu* are manufactured from this bean..."

In chapter 15, "Industry," is a paragraph titled "Soy" (p. 230) on the patented Suzuki process for brewing soy [sauce]. "For soy the prefecture of Chiba, which is contiguous to Tokyo municipality, heads all other places on the list. Parched wheat mixed with salt and beans is a principal ingredient. The process is still far from scientific, requiring about 12 months before the liquid is ready for sale. It is also costly, as it does not admit so much labor-saving appliances. To obviate these advantages, several patented processes, notably that by Mr. Suzuki, have been tried, but they do not seem to have attained ideal perfection. It was on the strength of the Suzuki process that a company backed with yen 2,500,000 paid up was started, in 1907, and the 2-months' brewing, the chief merit of the invention, was started. It is to be regretted that this first machine-brewing has failed to produce the soy which can compare with the old process soy in taste and flavor, and that the company has been wound up."

In Chapter 25, "Home trade" is a table (p. 351) titled "Prices of principal commodities in Japan," which includes prices for 1905-1911 in yen for soy beans (per *koku*), soy [sauce] (per *koku*), and miso (per *kwan*).

In Chapter 26, "Foreign trade" is a table (p. 356-58) titled "Imports" (in 1,000 yen). Under the heading "Staples articles of over yen 1,000,000" (p. 356) is given the value of soja bean imports for 1908-1912. Under the heading "Trade with China (p. 359) is given the value of imports of "beans" and of "oil-cakes" for 1906-1911.

In chapter 30, "Finance," is a paragraph (p. 438) titled "Tax on Japanese soy" [sauce].

In chapter 34, "Chosen (Korea)," a table (p. 654) on "Exports (in 1,000 yen), under the heading "Foreign trade" has data on exports of beans and peas for 1906-1912 (in yen).

In the same chapter, under the heading of "Agriculture" is a paragraph (p. 659) which states: "Barley and soya bean.–Barley covers 421,828 cho, yielding 4,194,425 koku. Beans are exported chiefly to Japan for manufacturing soy. The acreage is 358,000 cho and the yield [production] 1,925,000 koku. Export to Japan amounted to about 3,500,000 yen in 1909."

In Chapter 35, "Taiwan (Formosa)," under the heading "Agriculture," a table (p. 672) titled "Agricultural products" has production data on "Beans and peas" (in 1,000 *koku*) for 1905-1909.

In Chapter 37, "South Manchuria," is a paragraph (p. 690) titled "The soya bean" which states: "The fame of Soya bean has spread all over the world since 1906 when the Mitsui Bussan first shipped a trial consignment to England. As substitute of cotton seeds for extracting oil the bean met with a favorable reception not only in England but in Germany, France and elsewhere, and the following year the enterprising firm received large orders. The yield [production] of [soya] bean in Manchuria is between 1,500,000 and 2,000,000 tons and the output of bean-cakes about 1,000,000 tons. In 1909 the export amounted to 800,000 tons of which about 50% went to Europe, 30% to China and 20% to Japan. The export is made through Dairen, Newchang (which monopolized it before the export to Europe began), and Vladivostock [Vladivostok], the first claiming about one half and the other half is divided between the two ports." Address: Prof. at Waseda Univ. and Late of the *Japan Times,* Japan.

134. *Hawaiian Gazette* (*The*) (*Honolulu, Hawaii*). 1914. Six soy factories located in Honolulu: Product promises to rival that of Japan. Jan. 9. p. 8, col. 6.

• ***Summary:*** "An investigation carried out yesterday showed that there are six soy factories in Honolulu manufacturing about 2500 five-gallon tubs per month. They give employment to forty or fifty skilled laborers. One of the largest of these factories [Yamajo Soy Co.], on Pua lane, Palama, manufactures about three-fifths of the local product, or from 1300 to 1500 tubs per month."

Note 1. The names of the other five makers are not given, perhaps because they are all small, and combined make only 40% of the local soy sauce.

The daizu or soy beans used to make this soy sauce is imported from Korea; wheat, salt, and a "special variety of

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yeast" [sic, mold] are also used. "The fermentation room contains forty or fifty 2000-gallon wooden vats filled to the top" with the thick mixture. The mixture ferments slowly for from nine to twelve months. When the gas bubbles no longer form, the mixture is pronounced pau [finished or done]. It is then ladled into a great rectangular vat holding the contents of five or six of the tuns and is then filtered in bag presses with a lever arm made of a tree-trunk about three feet in diameter and thirty feet long, to which additional weight is added. When the filtered soy no longer drips from the presses the liquor is boiled in huge cast iron caldrons, to thicken it and preserve it from spoiling. When it boils down to the right consistency, it is measured into tubs that are manufactured on the premises from California cedar. The press-cake is a valuable fertilizer that finds ready sale to the rice and taro growers.

The yeast [sic, koji] that is used in soy manufacture is grown in a series of concrete chambers that are heated to a controlled temperature by means of charcoal braziers.

"The quality of the local product is said to be improving every year and the soy brewers say it is only a matter of time until the Honolulu made soy will entirely supplant the Japanese imported soy."

Note 2. This article raises several questions: (a) In about 1914, what was the ratio of Japanese to Chinese living on Oahu? (b) Chinese like and use soy sauce as much as Japanese. But the two types of soy sauce are quite different. Did the Chinese import theirs from China? Buy the local Honolulu Japanese soy sauce? Make their own in Hawaii?

Note 3. In 1890, there were 1,791 Chinese and Japanese (lumped together) who were *citizens* of the Hawaiian kingdom. The "alien" population far surpassed them in numbers which were:

Chinese 15,301

Japanese 12,360

Total population of Hawaii was 89,900.

Thus, in 1890 the ratio of Chinese to Japanese in Hawaii was roughly 55% to 45%. (Source: 1890 census of the Hawaiian Kingdom. http://www.hawaiiankingdom.org/info-census1890.shtml).

According to the 1910 census, the total population of Hawaii was 191,874. This included 79,675 Japanese and 21,000 Chinese. So there were almost four times as many Japanese as Chinese in the Islands. Source: http://www.altiusdirectory.com/Travel/hawaii-demographics.php

135. Griffin, R.C. 1914. Animal and vegetable oils: Their preparation and uses–I. *American Machinist* 40(6):239-41. Feb. 5.

• ***Summary:*** "Synopsis–The most valuable animal oils for lubrication are lard oil, neatsfoot oil, tallow oil, whale oil, sperm oil, and porpoise oil. All of these were formerly used for lubricating purposes, but now have given way to a great extent in this field to mineral oils."

"Animal and vegetable oils are often called 'fixed oils,' because in contradistinction to mineral oils they cannot be volatilized or distilled without decomposition. Chemically speaking, they are all glycerides of fatty acids. The glycerides are neutral substances, whereas the fatty acids are, as the name implies, of an acid nature. A simple differentiation for the layman between neutral oils, that is, glycerides, and fatty acids, is this: When treated with caustic alkalies they both form soaps and a secondary product; but in the case of the glycerides this secondary product is glycerin, whereas in the case of fatty acids it is simply water."

"Sperm oil is the lightest and the most fluid and castor oil the heaviest and the most viscous of the fixed oils. Certain of the vegetable oils, when exposed to the air, rapidly absorb considerable oxygen, forming thin, elastic, varnish-like films. Such oils are called drying oils, of which the best known is linseed oil, largely used in paints. Other vegetable oils show no tendency to form such films and these are called nondrying oils. There is also a third class of oils, called semidrying, which, as the name indicates, falls between the drying and nondrying classes. For lubrication, either nondrying or semidrying oils must be used, such as olive oil, rape oil, and castor oil. It is important, moreover, that all oils used for lubrication should be as free as possible from fatty acids."

"Animal oils are, as a rule, either nearly colorless or yellow; vegetable oils occur in various shades of yellow or green."

There follow long sections on the following oils: Linseed, China-wood or tung, soja-bean, cottonseed, rape, olive, and caster. The section titled "Soja-bean oil" states: "This oil is also variously known as soy-bean oil, Chinese-bean oil, and simply 'bean oil.' It is obtained from the seeds of a plant which grows largely in Japan, Korea, and China. In truth the soja-bean industry is one of the staple industries of Manchuria and of Japan. The oil is largely used in those countries for edible purposes, but has recently been finding more and more use in this country as a paint and varnish oil in connection with linseed oil. When exposed to the air it dries slowly with the formation of a thin skin. Its value as a paint oil has not been definitely settled as yet, but it is claimed to have valuable properties in varnish making. Its color varies considerably through several shades of brown and yellowish brown, according to the care with which it has been prepared. It has about the same specific gravity as linseed oil, but its drying properties are considerably inferior. It belongs, in fact, to the class of semidrying oils, and not to the class of drying oils."

136. Hanson, George C. 1914. Commerce and industries of Kwantung. *Daily Consular and Trade Reports* (*U.S. Bureau of Foreign and Domestic Commerce, Department of Commerce*) 17(153):7-17. July 1. See p. 11-12, 15-16.

• ***Summary:*** "The Dairen (Dalny) consular district embraces

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the Kwantung Leased Territory (Japanese), comprising the tip of the Liaotung Peninsula and the islands adjacent thereto... Its area is 1,221 square miles and its population in 1913 was 517,147, of whom 469,651 were Chinese [90.82%], 47,381 Japanese [9.16%], and 115 foreigners."

A table (p. 8) of "Foreign trade by countries" shows that the lion's share of its imports (71.5% of gross value) come from Japan, followed by Germany, UK, Belgium, and USA.

A table (p. 11) shows "Shipments from Manchuria into Kwantung during 1912 and 1913, including: Bean cake 103,787 / 127,690 tons. [Soy] beans 553,438 / 622,205 tons. Beans (small=azuki) 16,794 / 16,297. Sauce, bean and soy 50 / 78 pounds.

The export trade in soybeans and products expanded. A table (p. 12) shows the "native exports" (to within China; quantity and value), including bean cake, [soy] beans, and bean oil.

The section titled "Last year's improvement in bean trade–unfavourable outlook" includes a table which shows exports (incl. reexports) of [soy] beans and bean oil "in 1913, by countries of destination. Exports of bean cake to foreign countries increased in 1913 to 527,507 short tons, of which 520,947 tons went to Japan and the remainder to Chosen [Korea]. The amount shipped to Chinese ports was 38,629 tons in 1913, as against 76,172 in 1912." "A large proportion of the bean oil shipped to Japan is transshipped to the United States." Address: Vice Consul, Dalny (Dairen), Japanese Leased Territory.

137. Piper, C.V.; Morse, W.J. 1914. Five Oriental species of beans. *U.S. Department of Agriculture Bulletin* No. 119. 32 p. Sept. 2. [22 ref]

• ***Summary:*** The five beans are the adsuki [adzuki, azuki] bean, the rice bean (*Phaseolus calcaratus*), the mung bean (*Phaseolus aureus*), the urd (*Phaseolus mungo*), and moth bean (*Phaseolus acontifolius*). Soy is mentioned only briefly.

"The adsuki bean (*Phaseolus angularis* (Willd.) W.F. Wight; Pl. I) is much cultivated for human food in Japan and Chosen [Korea] and to a less extent in China and Manchuria, but is apparently unknown in India and elsewhere in Asia. No mention of its cultivation in Europe has been found in agricultural literature. Next to the soy bean it seems to be the most important legume grown in Japan." In 1910 345,634 acres of adsuki beans were grown in Japan, compared with 1,171,438 acres of soy beans.

The first knowledge of the adsuki, or atsuki [azuki] bean to Europeans is the brief description by Kaempfer (1712). Kaempfer's drawing of the plant was later published by Banks (Kaempfer, 1791). This illustration is excellent and unmistakable. Willdenow (1801), named the plant *Dolichos angularis* on the basis of Kaempfer's description and illustration.

The adsuki bean was grown at Arlington Farm, Virginia, in 1906 (6 varieties), 1908, 1909, 1912, and 1913 (8 varieties).

Use in Japan: In Japan the adsuki commands a higher price than any other bean, the varieties with maroon-colored seeds being most widely used. "Adsuki-bean meal is sometimes prepared simply by grinding the dry beans and then removing the seed coats with sieves. More commonly, however, a wet process is employed. The wet process seems to vary somewhat in different parts of Japan, but consists essentially of 4 stages: 1. Boiling the beans until soft, usually after a preliminary soaking. 2. Crushing the cooked beans. 3. Removing the skins by forcing the mass through sieves or by putting the bean paste in cold water, when the skins are easily separated. 4. Drying the bean paste. The fresh, undried bean paste is called *an* and the dried product *sarashi-an.*

In whatever way prepared, the bean meal is eaten in soups and gruels of various kinds, often sweetened. It is also used for making various kinds of cakes and confections. Adsuki beans are also eaten popped like corn, as a coffee substitute, and candied by boiling in sugar. The last product is called *amanatto.* The flour is also used for shampoos and to make facial cream. "The use of beans to make sweetmeats seems to be purely a Japanese invention."

"Among the seed brought back from Japan by the Perry expedition in 1854 was a 'red-seeded bean.' (Browne, 1855, p. XV.) The identity of this bean has never been definitely determined, but it was doubtless the most common form of adsuki bean.

"Two varieties of the adsuki bean were tested at the Kansas Agricultural Experiment Station in 1891 by Prof. C.C. Georgeson (1891). Both of these had red seeds, one having the pods 'white,' the other 'black.' The white-podded variety yielded 16.3 bushels per acre; the black-podded, 8.7 bushels. In thrashing, the beans were found to crack easily, and so they were flailed. The beans were tested only as human food. 'These beans have been submitted to several housekeepers for trial, who all, with two exceptions, give them most favorable recommendations.' The professor of household economy, in a letter to Prof. Georgeson, praised the beans highly both for use in soups and baked."

"S.P.I. No. 226. A maroon-seeded variety from North China, March, 1898, under the name 'wei-tou (vay-do).' No cultural notes." Address: 1. Agrostologist in Charge; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

138. *Chemist and Druggist* (*London*). 1914. Corean soya-beans. 85(14):499. Oct. 3. Series No. 1810.

• ***Summary:*** In the lower left corner is a short "filler" paragraph which states (p. 499): "The exports [of soya beans] from Corea during 1913 amounted to 98,341 tons, against 100,919 tons in 1912 and 88,151 tons in 1911. The values, however, in 1913 were 54,652 *l.* [British pounds sterling] more at 565,142 *l.* against 510,490 *l.* in 1912."

Note: Soybeans / Soya are mentioned in the Trade

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Report section of many, many issues, but the references are not listed in the volume indexes (with the exception of the last entry above).

139. Agricultural Bureau, Dep. of Agriculture and Commerce Japan (Norinsho, Nomukyoku). 1914. Outlines of agriculture in Japan. Tokyo: Agricultural Bureau, Department of Agriculture and Commerce. 20 + 35 p. Dec. No index. 15 x 22 cm. [Eng]

• ***Summary:*** See next page. Name of organization with diacritics is: Nôrinsho, Nômukyoku. The structure of this book is unusual. The table of contents (p. 1-3) is followed by a list of "illustrations" [all photographs] (p. 1-2), a colored map of Japan and pie chart, 20 unnumbered pages of black-and-white photos, and finally the text in four chapters (p. 1-34).

The pie chart (average of the 3 years 1910-1912, excluding Chosen, Taiwan, and Karafuto) shows the percentage of agricultural products in value; Rice has about 60% of the total value, followed by barley, naked barley and wheat, cocoon and silk worm eggs, and vegetables. Leguminous beans are one of the smallest categories.

Interesting photos include:

(1) The hall [building] of the Imperial Department of Agriculture and Commerce. (2) The Agricultural College of Tokyo University (fields, with buildings in the background). (3) The Agricultural College of Tohoku University (trees and walkways, with buildings in the background). (4) The Imperial Agricultural Experiment Station. (13) Interior of filiature at Okaya, Nagano prefecture (many women kneeling in two long rows like machines behind silk spools). (15) Silk conditioning house. (16) The sericulture institute. (20) Shibuya live-stock breeding farm, and long-tailed fowl (on a perch with a 9-foot tail).

Chapter 1–Condition of agriculture. At the end of 1912 about 60% of all households in Japan are farming households. Of these 5,510,000 farming households, 32% have occupations in addition to farming–primarily sericulture, followed by making items from straw (fancy matting, braids), tea manufacture, then chicken raising. There are three classes of farmers: Land-owners, peasant proprietors (32% of total number of farmers; cultivate their own land), and tenants (28% of total number; rent farms from land-owner). Both peasant proprietors and tenant farmers (40% of total). About 15% of Japan's land is under cultivation. Of this, about half is taken up by paddy fields (for raising irrigated rice) and half by upland fields. Many paddy fields give two crops a year. Soja beans are mostly grown as a summer crop on upland fields in rotation (p. 5). Because of the smallness of its scale, Japanese agriculture traditionally relied mostly on human labor. But in recent years the number of farm animals has increased. In late 1912 there were 2,290,000 of which 1,220,000 were horses, 1,070,000 cattle, and 300,000 swine. About 20 years ago, fertilizer meant mainly human excrement, weeds, and stable manures, plus small amounts of oil-cake [soja bean cake], fish-guano, and rice bran. Today the value is three times what it was 10 years ago, and now includes soylees [okara]. "Of these market manures, the bean cake, which is imported from China and Kwantung Peninsula, is most important and demanded the sum of 25 million yen [25% of the value of all fertilizers]. Next came the various composition manures [chemical fertilizers], the material of which is imported in large quantities, and super-phosphates of lime" (p. 8). There are more than 10,400 agricultural cooperatives in Japan with 1.16 million members; they are promoted by the Co-operative Societies Law of 1900. There are four types: Credit, Purchase, Sales, and Productive Societies (p. 9).

Chapter 2–Agricultural products. The value of all agricultural products is estimated at 1,720 million yen for the 3 years preceding 1912. These fall into six groups (value shown in million yen): 1. Cereals (incl. soja beans)–1,246 (72.4% of total). 2. Industrial crops (incl. tea, rape, tobacco, sugar cane)–65.3 (3.79%). 3. Horticultural products (fruits, vegetables, and flowers)–196.8 (11.4%). 4. Livestock and poultry–42.27 (2.45%). 5. Cocoons and silkworm egg cards–164.2 (9.5%). 6. Miscellaneous–5.1 (0.03%). Looking now at the value of individual cereals in million yen: Rice 966.4 (56.2% of total of 6 groups). Naked barley 74.2. Barley 63.3. Wheat 52.5. Soja beans 35.95 (2.1% of total). Indian millet 15.84. Miscellaneous 38.1.

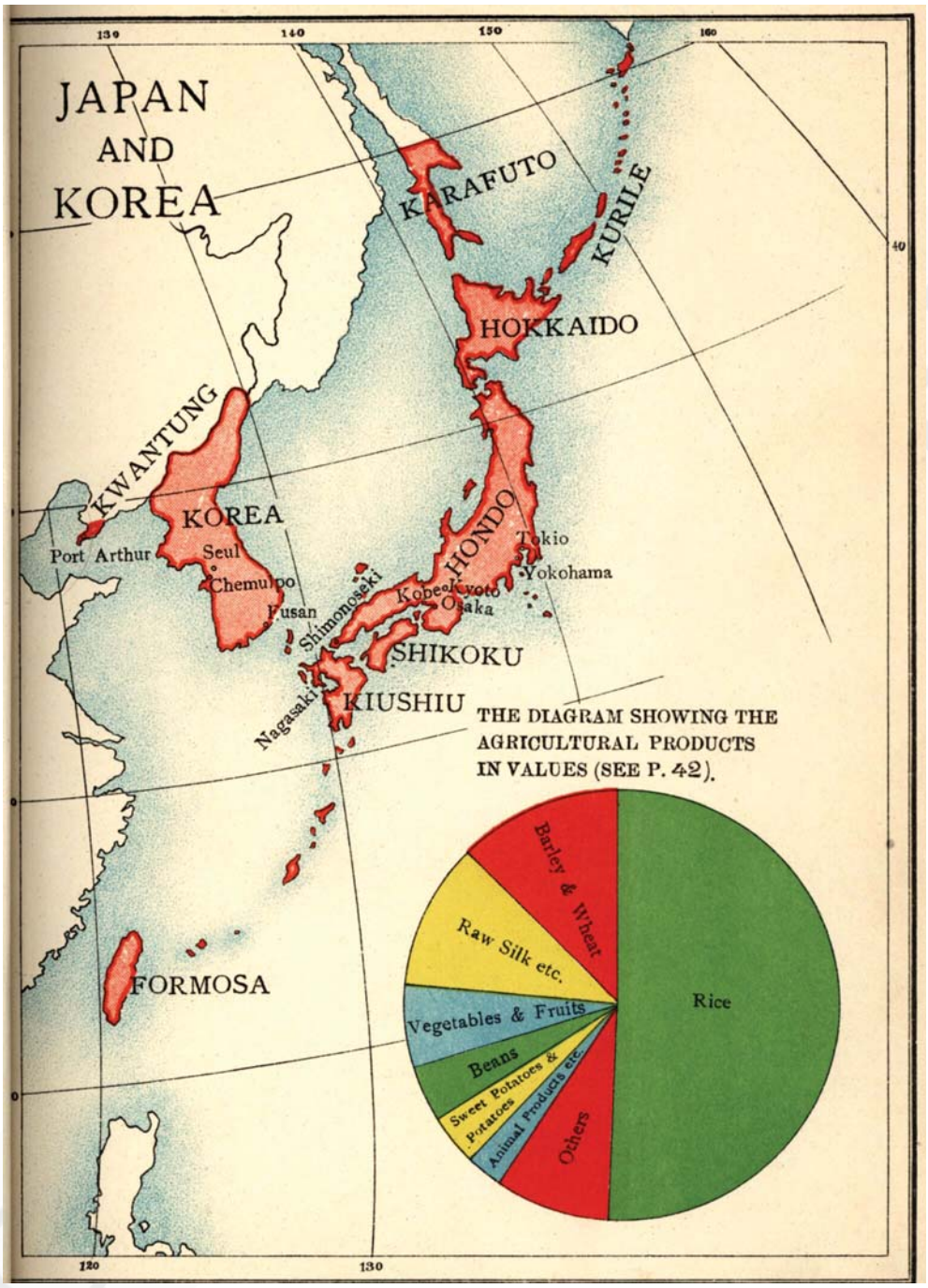
A table (p. 12-13) shows the acreage of the principal crops (in units of 1,000 *cho*) at 5-year intervals from 1887 to 1912. For soja beans: 466 in 1887, 443 in 1892, 435 in 1897, 466 in 1902, 471 in 1907, 475 in 1912. Thus, the are planted to soja beans was roughly static. For small red bean [azuki] it was: 109 in 1897, 129 in 1902, 135 in 1907, 136 in 1912. So azuki area was about 25-28% of soja bean area.

Another table (p. 13-14) shows the yield of the principal crops (in units of 10,000 *koku*) at 5-year intervals. For soja beans: 325 in 1887, 311 in 1892, 310 in 1897, 313 in 1902, 366 in 1907, 351 in 1912. Again, fairly static. By comparison, between 1887 and 1912 the average yield of wheat increased by 70%, naked barley by 39%, barley by 38%, and rice by 26%–but only 8% for soja beans.

Japan's top three export items (value on 1,000 yen) are raw silk (166,963), tea (12,639), and sugar (10,384). The main imports are cotton (193,735), rice (32,128), soja bean cake (for manure; 27,469), sugar (20,694), wool (14,531), and soja beans (8,571). Peanuts are exported to the USA.

Chapter 3–Agricultural administration. The highest organ is the Department of Agriculture and Commerce, which is divided into five sections. The highest organ of agricultural research is the Imperial Agricultural Experiment Station; there are 39 local agric. exp. stations. Agricultural statistics are compiled at the Section of Correspondence in the Secretariat of the Department. A statistical report on all matters concerning agricultural products is issued once a

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year.

Chapter 4–Outline of agriculture in the colonies. I. Agriculture in Formosa. Rice is the principal crop, followed by sugar cane, sweet potatoes, tea, beans, and peanuts. No statistics are given. II. Agriculture in Chosen [Korea]: A table (p. 32-33) shows area (in 1000 *cho*) and production (in 1,000 *koku*) in 1912: Rice 980 / 8,969. Indian millet 403 / 3,118. Barley 386 / 4,293. Soja bean 375 / 2,452. Wheat 169 / 1,094. Small red bean (azuki) 165 / 835. The largest export from Chosen in 1912 was rice, followed by soja beans. But the largest export from Chosen to Japan was soja beans, worth 4,917,000 yen. III. Agriculture in Karafuto (the Japanese name for Sakhalin Island). In 1875 it came entirely under Russian control when Japan ceded it in exchange for the Kuril / Kurile Islands. It was occupied by Japan in 1905, and the southern half (below 50ºN) was granted to Japan by the Treaty of Portsmouth, which ended the Russo-Japanese War. It was returned to the USSR in 1945 after the Allies defeated Japan in World War II. It is too far north to grow soybeans. But barley, naked barley, wheat, oats, rye, and rape grow well.

Note: This is the earliest document seen (May 2021) that gives clear soybean production statistics for Korea. Address: Tokyo, Japan.

140. Takenob, Y. 1914. Japan Year Book. Tokyo: Japan Year Book Office. 740 p. See p. 345, 400, 433-34, 439-40, 442, 689, 692, 705, 718. Ninth annual issue. [Eng]

• ***Summary:*** This annual book was first published in 1905. Facing the Preface is a table of Japanese weights, measures and moneys. In chapter 16, "Agriculture" (p. 337-57) is a table titled "Beans, sweet potato and potato (p. 345) which gives "Soy bean" production data in Japan for 1908-1912 (in *koku*).

3.892 million *koku* in 1908
3.766 million *koku* in 1909
3.396 million *koku* in 1910
3.693 million *koku* in 1911
3.511 million *koku* in 1912.

The next paragraph contains information on soy [sauce], *miso*, and *tofu* similar to that in the 1913 year book.

In chapter 20, "Industry," is a table on soy [sauce] production in Japan from 1908-1911, and a paragraph (p. 400) on the patented Suzuki process for brewing soy [sauce].

In Chapter 22, "Trade" is a table (p. 433-34) titled "Prices of principal commodities in Japan," which includes prices for 1907-1912 in yen for soy beans (per *koku*), soy [sauce] (per *koku*), and miso (per *kwan*).

In Chapter 23, "Foreign trade" is a table (p. 439) titled "Imports" (in 1,000 yen). Under the heading "Staples articles of over yen 1,000,000" (p. 438) is given the value of soja bean imports for 1911-1913. In a table titled "Soja bean" (p. 442), under the heading "Staple exports and destinations (in 1,000 yen)" (p. 440) is given the value of soja bean exports to China, Kwantung, India, and other places for 1911-1913.

In chapter 35, "Chosen (Korea)," under the heading "Agriculture" (p. 691) is a paragraph (p. 692) titled "Barley and soja bean," which gives acreage and yield for soja (year not specified) with the value (in yen) of exports to Japan in 1912.

In Chapter 36, "Taiwan (Formosa)," under the heading "Agriculture," a table (p. 705) titled "Agricultural products" has production data on "Beans and peas" (in 1,000 *koku*) for 1911-1912.

In Chapter 38, "South Manchuria," is a paragraph (p. 718) titled "The soya bean" which has information on South Manchuria's soya bean yield, [soya] bean-cake output, amount exported for specific years, and production of various milling centres.

In the advertisements at the rear (p. xiii) is a full page ad for Higeta Shoyu, showing many medals: "Patronized by the Imperial Household. Trade mark. The celebrated Japanese sauce. Established in 1616. Manufactured by G. Tanaka, Chioshi [Choshi], Chiba-ken, Japan." Address: Prof. at Waseda Univ. and Late of the *Japan Times*, Japan.

141. Terry, Thomas Philip. 1914. Terry's Japanese empire: Including Korea and Formosa, with chapters on Manchuria... A guidebook for travelers. Boston and New York: Houghton Mifflin Co.; London: Constable & Co., Ltd.; Tokyo: Kyo-Bun-Kwan, Ginza, Shichome. cclxxxiii + 799 p. See p. 515. Maps. Index. 16 cm. [75 ref]

• ***Summary:*** This guidebook, after its 283-page introduction, is organized geographically into: 1. Central Japan. 2. Northern Japan. 3. Yezo, the Kuriles, and Saghalien. 4. Western Japan. 5. Kyushu and the Loochoo and Goto islands. 6. Korea, Manchuria, and the Trans-Siberian Railway. 7. Formosa (Taiwan) and the Pescadores. Abbreviations (p. ix). List of maps (13).

In the Introduction: Japanese inns (p. xxxvi, xxxix-xl): The best food is not always to be had in the most pretentious places. In certain modest inns, where the rooms are as bare as a monk's cell, and the general appearance of austerity might argue a strict economy, there will often come, as an agreeable surprise, dainty food served in dishes that delight the lover of beautiful porcelain or lacquer. Later the traveler may learn that the place enjoys fame for some savory specialty–eels boiled in soy, broiled crayfish, stewed octopus, buckwheat-macaroni, or the like."

"Food is served in the guest's room on a lacquered tray... One of the soups may be made of... lobster, or seaweed, in which case it is amazingly thin and unpalatable; the other of beans [miso], bean curd or something of that nature. Salt is not provided unless asked for. Many of the dishes are cooked in soy; a tiny dish of which is supplied for dipping bits into before eating them."

Japanese food (p. xliii-xlvii): "Rice is a luxury with thousands of the peasants; it takes the place of bread with the

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well-conditioned; and wherever it is eaten to the exclusion of other foods it produces (because the thin phosphorous skin is polished off it) the prevalent beriberi. The proportion of animal food is small. Beans eaten in a variety of ways occupy a conspicuous place in the food of all classes and they supply the nitrogenous matter essential to those who rarely eat meat and who do not get the casein obtained by cheese-eating peoples. The soy-bean (*daizu; omame*) ranks first in extent, variety of use, and value among the pulse of Japan, and in point of nutriment is quite near to meat. It contains nearly two fifths of its weight in legumin, nearly one sixth in fat, and is rich in nitrogen. It is to the Nipponese what frijoles are to Mexicans and garbanzos (chick-peas) to Spaniards. Of the numerous varieties some are made into curd [tofu], and into the widely celebrated bean-sauce (the Worcestershire of Asia) called shoyu (sho, soy; yu, oil), and which is almost as indispensable as rice. It forms the daily relish of the rich man and the beggar, and is in as general use as tea and tobacco."

Fish (sakana)... Teriyaki: Fish in a sauce of soy, mirin, and sugar... Sashimi: raw fish cut in thin slices and eaten after being dipped in shoyu.–Kabayaki: fish which is first steamed then dipped into soy and roasted (or eels cut open on the dorsal line, covered with soy mixed with sugar, and roasted). The latter dish, usually called Unagi-no-kabayaki, is a favorite with the Japanese,..."

"Rice:... Azuki-meshi: rice and red pea-beans mixed (boiled).–Mochi: small dough-cakes made of rice and sold throughout Japan.–Sushi: a general name for food of boiled rice and fish, eggs, vegetables, etc., seasoned with vinegar and soy...–Inari-zushi: fried tofu stuffed with chirashi-zushi.

Note: This is the earliest English-language document seen (April 2013) that contains the term *Inari-zushi.*

- Maki-zushi: boiled rice and other vegetables rolled and wrapped in a sheet of the sea weed called Asakusa-nori...–Kombu-zushi: fish seasoned with vinegar and wrapped in a piece of the edible seaweed known as Laminaria japonica. A differentiation of this popular food is the Kombumaki: baked or roasted fish wrapped in kombu, then tied, and boiled in sugar and soy.

Various:... Tsukudani: small fish boiled in soy and used as a relish or condiment (named for Tsukudajima, a place in Tokyo famous for its preparation).–Oden: a stew (greatly enjoyed by the proletariat) of fried bean-curd, lotus-roots, potatoes, etc." Ame and midzu ame.

"Soup (shiru): Tôfu-jiru: bean-curd soup.–Miso-shiru: bean-soup with vegetables."

Railways–Dining cars (p. lxxxiv): Discusses "The unique and not unpalatable bento,–a sort of national sandwich,–put up (usually cold) in thin, flat, twin boxes (bento-bako) of dainty white wood (1 in. high, 5-7 in. long), along with a paper napkin (kuchifuki) and a pair of chop-sticks (hashi), and sold at many stations, is distinctively Japanese and widely popular... Besides the full box of plain boiled rice, the ordinary (15 sen) bento contains usually... a few boiled black beans (nimame)... seaweed (kobu)..." Rice cakes (mochi) with the kernel of yokan, or sweet [azuki] bean paste, which usually forms their center.

Buddhism (cxc): Again the rice-flour cake [mochi] is offered at the domestic altar. It now takes the form of a lotus-petal with capsule of [azuki] bean-paste." (an).

Yokohama (p. 13): "The return gifts from the emperor and princes included...jars of soy [sauce]; coral and silver ornaments;..."

Tokyo (p. 199): "The hill beyond the intersecting roadway is called Suribachi-yama because of the similarity in shape to a suribachi–an earthenware vessel in which bean-soup [miso soup] is prepared."

Nikko–Shops: "... the kuri-yokan (so-called from the chestnuts mixed with the sweetened bean-paste [azuki]) is good and cheap (10 sen)."

Kyoto–The Shinto Shrine of Inari. There are many local festivals, the most important of which is the Inari-matsuri which usually falls on June 5. There are trick riders on horseback and decorated sacred cars [carts] are "placed in the procession, and the day is devoted to general jollity–and pocket- picking. On this occasion the people eat Inari-zushi, or fried tofu stuffed with boiled rice, since tofu [fried, as aburage] is the favorite food of the fox popularly believed to be the messenger of Inari (and by extension, the God of Rice)."

Kyoto–Miidera (p. 504-05): Travelers visit Benkei's Iron Pot (*Benkei-no-shiru nabe*), a very old, rusted, and broken contraption (about 5 ft. wide and 3 deep) resembling a soap-boiler, and from which Yoshitsune's devoted servitor (and popular hero) is supposed to have eaten his bean-soup [miso soup]–which may well be doubted."

Kyôto to Kôya-San (p. 515): For the Western traveler there is "a tiny kitchen, a blessed refuge wherein, if he is making a prolonged stay, he may cook his un-Christian food without the vegetarian priests knowing (or caring) that such a sacrilege is being committed! Meals are served in one's apartment; the food is purely vegetable, and after the second day distressfully unpalatable. Fish, flesh, fowl, butter, cheese, eggs, milk, bread, coffee, and other necessaries of life are absent, and are replaced by seaweed, greens, bamboo-shoots, cabbage, daikon in various unappetizing forms, and other garden-truck which one eats as a novelty the first meal and rejects with an involuntary tightening of the throat when it is offered at the second and third. In addition there are flabby mushrooms boiled in very thin water without seasoning; the omnipresent boiled rice without sugar, milk, or salt; a bean-curd (*tofu*) for which one acquires a liking only after much patient effort; a yellow substance (known as *yuba*) made of the skin of bean-curd, and looking and tasting like thin sheet rubber;..."

Kobe excursion–The Tansan Hotel (p. 630): The strawberries and other ground fruits and vegetables, which

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grow nearly all the time in this favored spot, are enriched with [soy] bean-cake only [no human excrement is used] (as a precaution against typhoid)."

Korea (p. 725): "Among the dishes dear to the native heart are pounded capsicum, bean curd [tofu], various sauces of abominable odors, a species of sour kraut (kimshi [kimchi]), seaweed, salt fish, and salted seaweed fried in batter."

Manchuria and the Trans-Siberian Railway (p. 756): "Considerable [soy] bean-cake and furs, and vast quantities of lumber, etc., come down the river from upper Manchuria and Siberia."

Also discusses edible seaweed (p. xliv, 330): Japanese food: "Seaweed in almost endless variety enters largely into foodstuffs. Not only are the giants of the marine flora taken up and utilized in various ways, but also the more delicate red and green sorts–the use of which has been adopted by other nations. Most of the edible green and red algae bear the generic term nori, while the words *umi-kusa*, or *kai-so* (which also means *bêche-de-mer*), are used for algae in general. Many of the weeds are eaten fresh, others in soup. Some are dried or pickled and eaten in vinegar. They usually appear in commerce in the form of little packages, to the sale of which special stores are dedicated. Certain varieties are converted into jelly."

Yezo–fisheries: "Certain of the many varieties of edible seaweed which flourish along the Japanese coast are found in Yezo, particularly the circumpolar tangle (*Laminaria*) and seawracks (*Fucus* species), which prefer cold water and a heavy surf. For this reason sea-algae add considerably to the value of the Yezo exports."

Note: The author resided for almost 12 years in Japan and made repeated journeys on foot (and otherwise) from one end of the country to the other. Address: F.R.G.S. [Fellow of the Royal Geographical Society, England].

142. Ide, Hayamizu. 1915. Daizu shushi-chû no jiyasutaze ni tsuite. I. [On the diastase of soybean seeds. I]. *Chosen Sotokufu Chuo Shikenjo Hokoku* (*Korean Governor-General's Central Research Laboratory, Report*) 1(1):2-1 to 2-19. March. [Jap]
Address: Gishu [Japan].

143. *Bulletin Economique de l'Indochine* (*Hanoi*). 1915. Surface cultivée et production du Soja au Japon de 1904 à 1913 [Area cultivated and production of soybeans in Japan from 1904 to 1913 (and in Korea from 1909 to 1912)]. 18(112):260. March/April. [Fre]
• ***Summary:*** This table for the years 1904 to 1913 inclusive in Japan gives for each year: Area cultivated (in *cho;* 1 *cho* = 2.451 acres). Soybean production (in *koku;* 1 *koku* = 180 liters = 47.6 gallons). Average yield (in *koku* per *tan;* 1 *tan* = 0.245 acre). The cultivated area rose from 446,843 *cho* in 1904 to a peak of 495,802 *cho* in 1908, then fell to 475,284 *cho* in 1913. Production rose from 3,710,459 *koku* in 1904 to a peak of 3,892,934 *koku* in 1908, then fell to a low of 2,993,095 *koku* in 1913. Yield fell from a peak of 0.830 in 1904 to a low of 0.629 in 1913.

A second table gives statistics for soybean production in Korea from 1909 to 1912. The area cultivated rose dramatically from 280,090 *cho* in 1909 to a peak of 375,340 *cho* in 1912. Production also rose sharply from 1,533,027 *koku* in 1909 to 2,452,203 *koku* in 1912.

Note: This is the 2nd earliest document seen (March 2014) that gives clear soybean production statistics for Korea. Address: Hanoi.

144. Porter, Robert Percival. 1915. Japan, the new world-power: Being a detailed account of the progress and rise of the Japanese empire. London, New York, Toronto, Melbourne and Bombay: Humphrey Milford, Oxford University Press. xxiv + 789 p. Illust. Seven colored maps. Index. 23 cm. [ soy ref]
• ***Summary:*** Japan (regardless of race and colour) intervened in the Great War on the side of her ally Great Britain. They worked together successfully against Germany in the siege of Tsing-Tau in 1914 from Oct. 31 to Nov. 7.

Near the front of the book is a table of "Weights, measures and moneys, for Japan, Great Britain, and the USA."

Page 149-50: "The annual average number of immigrants from Japan is about 20,000. Roughly, half go to China and the United States of America... Since 1907 two batches of Japanese emigrants, under 2,000 in all, have gone to Brazil, the majority of which have been under contract with the Sao Paulo Government to work in the coffee plantations." There are now about 155,000 Japanese in the United States. Since a 1907 agreement between Japan and the USA, immigration of Japanese labour to the USA has been restricted. Some Japanese have tried to enter the USA by going first to Mexico. There are not more than 2,000 Japanese in Canada at present.

Page 232: In Japan: "The necessity for increased military and naval expenditure, which rose in connection with Korea in 1881, called for considerable additional revenue. Fresh military taxes were therefore levied; income-tax was introduced along with indirect imposts [taxes] on soy [sauce], tobacco, confectionery, and stamps, and the tax on *sake* was raised, augmenting the receipts to such an extent that the Government was able in 1886 to reduce the land-tax again. But following the war with China [1894-95] it became necessary to establish occupation and registration taxes, to raise again the *sake* tax, and to create a Government monopoly of leaf tobacco."

A table (p. 233) shows how the ordinary State revenue of Japan was derived in the financial years 1898-99 and 1909-10. The two main sources of revenue were: Land tax (38.4 and 85.7 million yen respectively) and liquor tax

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(33.0 and 91.5 million yen). By comparison, the soy tax was relatively small: 1.54 and 4.73 million yen.

Page 235-36: "The tax on liquors is levied upon (a) brewers of *shurui* (alcoholic liquor), which is divided into five classes, viz. *seishu,* or refined *sake, dakushu,* or unrefined *sake, shirozake,* or white *sake, mirin,* or sweet sake, and *shochu,* or distilled sake; (b) brewers of beer; and (c) wine and alcohol and alcoholic liquors other than sake or beer."

"Soy tax: The soy tax is levied upon manufacturers of this sauce at the rate of about 1 3/4 yen per *koku.* A tax on soy for household use was introduced in 1900, and ranges from 50 sen to 4 yen per *koku,* according to the amount manufactured. No more than 5 *koku* of soy per annum may be made for household use."

Page 240: A full-page table shows the "Budget for financial year 1911-12." The main sources of "Ordinary revenue" are liquors tax (88.7 million yen), land tax (75.1 million), customs duties (50.5 million), and tobacco monopoly (50.5 million yen). Revenue from the soy [sauce] tax is 4.6 million yen. The sugar excise is 14.7 million yen.

Page 261-62: "The upland fields, being for all intents and purposes unirrigable, are only to a very limited extent utilized for the cultivation of rice. Rotation crops are, however, raised twice a year, usually barley, 'naked barley,' and wheat as winter crops, and soya (more properly soja), sweet potatoes, and millets as summer crops." A key unit of area in agriculture is one *tan* = 0.245 acre. On [lowland] paddy fields, nationwide over the past 10 years, the average yield per *tan* is 7.913 bushels of rice and 6.668 bushels of barley, which may be considered a representative winter crop. "Upland fields, upon the same basis, produce 6.638 bushels of barley as a summer crop and 3.756 bushels of soya bean."

Another key (larger) unit of area in agriculture is one *cho* = 2.45 acre.

A table (p. 263) shows the total area, production, and yield of 17 major crops in Japan in 1897 and in 1910. Both years, the leading crop (by far) in area was rice, followed (in 1897) by barley, naked barley, wheat, and soya bean. For 1897 the three figures for soya beans were: 1,067,000 acres under cultivation, 15,381,000 bushels total production, and 14.41 bushels per acre yield. For 1910 the three figures for soya beans were: 1,137,000 acres, 18,834,000 bushels total production, and 16.56 bushels per acre yield.

Statistics for "small red bean" [azuki] are also given: For 1897 268,000 acres under cultivation, 3,069,000 bushels total production, and 11.45 bushels per acre yield. Thus, in 1897 and 1910 the production of soybeans was roughly 5 times the production of azuki beans.

Chapter 15, "Agriculture," contains a section titled "Soya bean" (p. 264-65): The soya, or soja, bean is well enough known in England as a cattle-food, but in Japan its application is by no means limited to this use. It is the basis of the Japanese sauce, soy, of which enormous quantities are brewed; of *miso,* or bean cheese [sic], used extensively for soup and in cookery in general; and of *topu* [sic, tofu], or bean curd, a cheap, highly nutritious and very popular article of diet. The residue from these manufactures is used both as fertilizer and as cattle food, or, alternatively, an oil of some value may be obtained from it. It is the principal summer crop of the upland fields, and its cultivation, which requires less fertilizer and less labour than other products, is general throughout Japan and particularly in Hokkaido. But the supply is far from equal to the demand, and a large quantity of beans and bean cake is imported from Chosen and Manchuria, the value of the present importation amounting to £3,000,000 annually.

"Among other beans the small red bean is largely cultivated, especially in Hokkaido, and is used for cakes and confectionery, and boiled with rice on occasions of ceremony. The Japanese are very fond of peas, horse-beans, and kidney-beans, which are grown as a stolen crop after rice in the paddies and just before it in the upland fields."

Page 269: "A comparison of the relative positions of human and animal labour in paddy fields and upland farms for the years 1903 and 1908 (the latest year for which figures are available) shows that the area tilled exclusively by human labour still forms a very large proportion of the total, though it tends steadily to decrease." "Manual labour is plentiful and it is chiefly by reason of its abundance that the intensive system can be carried on. Rice-growing requires, for instance, the labour of 17 men and 9 women per *cho* (2.45 acres), barley and wheat 11 men and 6 women, tobacco 25 men and 23 women, soya bean 7 men and 5 women, and so on. Farmers, in the vast majority of cases, are their own labourers, and those who may be distinguished as 'professional labourers' are a very small class."

Page 292: Sea-weeds: "Chief among the sea-weeds used as food is that known as 'Kombu' (*Laminaria*). It grows mostly on the shores of Hokkaido and the south-east of Honshiu [Honshu], and is eaten sliced into very thin shreds. 'Kanten' is made by dissolving the weed Tengusa in water and exposing the resulting gelatinous infusion to the action of cold by night and the sun by day. Only the Chinese use it as food, however; in the West it is a substitute for gelatine, isinglass, starch, and the like. Other sea-weeds are used as paste."

Page 319: "Japan is self-supporting in silk weaving, the preparation of national liquors, soy brewing, matches, porcelains, and some other articles."

Page 450: A history and discussion of the South Manchuria Railway Co.

Page 583: "A Rescript of Emperor Daigo, issued in 930, said:–'We have seen that many sick people are lying by the roadside and that no one gives them shelter. We order that they shall be supplied with shelter and with food. There shall be given daily to a man or a woman one *sho* of rice, one

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*shaku* of fine salt, and one *go* of soy [sauce]..."

Page 692: Hokkaido. "Of the food crops, the soya bean and the small red bean [azuki] are the most important." Agriculture "now constitutes Hokkaido's principal source of wealth," yet fisheries have long been important.

Chapters 44 and 45 (p. 699-733) are about Manchuria; soya beans are discussed at length. The Japanese government wisely selected Baron Goto to reorganize the South Manchurian Railway.

Chapter 47 (p. 745-57), "The Soya Bean," is basically the same as that found in the 1911 edition titled "The Full Recognition of Japan." Address: Queen Anne's Mansions, London, England.

145. Takenob, Y. 1915. Japan Year Book. Tokyo: Japan Year Book Office. 789 p. See p. 349, 391, 401-02, 436, 634, 714, 716-17, 730, 743. Tenth annual issue. [Eng]

• ***Summary:*** This book gives statistics for the Japanese empire: Japan Proper, Korea, and Formosa.

The population of Japan Proper (based on the census taken every 5 years) was:

1898–45.4 million.

1903–48.5 million.

1908–51.7 million.

A table of "Weights, measures and moneys" is on p. xxxii (near the front).

Page 349. In the chapter on "Agriculture," a table shows production of soy beans, sweet potatoes, and potatoes, 1911-1913 (in 1,000 koku). Production of soy beans decreased from:

3.69 million *koku* in 1911, to

3.51 million *koku* in 1912, to

2.99 million *koku* in 1913.

Note: The decrease of soy bean production in Japan during this period was due mainly to imports of soy beans from Manchuria and Korea (see below).

The text below the table states: "Among subsidiary farm crops there is perhaps nothing which plays so important a part in the Japanese kitchen as soy beans. The three daily articles of diet for all classes, viz. *soy, miso,* and *tofu* are manufactured with this bean either in part or wholly, The tofu (bean curd) is one of the most popular articles of diet, being cheap and highly nutritious; the miso makes Japanese soup and is used in various other ways. The soy is indispensable in Japanese cooking. Then for extracting oils, [the cake] as manure, and food for horses, beans are equally important. The supply being insufficient, quite a large quantity comes in from Manchuria and Korea. In Japan Hokkaido is the principal centre of production. Red beans [azuki], also very extensively produced in the northern island, are used for making confectionery, are boiled with rice on ceremonious occasions, and for other purposes. Peas and horse-beans, whether green or fully ripe, are favorite food-stuffs in Japan, and they are extensively cultivated as a second crop after rice and as a forerunner to rice, indigo, etc. on upland farms. Groundnuts are among a few subsidiary farm produce that go abroad, mostly to U.S.A. In Japan they are used by confectioners and also for pressing oil..."

Pages 390-91. A table titled "Industrial companies classified by amount of investment" states for "Soy and miso." Number of companies: 251. Paid up capital: 5.9 million yen. Reserves: 580,000 yen.

Page 401-02. In the chapter on "Industry" under "Brewing industry" we read: "The brewing industry in Japan comprises sake, beer and soy, for wine is still insignificant and as yet enjoying the benefit of non-taxation. The two indigenous industries of sake and soy are still primitive in process, and various new methods, several of them patented, have so far failed, especially as regards soy.

Page 402. "Soy.–For soy the prefecture of Chiba, which is contiguous to Tokyo municipality, heads all other places on the list as to output. Parched wheat mixed with salt beans is a principal ingredient. The process is still far from scientific, requiring about 12 months before the liquid is ready for sale. It is also costly, as it does not much admit labor-saving appliances. To obviate these advantages have been tried several patented processes, but most of them have failed. The collapse of the short-lived Nippon Soy Co., started in 1907 near Osaka with 2,500,000 yen paid up, has dampened the cause of scientific process of soy brewing."

A table shows annual production of sake, beer, and soy (in koku) from 1912-13 to 1914-15 (three years). Note: Since all three of these are taxed by the federal government, careful records are kept. Sake averaged 4.32 million *koku* (the largest output). Soy averaged 2.37 million *koku* (roughly half of sake). Beer averaged about 0.219 million *koku* (by far the smallest).

A 2nd table gives exports of these three products during the same years. Sake averaged 3.61 million *sho* (100 *sho* = 1 *koku* = 47.6 gallons). Soy averaged 3.15 million *sho.* Beer exports (in 1914) were by far the smallest: 117,000 pints, 377,000 quarts, and 22,000 casks of 1 *sho* each. Note: "Beer brewing first started about 1876 in Hokkaido. The brewing was at first under the tutelage of German experts... At present there are four or five breweries, the Dai Nippon, Kirin, and Kabuto."

Page 465. A table titled "Prices of commodities in Japan" (1911-1913) includes the following for 1913:

Rice 21.01 yen per koku.

Barley 7.93 yen per koku.

Soja beans 11.54 yen per koku.

Red bean [azuki] 16.02 yen per koku.

Soy [sauce] 23.85 yen per koku.

Miso 0.37 yen per kwan [kan; 1 kwan = 3.75 kg].

Page 518. A table titled "Carrying trade on main routes" shows that China was exporting a lot of Soja beans and [soja] bean cake to Japan. China (including Manchuria) had exports to Japan worth 142.3 million yen and imports from

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Japan worth 80.5 million yen.

Page 634. In the chapter on "Finance" under "6. Tax on Japanese soy" we read: "The tax is assessed both on the soy manufactured for sale and on that for home consumption. In the former the tax is yen 1.75 [per koku] for refined soy and yen 1.65 for the unrefined soy and in the latter it ranges between the two extremes of yen 4.00 and yen 0.50 according to quality.

Page 714. In chapter 35, "Chosen (Korea)," under the heading Foreign Trade," is a table on "Staple exports" (in 1,000 yen) which has data on "Beans and peas" for 1910-1914.

Page 717. In the chapter on "Chosen (Korea): Agriculture," under "Barley and Soja Bean" it is stated that "Soja and other beans are exported chiefly to Japan for manufacturing soy [sauce]. Acreage of soja beans in Korea is 553,077 *cho* and the yield 3,345,472 *koku.*" Note: 1 *cho* = 2.45 acres and 1 *koku* = 47.6 gallons or about 6 gallons. Thus, in English units, in Korea 1,355,039 acres produce 20,072,832 bushels, for a yield of 14.8 bu/acre.

Note: This is the earliest document seen (Jan. 2005) that gives soybean production or area statistics for Korea (which has been a "province" of Japan since 1910).

Note: Japan was importing a lot of soybeans from its colony, Korea, in 1912. Korea had exports to Japan worth 20.9 million yen and imports from Japan worth 27.1 million yen (p. 518).

Page 730. In Chapter 36, "Taiwan (Formosa)," under the heading "Agriculture," a table (p. 730) titled "Agricultural products" has production data on "Beans and peas" for 1912-1913. The beans were probably mostly soy beans.

102,000 *koku* in 1912

137,000 *koku* in 1913

In Chapter 38, "South Manchuria," is a paragraph (p. 743) titled "The soya bean" which has information on South Manchuria's soya bean yield, [soya] bean-cake output, amount exported for specific years, and production at various milling centres (almost same wording as 1914 Year Book). Address: Japan.

146. Davis, John K. 1916. Foreign bean production and trade: Manchuria–Antung export statistics. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*) 19(42):694-705. Feb. 19. See p. 703-04.

• ***Summary:*** "It is impossible to secure estimates of the acreage of beans in this district that sufficiently approximate accuracy to be worth recording. The only available figures from which estimates can be made are the customs statistics of the total exports of beans of all kinds from this port, which of course include soya as well as purely edible beans."

A table shows direct exports of beans from Antung directly to foreign countries from 1912 to 1914. Only soya beans and "red beans" [azuki] are exported in large amounts. For "Yellow (soya)" beans: 4,899,866 pounds in 1912. 8,404,533 pounds in 1913. 21,025,4666 pounds in 1914. Clearly a huge increase. For "Red" [azuki] beans. 4,175,600 pounds in 1912. 4,647,200 pounds in 1913. 3,344,533 pounds in 1914. A decrease.

"While there are no figures showing exactly the destination of the beans exported from Antung it is commonly known that the larger part of the edible as well as the soya beans exported is sent to Japan and Korea (Chosen)." Address: Consul, Antung, China.

147. Latham, F.P. 1916. Soy beans as a cereal: Soy beans a great crop for southern farmer. *Progressive Farmer* (*The*) (*Raleigh, North Carolina*) 31(8):254-55. Feb. 19. See also p. 286 (Feb. 26) and p. 342 (March 4).

• ***Summary:*** "The first mention of the soy bean in this country was in the early part of the 19th century; however, it attracted little attention prior to 1854, when 2 varieties were brought to this country from Japan by the Perry expedition. It followed that other varieties were found and introduced, among them that 'old standard,' the Mammoth Yellow, which came to our shores sometime previous to 1882. The success with Mammoth furnished an encouraging lead to our diligent research workers, resulting in the importation into this country by the Department of Agriculture of some 800 distinct varieties."

As a cereal, it is widely produced in Japan, China, Korea, and Manchuria. "By certain processing of the ground beans a milk is extracted which is not such a poor substitute for the real article; from this a cheese [tofu] is made that resembles in texture and nutrient value, our cottage cheese. Another product is a heavy, rich sauce [miso], similar to our peanut butter, which is consumed in large quantities. Soys occupy the place in the diet of these people that navy and lima beans do in our own, and are prepared in a like manner. They furnish the brown man his 'peanut.' By the simple process of soaking in salt water, then roasting they at once become a close competitor of the famous American delicacy."

"So far as I have been able to ascertain there is but one mill in the United States built for and operating exclusively on soy beans. The Pacific Oil mills, of Seattle, Washington, have build up a lucrative business in this line and only get foreign beans for crushing, its output of both oil and meal meeting a ready demand in the West. That such can be done profitably in the South is no longer a question. The fact has already been demonstrated by several cotton oil mills in eastern North Carolina... If these satisfactory results can be obtained in mills not constructed for the purpose of handling beans, it is entirely reasonable to suppose that specially constructed machinery will in time be installed that will further enhance the profits accruing from such operations."

A portrait photo shows F.P. Latham.

Note 1. This is the earliest document seen (Aug. 2011)

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that mentions Pacific Oil Mills of Seattle, Washington.

Note 2. This is the earliest of many articles seen (Aug. 2011) that likens tofu to cottage cheese, or roasted soybeans to peanuts. Address: Belhaven, North Carolina.

148. Meyer, Frank N. 1916. Re: Autobiographical sketch and resumé of work as a plant explorer for USDA–to be considered for membership in the Botanical Society of Washington, DC. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. See p. 2176-77. Letter of 15 March 1916 to Mr. Stephen Stuntz, David Fairchild's botanical assistant. • ***Summary:*** "Born in Amsterdam, Holland, November 29, 1875.

"Had an ordinary public school education; at the age of 14 entered the Botanical Garden of the University of Amsterdam as a pupil in Botanical Gardening; after two years entered the Experimental Garden of Professor Hugo de Vries, became his assistant; later had private and public tuition from 16 until 20 years of age in various subjects, such as French, English, German, landscape gardening, technical drawing, botany, physics, chemistry, etc.

"Became a student of botany and horticulture in the University of Groningen, Holland, for six months; returned to Amsterdam, had charge of the experimental work of Prof. de Vries, followed his lectures on Plant Breeding and Botanical Physiology for several years; botanized in Holland for several summers; accumulated a large herbarium of plants of the Netherlands.

"Resigned from the University of Amsterdam in March, 1899. Spent two and one-half years in travelling in Holland, England, France, Belgium, Germany, Italy and Switzerland.

"Immigrated to the United States of America in October, 1901. Found employment with the U.S. Dept. of Agriculture; resigned in September, 1902. Went to California, found employment again with the Department at the Plant Introduction Garden at Santa Ana; resigned again in March, 1903. Was in the florist business in Santa Barbara, California, from April, 1903 to March, 1904.

"Left California for Mexico in April, 1904. Walked across Mexico from San Blas to Vera Cruz; went to Cuba, also to the southern United States. In August, 1904, entered the employ of the Shaw Botanical Garden at St. Louis [Missouri]; was a member of the jury on Forestry at the World's Fair in 1904. Resigned in July, 1905, from the Shaw Botanical Garden to enter service of the Department of Agriculture as an Agricultural Explorer. Collected and travelled in China, Japan, Korea, Siberia, Russia, Central Asia, etc. for c.a. nine years–am still at it.

"Wrote a bulletin on Agricultural Explorations in the Fruit and Nut Orchards of China, Chinese Plant Names, also many minor papers.

"Intentions are to roam for many more years, primarily in China."

Note: Stephen Stuntz was David Fairchild's botanical assistant.

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer.

149. *USDA Bureau of Plant Industry, Inventory.* 1916. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from October 1 to December 31, 1913. Nos. 36259 to 36936. No. 37. 95 p. March 25. • ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. (*Glycine hispida* Maxim.)

"36576. From Fakumen, Manchuria. Presented by Dr. S.A. Ellerbeck, Mukden Hospital, who secured them from Mr. F.W.S. O'Neill, Fakumen. Received November 1, 1913. 'A bean called *white eyebrow bean.* This is the nearest I can obtain to the bean you mention. It is said that this bean produces plenty of oil. The name seems to arise from the white edge from which the sprouts come.' (O'Neill.)

"36643-36653. From Newchwang, Manchuria. Presented by Mr. George F. Bickford, vice consul. Received November 24, 1913. Quoted notes by Mr. Bickford.

"36643. 'Large black beans, *Ta hei tou.* From Hsin Min-fu.'

"36644. 'Large, round, black bean, *Ta lieh hei.* From Hsin Min-fu.'

"36645. Small black beans, *Hsiao heo tou.* From Hsin Min-fu.'

"36646. 'Green soy beans, *Ching tou.* From Chang Chun, north of Mukden.'

"36647. 'White eyebrow soy bean of the Fakumen meadow land.'

"36648. 'White eyebrow soy bean, *Pei mei.* From Sze Ping Kai, northeast of Mukden.'

"36649. 'Golden yellow soy beans, *Chin hwang tou.* From north of Mukden.'

"36650. 'Yellow soy bean, *Hwang tou.* From Liao River Valley.

"36651. 'Golden round soy bean, *Chin yuan* or *Chin yuan tou.* From north of Mukden.'

"36652. 'Yellow soy bean, *Yuan tou.* From Kung Chuling, south of Harbin. Round.' Note: Kungchuling, Chilin -> Gongzhuling, Jilin.

"36653. From Peh tuan lin tza, northern Manchuria. Presented by Mr. N. Kristiansen, at the request of Dr. S.A. Ellerbeck, Mukden Hospital. Received November 29, 1913. 'Manchurian bean, from Heilung chiang [pinyin: Heilongjiang], northern Manchuria.' (Kristiansen.)"

"36718/36810. From China. Collected by Mr. Frank N. Meyer, Agricultural Explorer for the Department of Agriculture. Received November 28, 1913. Quoted notes by Mr. Meyer.

"36785. '(No. 1972a. Peking, China. September 29, 1913.) The original wild soy bean, which occurs in North China here and there in hedges, copses, between shrubbery,

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and between reeds (*Phragmites communis*) on the drier places, where it turns itself around any support available. The beans are blackish and very small and are inclosed [sic] in small pods, which are quite hairy, though looking typically like some of the smaller cultivated varieties of soy beans. The poorest of the Chinese eat the young pods when boiled, but the plant at large is considered a weed and is gathered only when large quantities are found, in which case it is fed to domestic animals as a fodder. Of value possibly as a fodder plant when sown out among erect-growing vegetation, like barnyard millet, Johnson grass, and corn. Chinese name *Mau doh*, meaning 'hairy bean'.'"

"36809. '(No. 1996a. Peking, China. October 30, 1913.) A rare, brown and black striped variety of soy bean, used roasted as a delicacy. Very wholesome, apparently, and worthy of trial by the American public. Could be slightly salted and buttered and sold like pop corn and peanuts. Chinese name of this bean *Ghu pee doh*, meaning 'tiger-skin bean.'

"36829/36840. From Pying Yang, Chosen (Korea). Presented by Mr. Charles L. Phillips, Presbyterian Mission. Received December 10, 1913. Quoted notes by Mr. Phillips.

"36829-36837. 'The soy bean in Korea is usually sown in the fields with millet. In the early spring, after the millet has reached the height of 2 or inches, the beans are dropped in between the hills of the grain, all of which is sown in rows and cultivated with the Korean ox plow. Beans of this kind produce best in heavy clay soil rather than in light, stony ground. These beans serve as food for man and beast and are used most extensively throughout this whole northern country. For man, bread and cake are baked with these beans, a sloppy cereal dish is cooked, and, of course everywhere soy is made. Especially with the yellow varieties, bean spouts are grown during the winter, which furnish a fresh vegetable dish for the people when green things are scarce. The beans are put in an earthen dish and daily sprinkled with water and kept in the warm living room of the house, where they are quickly sprouted and send long shoots out from the dish. These sprouts are a great relish. They are boiled and eaten with rice and millet. For fodder, the beans are fed in the pod to the cattle and horses, but in cold weather are most often boiled and fed as a hot mash.'

"36829. 'No. 1. Yellow. This is the most common of all soy beans in Korea.'

"36830. 'No. 2 Small Yellow.'

"36831. 'No. 3. Black.'

"36832. 'No. 4. Green. These beans are also roasted and popped like our pop corn or like roasted chestnuts. A great favorite among the Korean children.'

"36833. 'No. 5. Brown. Rarely grown in northern Korea.'

"36834. 'No. 6. Brown and black.'

"36835. 'No. 7. Black and yellow.'

"36836. 'No. 8. Mottled green and black.'

"36837. 'No. 9. Black with white spots. Called sometimes in this province 'widowers' beans.'"

"36846-48. From Dalny, Manchuria, Presented by Mr. Albert W. Pontius, American consul. Received December 10, 1913.

'A large variety of beans is grown in Manchuria, and together with their resultants, bean cake and bean oil, they constitute by far the most valuable item in the export trade of the three provinces. In the month of April they are sown by hand in drills and the crop is ripe in September; but as regards the beans of commerce there is an exception, namely, the small green bean known as *Lu tou* (*Phaseolus aureus* Roxb. [Roxburgh, mung bean]), which ripens as early as July and can be sown again in that month and gathered early in October. The Chinese distinguish the beans of commerce by their colors. At the end of March or beginning of April the ground fertilizer (night soil and animal manure) is spread over the fields in the furrows in which the previous season's beans were cultivated. The soil in the old ridges is then turned with the ordinary shallow native plow, the new ridges being formed where the fertilizer has been spread. The ground is broken with a wooden roller drawn by a mule, the tops of the ridges being partly leveled. A line marker is then used on the leveled ridges, this implement marking a shallow trench, preparing the ground for seeding purposes.

"The planting of beans in Manchuria takes place during the month of April. The seeding is effected in two manners, the beans being sown in light furrows or in finger holes placed uniformly apart. The former method is quite simple and requires no explanation; in the use of the latter method, the finger holes are about 9 inches apart, four or five seeds being dropped in each hole. The amount of seed used differs in the various districts, a higher altitude requiring a proportionately larger quantity of seed. The following shows the different quantities of seed used in the varying latitudinal districts of Manchuria: Liaotung Peninsula (district south of Tashihchiao), thirty to forty-five hundredths of a bushel per acre; Mukden, Tiehling, and Kaiyuan, from forty-five to sixty hundredths of a bushel per acre; Kirin [pinyin: Jilin], from sixty-five to eighty hundredths of a bushel pre acre; Heilungchiang [pinyin: Heilongjiang]; eighty hundredths of a bushel or more per acre. The first breaking and weeding of the soil takes place from six to ten days after seeding and when the sprouts are from 3 to 4 inches in length. Weeding is subsequently effected during intervals of four or five days (every ten days in northern Manchuria). Native hoes and rakes are used for weeding, the ground being broken with a wooden plow drawn by a horse or mule. The period of harvesting is from the latter part of September to the beginning of October, the bean plants being cut close to the roots, a stone roller or wooden flail being used in hulling. The average crops per acre by districts are estimated as follows: In southeast Manchuria and the coast of the Yellow Sea the yield is from 10 to 15 bushels per acre; in the Liao

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River valley, Changtu, Kaiyua, Tiehling, and Mukden the yield is from 40 to 50 bushels per acre; at Kirin the yield is from 24 to 26 bushels per acre; and in Heilungchiang (Amur district) the yield is from 17 to 22 bushels per acre.' (Pontius).

"36846. 'Yellow bean. *Pai mei,* 'white eyebrow,' from the white scar on the saddle, or point of attachment to the pod. This variety is highly prized for the quantity of oil or fat which it contains. Shipped from Fanchiatun station, near Changchun, south Manchuria.' (Pontius.)

"Yellow bean. *Hei chi,* 'black belly,' from the dark-brown scar on the saddle. This variety is highly prized for the quality of oil or fat which it contains. Shipped from Kinchou station, leased territory.' (*Pontius.*)

"36848. 'Green bean. *Ching tou.* This variety is said to yield more legumin in the manufacture of bean curd than the yellow bean, but the quality is inferior. It is also boiled and used as food.' (*Pontius.*)

"36901-06. From Peking, China. Presented by Mr. John McGregor Gibb, Peking University. Received December 26, 1913. Quoted notes by Mr. Gibb.

"36901. 'Iron Pod.'

"36902. 'Small golden flower.'

"36903. 'The yellow four in a pod.'

"36904. 'Big, white eyed.'

"36905. 'White, flower, short stalks.'"

"36906/36912. From Dalny, Manchuria. Presented by Mr. Albert W. Pontius, American consul. Received December 26, 1913. Quoted notes by Mr. Pontius.

"36906. 'Black soy bean. Shipped from Suchiatun station.'"

"36913/36924. Presented by Mr. Lewis S. Palen, Harbin, Manchuria, Received December 29, 1913. Quoted notes by Mr. Palen.

"36914-36919.

"36914. '(From Tsitsikhar, Manchuria. November 5, 1913.) Yellow. White-eyebrow variety, *Ta pai mei.* This bean is used for oil, bean curd, sauces, and bean sprouts. This sample is from about 100 miles east of this neighborhood. This variety is found mostly west of Kaiyuan and Tiehling on the South Manchuria Railway. The estimated yield is from 936 to 2,574 pounds per acre, and the price roughly estimated at 46 cents gold per bushel of 60 pounds on the market.'

"36915. '(No. 2. Changchun, Manchuria. November 1, 1913.) Yellow. Golden, round variety, *Chin yuan tou.* This bean is used for oil, bean curd, sauces, and bean sprouts. It is the variety most generally found scattered all over the bean districts of Manchuria. The estimated yield is from 936 to 2,574 pounds per acre, and the price is roughly estimated at 46 cents gold per bushel of 60 pounds on the market. The Chinese are most casual in their estimates of yields.'

"36916. '(No. 3. Kirin, Manchuria. November 1, 1913.) Large green variety, *Ta ching tou.* A bean with green epidermis and green interior. The percentage of oil is less than that of the yellow. Used as bean curd, and as bean sprouts boiled with vegetables. The estimated yield is from 936 to 2,574 pounds per acre and the price slightly less than that of the yellow, roughly, 3 per cent.'

"36917. '(No. 3. Changchun, Manchuria) Small green. Green epidermis and yellow interior.'

"36918. '(No. 4. Changchun, Manchuria. November 1, 1913.) Large black variety, *Ta wu tou.* The oil equals about 75 per cent of that from the yellow. Mostly fed to horses and cattle. In some places officials prohibit the use for oil, in fear of the cost of feed being too greatly enhanced. It grows best and is much used on wet and marshy lands, where the yellow and green varieties will not do well. The yield is about the same as that of the yellow. The price is from 1 to 2 per cent higher than the yellow, owing to the Japanese demand at Dalny. The Chinese do not know the reason why it is preferred to the yellow.'

"36919. '(No. 5. Tsitsikhar, Manchuria. November 5, 1913.) Flat, black variety, *Pien wu tou.* The oil equals about 75 per cent of that from the yellow. Mostly fed to horses and cattle. In some places officials prohibit the use for oil, in fear of the cost of feed being too greatly enhanced. The sample comes from about 100 miles to the northeast of here. It will do well in very wet ground. The price is estimated at about 50 cents gold per bushel of 60 pounds on the Tsitsikhar market, which is slightly lower than the price of the yellow.'" Address: Washington, DC.

150. Kuraz, Rudolf. 1916. Ueber den Anbau einiger Oelpflanzen: 4. *Soja hispida* Moench [On the cultivation of some oilseeds: 4. The soybean]. *Pharmazeutische Post* (*Vienna; later renamed Pharmaceutische Post*) 49(31):317-20. April 15. [5 ref. Ger]

• ***Summary:*** Note: This is a good introduction to and summary of earlier publications on the soybean, with many partial in-text citations.

The coarse-haired soybean (*rauhhaarige Sojabohne*) (*Soja hispida* Moench.) is an annual legume which, depending upon the variety, reaches a height of 40 cm to 1 m, and under favorable conditions even more. It is a very foliose (*blattreich*) plant. The color of the leaves is bright green, and sometimes also dark green. Their form varies. They are long stemmed, tripinnate (*dreizählig gefiedert*), and thickly covered with stiff hairs. The color of the hairs is for the most part brown, and less often whitish gray. The upright and branched stem is likewise thickly covered with hairs. The blossoms are minute and colored white to dark purplish red. They sit together for the most part in a cluster of from two to eight. They are odorless. The fruits are pods that are bivalvularly dehiscent (*zweiklappig aufspringend*), somewhat constricted [or threaded] (*eingeschnürt*) between the seeds, bent a little bit in the shape of a sickle, and very numerous. Most of them sit along the main axis, they are for the most

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part covered with brown hairs, and contain from one to four seeds, the size and color of which are different. The shape of the seeds is more or less spherical or oblong, the diameter is from 4 to 8 mm, and the thickness is always smaller than the width. The color of the seeds is straw yellow, olive yellow, olive green, green, brown, or black. Depending upon the variety, the weight of one hundred seeds amounts to from 8 to 20 g. Deviations upwards as well as downwards also occur.

The soybean is currently cultivated primarily in China, above all else in Manchuria, as well as in Japan, Korea, Formosa [today's Taiwan], and India. In addition, considerable cultivation areas are dedicated to the plant in the Philippines as well as on Java and Borneo. More or less successful agronomic trials outside of Asia have been carried out thus far in particular in Italy, Russia, France, North America, and then in Algeria and Tunisia.

In Austria, Haberlandt (*Die Sojabohne* [The Soybean], Vienna, Carl Gerold's Sohn, 1878) undertook to make the soybean known. Even though his agronomic trials were to the greatest degree accompanied by success, the plant still did not become established. Why that is the case is hard to say. In more recent times, interest in soybeans (*Soja*) has awakened with us once again. Among others, it has been in particular Fruwirth (*"Die Sojabohne"*) ["The Soybean"], *Fühlings Landwirtschaftliche Zeitung* (Fühling's Agricultural Journal, 1915, vol. 3/4) who has devoted himself to it. This year, our committee is carrying out its third year of agronomic trials with the yellow-seeded soybean under an order from the Imperial-Royal Ministry of Agriculture (*k.k. Ackerbauministerium*). A report about it will appear at the end of the year. And in the agricultural practice, there are those who are newly occupied with this important legume.

The varieties of the soybean are extraordinarily numerous. Thus, for example, just the soybeans (*Soja*) that are grown in China today have close to four hundred varieties. This also appears to be understandable if one thinks that as Li-Yu-Ying [also known as Li Shizeng, Li Yuying, Li Yu-Ying, Li Yu-ying] (*Le Soja, sa Culture,* etc. [The Soybean, Its Cultivation, etc.], Paris, Chalamel, 1912) indicates, this important oil and food plant has already been cultivated for five thousand years. For Austrian conditions, it is only a few early-maturing varieties that come into consideration for cultivation for the purpose of obtaining seeds.

Even though the soybean is capable of demonstrating a significant capacity for adaptation with regard to climate, even the earlier varieties do in fact require a total temperature [heat units] (*Gesamttemperatur*) of 2,300ºC. for good maturation. In general, this temperature does not need to be too high at all (in July and September, an average of around 17 to 20º), but it should be distributed as evenly as possible and last for a sufficiently long time. In particular, the autumn should be evenly warm (in September, an average of 14º). The success of soybean cultivation (*Sojakultur*) is less dependent upon the quantity of precipitation. The soybean withstands dryness and even the greatest drought very well. Lasting wet weather during the vegetation period, on the other hand, has the consequence that the seeds sometimes do not mature completely. Even the autumn may not be too wet. For that reason, areas with a dry summer are in general more favorable for the cultivation of the soybean for the purpose of obtaining seeds than those with a wet summer. The soybean is relatively resistant to frost in the spring and autumn. According to Fruwirth, the majority of the forms are only killed off at -2.7ºC, and some even withstand this temperature. Soybeans that were planted by us even withstood a frost of -2.5ºC in 1915 without undergoing any considerable damage. The yellow varieties appear to be the least sensitive to the cold. In general, it can be said that the early-maturing soybeans can be grown anywhere in areas with a winegrowing climate with satisfactory success.

For the more northern areas of Austria, it is in fact only the very early varieties that can be planted in warm, protected areas. However, even in this case, it appears to be advisable in the name of caution to be convinced of the cultivation capability of the plant first by means of trials at a small scale before going on to plant large areas. In southern areas of our monarchy, on the other hand, good harvest results may be expected with certainty.

With regard to the soil conditions, the soybean is likewise very capable of adaptation. In this regard, it does not make any especially high demands and it provides good yields on a variety of soils. It is only the case that the soil must not stick together too much, because otherwise the entire development of the plant–along with the maturation, as well–will be significantly delayed. Wet areas are likewise unsuitable for the soybean. It thrives best on a light, very well loosened, dry, deep, porous and sandy loam soil. It also seems to require a sufficient calcium content. The area should always be as free as possible, but within that context also warm, sunny, and protected from the wind. Since the soybean extracts a significant quantity of nutrients from the soil, it is necessary for the field that is to be planted to be rich in plant nutrition that can be easily assimilated. On poor soils, it is therefore necessary to see to the proper addition of nutrients. Within that context, it is above all else phosphoric acid that comes into consideration, since it is capable not only of bringing about an increase in and enlargement of the seed harvest, but also substantially supporting the exploitation of the potassium fertilizing that is provided at the same time. According to Lechartier, sufficient quantities for one hectare are 200 kg of superphosphate (16%) or 400 kg of Thomas meal (*Thomasschlacke*), 200 kg of potassium salt, and around 100 kg of Chile saltpeter [sodium nitrate] (*Chilisalpeter: sic, Chilesalpeter*). In most cases, though, it is possible to do without nitrogen fertilizing, since that nutrient almost always remains ineffective. But the fertilizing

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should not be unbalanced. However, soybeans should never be planted on fresh barn manure fertilizer, but rather always only one or two years thereafter.

As a field crop, the soybean finds a good position [in a crop rotation] after grain. In general, though, it may be planted after any crop. Since during its vegetation period, it does not allow weeds to come up and therefore keeps the ground clear, and since like all legumes, it collects nitrogen to a certain degree, it also constitutes a good prior crop [in a crop rotation] for any crop. It is usually the case that grain is planted again after soybeans. It can, however, be planted on the same field for several years in a row without the yield decreasing notably.

In terms of the preparation of the soil, a proper loosening of the surface soil is to be attended to. For that purpose, a deep plowing is carried out in the autumn. The field than lies in coarse furrows over the winter. In the spring, a good crumb cover (*Krümmeldecke*) is produced with a cultivator (*Exstirpator*) and then, before sowing, with the harrow. If soybeans are to be planted after grain, then on lighter soils the stubble is simply plowed under in the autumn.

According to Fruwirth, the germination of the soybean only takes place with an average temperature of 9 to 10ºC.

Even though the germinated seedlings are not especially sensitive to lighter frosts, it is not necessary to hurry with the sowing, since the seeds that are planted later usually easily catch up with those that were planted earlier. Because of the rather long lifespan of the plant, though, on the contrary it is not advisable to delay the sowing too long, since in that case, the soybeans are no longer capable of developing properly before the blossoms set. According to trials by Haberlandt, with later sowings (from May 19 onward), the size of the seeds and their absolute weight decreased more and more.

For that reason, the sowing is only to be carried out most expediently once the soil has warmed sufficiently and no great return of cold is to be feared. In our areas, the last week of April through the first week of May is the most suitable time. In southern areas, the planting can of course take place correspondingly earlier; in Dalmatia, for example, already as early as the beginning of March. For the cultivation, only the nicest and largest seeds should be used (Continued).

151. Takimoto, S. 1916. Daizu byôgai nishu ni tsuite [Two soybean diseases]. *Byochu-gai Zasshi* (*J. of Plant Protection, Tokyo*) 3:368-69. May. [Jap]
• ***Summary:*** Records downy mildew and another disease due to mite injury. Address: Chosen Kangyo Mohanjo.

152. Kawakami, K.K. 1916. The people's safety valve (Letter to the editor). *San Francisco Chronicle.* July 17. p. 14.
• ***Summary:*** "The Chronicle disclaims responsibility for the utterances in this column."

"Japanese influence on the Asian continent has benefited and will continue to benefit American trade." For example, since the "inauguration of the Japanese regime in Korea," American exports to Korea have expanded dramatically. They increased 20 times in the decade from 1902 to 1913. "This is all the more remarkable considering that America buys practically nothing from Korea." In short, Japan did not slam closed Korea's doors.

The situation in Manchuria is somewhat different. "Though Manchuria, after Japan's advent there, bought a great deal of American rails, rolling stock, kerosene and flour, Japanese cotton goods have to a considerable extent replaced American cottons. This, however, is due mainly to the fact that Japan has been almost the sole buyer of Manchuria's premier product, beans, and their by-products, bean cake and bean oil, amounting in value to some $20,000,000. The secret of Japan's commercial success in Manchuria lies chiefly in the operation of the fundamental economic law that the country consuming the major portion of the exports of another country holds the most advantageous position in supplying its necessary imports." Address: San Francisco.

153. Murakami, Kamekichi. 1916. Bean-curd and the process for making same. *U.S. Patent* 1,195,843. Aug. 22. 3 p. Application filed 11 March 1916. 5 drawings.
• ***Summary:*** The inventor, a citizen of Japan, describes the process and apparatus for making "bean cubes" from "beans known as the 'soy' bean, raised largely in Korea and Japan and to some extent in California." Illustrations (line drawings) show: (1) Two views of one of the cubes. (2) A vertical sectional view of the stone grinder or mill, in which the soaked beans are ground with water. (3) A similar view of a lever press for pressing the soymilk from the pulp. (4) A box in which the "bean jelly" is formed; it has drainage holes in the sides and bottom. (5) Detailed views of the bottom and one side of the forming box.

The ground beans are slowly poured into boiling water; the mass of bean paste is kept in a boiling condition for 15-20 minutes. During boiling a mixture of 3 parts slaked lime and 7 parts edible vegetable oil is added, causing the foam on the surface to sink. Salt water or nigari is used as the coagulant, and it is added in 4 steps.

Note: The person who wrote the final patent apparently had difficulty understanding the process Mr. Murakami was describing. He wrote "skins" instead of okara or pulp, and wrote "pulp" instead of soymilk. Address: Seattle, Washington.

154. Piper, C.V.; Morse, W.J. 1916. The soy bean, with special reference to its utilization for oil, cake, and other products. *U.S. Department of Agriculture Bulletin* No. 439. 20 p. Dec. 22. [9 ref]
• ***Summary:*** Contents: Introduction. Soy beans in

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Manchuria. Soy beans in Japan. Soy beans in Europe. Soy beans in the United States. Methods of oil extraction. Soy-bean meal as human food. Soy-bean meal as stock feed. Soy-bean meal as fertilizer. Uses of soy-bean oil. Analysis of important varieties of soy beans. Possibility of developing a manufacturing industry with American-grown soy beans.

"Analyses of important varieties of soy beans (p. 16-17):... In determining the range in the oil and protein contents of over 500 varieties grown in the variety tests at Arlington Farm, Virginia, the percentage of oil was found to range from 11.8 to 22.5 [Tokyo had 20.7% and Biloxi had 20.3% oil] and of protein from 31 to 46.9 [Chiquita had 46.9% protein]... At the present time the Mammoth Yellow variety is the most generally grown throughout the South and is the one used in the production of oil. The yellow-seeded varieties, which are most suitable for the production of oil and meal, contain the highest percentage of oil.

"Environment has been found to be a potent factor in the percentage of oil in the same variety. Considerable differences occur in oil content when soybeans are grown in different localities. The Haberlandt variety grown in Mississippi, North Carolina, Missouri, Virginia, and Ohio gave the following percentages of oil, respectively: 25.4, 22.8, 19.8, 18.3, 17.5; while the Mammoth Yellow variety grown in Alabama, South Carolina, Tennessee, North Carolina, and Virginia gave, respectively, 21.2, 19.6, 19.5, 18.4, and 18.8. Variety tests conducted in various parts of the country indicate a higher percentage of oil with the same variety for southern-grown seed. Similar results have been obtained in Manchuria, the North Manchurian beans showing an oil content of 15 to 17 percent and the South Manchurian beans from 18 to 20 percent."

Photos (both by Frank N. Meyer) show: (1) A fleet of junks carrying soy beans to Newchwang, Manchuria.

(2) Coolies at Newchwang, carrying loads of soy beans from junks to big stacks.

An outline map of the USA (p. 8) shows the area to which the soy bean is especially adapted for growing for oil production. The area of double hatching shows that it is especially well suited to the Deep South. The northern boundary of the area where it is "less certain of profitable production" includes the southern one-third of Ohio, Indiana, and Illinois, and most of Missouri. On the west, the "less certain" area includes the eastern one-third of Nebraska, Oklahoma, and Texas.

Tables show: (1) "Exports of soy beans, bean cake, and bean oil from the principal ports of South Manchuria (Antung, Dairen, Newchwang), 1909 to 1913, inclusive." (2) "Quantity and value of exports of soy beans and soy-bean oil from Japan to foreign countries, 1913 and 1914." The countries are: China, United Kingdom, France, Germany, Belgium, United States, Hawaii, British America, Australia, other countries. (3) "Quantity of imports of soy beans, soy-bean cake, and soy-bean oil from Dairen, Manchuria, into Japan, 1911 to 1914, inclusive. The greatest imports were of soy-bean cake, followed by soy beans, with only small amounts of oil.

(4) "Quantity and value of imports of soy beans, bean cake, and bean oil by European countries, 1912 to 1914, inclusive." The countries are: Austria, Belgium, France, Germany, Italy, Netherlands, Russia, Sweden, United Kingdom. In 1912, the UK imported the most soy beans, while Netherlands imported the most cake and oil. (5) "Quantity and value of imports of soy beans, soy-bean cake (Footnote: Includes bean cake [perhaps fermented tofu or canned regular tofu], or bean stick [probably dried yuba sticks], miso, or similar products, with duty, 40 per cent) and soy-bean oil into the United States, 1910 to 1915, inclusive." The quantity of soy bean imports was greatest in 1915 with 3.837 million lb. The quantity of soy-bean cake imports was greatest in 1913 with 7.005 million lb. The quantity of soy-bean oil imports was greatest in 1911 with 41.106 million lb. "Prior to 1914 soy beans were not classified separately in the customs returns" (p. 9). (6) "Composition of soy-bean flour in comparison with wheat flour, corn meal, rye flour, Graham flour, and whole-wheat flour."

(7) "Value of a short ton of soy-bean cake and other oil cakes in the principal European countries" (Incl. cottonseed, linseed, peanut {Rufisque}). Countries: Germany, United Kingdom, Netherlands, Denmark, Sweden. (8) "Analyses [nutritional composition] of soy-bean meal and other important oil meals." (Incl. Cottonseed, linseed (old and new processes), peanut (decorticated), sunflower seed). (9) "Fertilizing constituents [nitrogen, ammonia, phosphoric acid, potash] of soy beans, soy-bean meal, and cottonseed meal."

(10) Analyses for protein and oil of important varieties of soy beans grown at Arlington Farm (Virginia), Newark (Delaware), and Agricultural College (Mississippi). The varieties are: Mammoth, Hollybrook, Manchu, Haberlandt, Medium Yellow, Ito San, Chiquita, Tokyo, Lexington, Guelph, Black Eyebrow, Shanghai, Peking, Wilson, Biloxi, Barchet, Virginia. Note 1. "At the present time, the Mammoth Yellow variety is most generally grown throughout the South and is the one used in the production of oil" (p. 16). (11) "Acreage, production, and value per ton of cottonseed in the boll-weevil states." "Since the boll weevil first entered Texas in 1892," it has steadily decreased production of cottonseed. The soy beans offers a good replacement. (12) "Comparative prices per ton of cottonseed and soy beans on the European market, 1911 to 1914, inclusive." Soy beans are usually slightly more expensive.

Note 2. This is the earliest published document seen that contains soy-related photos by Frank. N. Meyer.

Note 3. This is the earliest document seen in which William Morse describes soy milk, or mentions natto, or correctly mentions tofu.

Note 4. This is the earliest document seen (March 2021)

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that mentions the soybean variety Lexington. Address: 1. Agrostologist in Charge; 2. Scientific Asst. Forage-Crop Investigations, USDA, Washington, DC.

155. Piper, C.V.; Morse, W.J. 1916. The soy bean, with special reference to its utilization for oil, cake, and other products: Soy beans in Japan, in Europe, and in the United States (Document part). *U.S. Department of Agriculture Bulletin* No. 439. 20 p. Dec. 22. See p. 4-7. [2 ref]
• ***Summary:*** "Soy beans in Japan (p. 4): The soy bean is cultivated quite extensively throughout the Empire of Japan and occupies about 3.8 per cent of the total area devoted to the cultivation of rice and other cereals. In many districts it is cultivated not in fields by itself, but in rows along the edges of rice and wheat fields. Although not grown to any considerable extent as a main crop by the Japanese farmer, the average annual production is about 18,000,000 bushels. In quality the beans raised in Japan are said to be superior to those of Manchuria and Chosen [Korea] and are used exclusively in the manufacture of food products. The imported beans, of which very large quantities are obtained from Manchuria and other Asiatic countries, are used principally in the manufacture of bean cake and oil."

"The soy bean forms one of the most important articles of food in Japan. It is one of the principal ingredients in the manufacture of shoyu (soy sauce), miso (bean cheese), tofu (bean curd), and natto (steamed beans). The beans are also eaten as a vegetable and in soups; sometimes they are picked green, boiled, and served cold with soy sauce, and sometimes as a salad. A 'vegetable milk' is also produced from the soy bean, forming the basis for the manufacture of the different kinds of vegetable cheese. This milk is used fresh and a form of condensed milk is manufactured from it. All of these foodstuffs are used daily in Japanese homes and for the poorer classes are the principal source of protein. To a limited extent, soy beans are used as a horse or cattle feed, being sometimes boiled and mixed with straw, barley, and bran."

"Soy beans in Europe (p. 6): The soy bean was first introduced into Europe about 1790 and was grown for a great number of years without attracting any attention as a plant of much economic importance. In 1875 Professor Haberlandt, of Vienna, begun an extensive series of experiments with this crop and strongly urged its use as a food plant for man and animals. Although interest was increased in its cultivation during the experiments, the soy bean failed to become of any great importance in Europe. At the present time it is cultivated only to a limited extent in Germany, southern Russia, France, and Italy."

"Soy beans in the United States (p. 7): Although the soy bean was mentioned as early as 1804 (Footnote: Willich, A.F.M. American Encyclopedia, 1st Amer ed., v. 5, p. 13. Philadelphia, 1804), it is only within recent years that it has become a crop of importance in the U.S. At the present time the soy bean is most largely grown for forage. In a few sections, such as eastern North Carolina, however, a very profitable industry has developed from the growing of seed... The yields of seed to the acre in various sections of the United States range from about 15 bushels in the Northern States to about 40 bushels in the northern half of the cotton belt. The average yield in eastern North Carolina is about 25 bushels, although many fields produce 35 bushels or more to the acre..." Note: This is the earliest U.S. document seen (June 2003) that cites the 1804 publication by Willich [and James Mease] concerning the soybean in Philadelphia. Note that this article appeared 112 years after 1804.

"The first extensive work in the U.S. with the soy bean as an oil seed was entered upon about 1910 by an oil mill on the Pacific coast. The beans, containing from 15-19% of oil, were imported from Manchuria, and the importations, most of which are used in the manufacture of oil and cake, have gradually increased, as shown in Table V. The oil was extracted with hydraulic presses, using the same methods employed with cottonseed and linseed. It found a ready market, as a good demand had been created for this product by soap and paint manufacturers, which up to this time had been supplied by importation from Asiatic countries and England. The soy cake, ground into meal, was placed on the market under a trade name and was soon recognized as a valuable feed by dairymen and poultrymen. The use of the cake has been confined almost wholly to the Western States, owing principally to the high cost of transportation."

"An industry which promises to be of importance in a further utilization of the soy bean is the manufacture of 'vegetable milk.' At the present time a factory in New York State is being equipped for this purpose." Address: 1. Agrostologist in Charge; 2. Scientific Asst. Forage-Crop Investigations, USDA, Washington, DC.

156. Williams, C.B. 1916. Soy-bean products and their uses. *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec.
• ***Summary:*** Contents: Introduction. First commercial crushing from domestic beans (started on 13 Dec. 1915 by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina). Soy-bean oil. Uses for the oil. Soy-bean meal. Composition and exchange value of the meal. Prices paid for beans by the oil mills. Soy-bean oil industry in England, Manchuria, and Japan. Importation of oil. Soy-bean meal as feed. Soy beans and products for human food.

This Circular begins: "In order that any people may maintain their soils in the highest state of productivity in an economical way it will be necessary that proper systems of crop rotation are used, and in these rotations it will be necessary to bring in leguminous crops at as frequent intervals as practicable. For North Carolina conditions one of the crops of this nature that may be used to good advantage in all parts of the State is the soy bean. If properly

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handled, this crop may be used as the means of adding to the productivity of the soils as well as to increase the net returns from the farm. Recently there has been a marked interest throughout this State and the South in the growing of soy beans." A "new outlet for the beans has developed from the crushing of the seed by a number of oil mills of the State..." The spread of the boll weevil should lead to increased interest in the soy bean.

"This crop was introduced into the State something like thirty-five years ago, yet very little was heard of it, outside of very limited areas, until quite recently, when a campaign was begun to induce the cotton oil mills of the State to use beans for crushing purposes in the same general way that cotton seed had been used for many years before. This campaign not only opened the eyes of the oil crushers to the possibilities of the soy bean in a commercial way, but of the farmers, also, to the great opportunities of this crop.

"During the spring of 1915 farmers, particularly in the Eastern part of the State, were casting about to find a crop or crops that might be substituted, satisfactorily, for cotton, as the price of this latter crop during the previous fall had been, in many cases, below the cost of production. Many farmers increased their acreage of soy beans, and as a result of this increase at least a million bushels or more of beans were produced last year." Something like 80,000 to 100,000 bushels of soy beans were used by the cotton oil mills of the State during the past fall, winter, and spring.

"The first commercial manufacture of soy-bean oil and meal from domestic soy beans in the United States was started on December 13, 1915, by the Elizabeth City Oil and Fertilizer Company of Elizabeth City, North Carolina.

"From the start this mill operated night and day solely on soy beans until it had crushed it supply of about 20,000 bushels. This mill was able to crush about twenty tons during each twenty-four hours...

"It is understood that before the mill had ground a single bean they had contracted their entire output of oil to one of the leading manufacturers of the country at fairly reasonable prices. It, too, had no difficulty in selling its entire output of soy-bean meal, most of it going to a fertilizer manufacturer. From a ton of the beans this mill was able to secure something like 32 to 35 gallons of oil and about 1,650 pounds of meal... Other oil mills in North Carolina that crushed more or less soy beans during the past season were those located at New Bern, Hertford, Winterville, Washington, Wilson, Farmville, Lattimore, and at a few other places."

"Soy-Bean Oil (p. 3): One of the chief products secured in the crushing of the beans is the oil. This oil has wide usefulness at the present time in the commercial world. The amount of oil in the beans amounts to from 17 to 20 per cent. This oil, when expressed from good, sound beans is practically neutral, and about 95 per cent of it is saponifiable. It consists chiefly of the glycerides of the fatty acids. These acids are made up of about 15 per cent palmitic, 56 per cent oleic, 19 per cent lenolic, and 5 per cent lenolenic acids. The presence of the unsaturated acids (oleic, lenolic, and lenolenic) impart to the oil drying properties. The oil, although more efficient in drying properties than cotton-seed oil, is less so than linseed oil. It is classed among the semi-drying oils.

"In a bushel of Mammoth Yellow soy beans there are ordinarily contained about 11 pounds or 1.42 gallons of oil, weighing 7.72 pounds per gallon. The oil mills at present are able, by expression methods, to get out only 70 to 75 per cent of the total amount of oil contained in the beans. By the use of appropriate solvents, such as gasoline, practically all of the oil might be removed. This latter method has never gained much headway in this country as a means for extracting oil from cotton seed, and it will probably be some time, if ever, before it will generally be used as a commercial method. From an economic standpoint the method most commonly used with cotton seed by Southern oil mills will most likely be the one that will be most generally practiced in soy-bean oil extraction. At present those mills that have apparently been most successful in manufacturing oil and meal from soy beans are those which are equipped with expellers or screw presses.

"Uses for the oil: At the present time the oil is used in this country chiefly in the manufacture of soaps, varnishes, paints, enamels, linoleums, and water-proofing materials. It has entered, also, to some extent in the manufacture of edible salad oil and butter substitutes. The untreated oil may replace linseed oil completely, with quite satisfactory results, in the manufacture of soft soaps; but it can only partially take the place of cotton-seed oil in making hard soaps. This is because the soap made from soy-bean oil is of a somewhat softer nature than that manufactured from cotton-seed oil. After hydrogenation the oil has a wider field of usefulness and may, in some cases entirely replace linseed oil or other drying oils with very satisfactory results. As the untreated oil is of a semi-drying nature, it may be used only when mixed with linseed oil for the manufacture of paints, varnishes, and enamels. In making paints, if the proportion of the soy-bean oil to the total oils present does not exceed 20 to 25 per cent, there does not seem to be any inferior qualities developed in the paint, any more than when linseed oil alone is used. In this respect the soy-bean oil is superior to cotton-seed oil, as it has not been found that the latter oil can be used for this purpose. It is not improbable that with the use of suitable dryers soy-bean oil may in the future find more extended use for this purpose. When the oil is properly refined it will yield about 10 per cent glycerine as a by-product in the manufacture of soaps. This glycerine has been found to be equal in value to that recovered from other soap-making fats, such as tallow, cotton-seed oil, cocoanut oil, etc. It is significant of the possibilities of the use of this oil that more than $5,000,000 worth of it was imported into the United

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States this year from other countries, chiefly from Asia.

"Soy-bean meal: The meal secured from crushing the beans is the most valuable product and will have the widest usefulness. That secured from the crushing of yellow-colored beans is of a bright yellow color while that produced from the brown and dark colored beans is of a somewhat darker shade. Meal, too, that has been treated with ordinary solvents, employed for this purpose to remove the oil, is of a brighter color than are those meals from which the oil has been removed by heating and pressure. The oil, however, secured by a solvent process would be of a darker color. The soy-bean cake secured by expression methods, has a pleasant taste, not unlike malted milk, and when ground into meal may be used, at the present time, chiefly for feeding to livestock or for fertilizing purposes. The meal as a feed is highly concentrated and nutritious, and all kinds of stock seem to relish it when fed to them properly. It should not be fed in large quantities for any great length of time, because of its highly concentrated nature. As a fertilizer it acts satisfactorily. Much of the meal produced by the oil mills of the State during the past year seems to have been sold, without any difficulty, to manufacturers for the making of mixed fertilizers." Continued. Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

157. Williams, C.B. 1916. Soy-bean products and their uses (Continued–Document part II). *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec.

• ***Summary:*** (Continued): "Composition and Exchange Value of the Meal: From the fertilizer standpoint, soy-bean meal is richer in plant-food constituents than is cotton-seed meal. From available analysis, the meal on an average contains 7.48 per cent nitrogen, 1.4 per cent phosphoric acid, and 1.83 per cent potash. All these constituents contained in soy-bean meal should be in about as available form-for use by crops as they are in cotton-seed meal. Based on these percentages, an exchange, purely from the fertilizer standpoint, of about 1,500 pounds of soy-bean meal of average composition for 2,000 pounds (33 1/3 bushels) of beans would be about equal in money value. Where the farmer makes an exchange, he should, however, secure at least enough above this amount to cover well the cost of delivery of the beans to the mill. The meal, being a very concentrated product, should always sell as high, or higher, than cotton-seed meal, as it is usually richer in protein than the latter.

"Prices Paid for Beans by the Oil Mills: The price which the mill men can pay for soy beans will be governed to a large extent by the prices they are able to secure for the soy-bean oil and meal. If these products bring good prices the mills ought to be in a position to pay the farmer a good price for his beans. During the past fall farmers generally were able to secure from the oil mills from $1 to $1.15 per bushel. In some cases as high as $1.25 per bushel was paid. It may be of interest in this connection to know that during 1913 and 1914 the British Oil Mills, located mainly at Hull, England, paid from $1.00 to $1.17 per bushel for Asiatic beans. During 1915 the price paid at the mills at Hull varied from $1.04 per bushel in January to $1.82 per bushel at the end of the year.

"Soy-Bean Oil Industry in England, Manchuria and Japan: In England, the oil from the soy bean is extracted largely by a secret process owned by an oil extracting company of Hull. By this process the seed are ground finely and are then treated directly by means of a solvent, which is thought to be benzine. Afterwards the oil is removed from the solvent by distilling off the latter, the solvent being used over and over again in the extractive process. The meal after treatment is dried and ground finely. The meal is of a bright color, is sweet in taste, and has a pleasant odor. By this process not more than 1 per cent of oil is left in it, the remaining meal running from 43 to 45 per cent of protein. It has practically the same number of feeding units as has meal derived directly from soy-bean cake, and it sells in Europe for practically the same price per ton. This industry in Manchuria and Japan is one of the most important and profitable. In 1911 more than 1,500,000 tons of oil were exported from these countries. Most of the oil is secured from the bean by processes of expression. Some of these methods are quite crude, especially those used by the natives.

"In the modern mill in Manchuria the soy beans are crushed in large quantities by steam-driven rollers. The crushed seed are then carried down funnels to the oil extracting room, where they are steamed by vapor, which can be regulated at will, the process being rapid, owing to the force at which the steam plays upon the wafers. In some of the mills it has been found to be more satisfactory to discard steam pressure in extracting the oil, and use hand pressure, as it is done in the mills of the natives, the reason for this being that hydraulic pressure is so quickly finished, notwithstanding the fact that a much less flow of oil is secured than by the slower hand process. The bean cake, with as much oil as is left in it after hand pressure, is not in the best condition for fertilizing purposes. By use of gasoline extraction the whole of the oil may be secured, the oil being of a clear, pure color, and hardly bearing any resemblance at all to the dark, muddy oil secured by the old hand-press method.

"The machinery used by the larger operators of England, Continental Europe, as well as of Japan, Korea, Manchuria, and China, is of Anglo-American manufacture, which is the kind ordinarily used in the expression of oil from cotton seed. In 1910 Stewart and Chard secured patents in England for a special machine which was particularly adapted for breaking up the beans. This machine has been very useful in solving some of the difficulties experienced in the soy-bean crushing industry in England.

"In England soy-bean oil for general purposes is not refined, as is cotton-seed oil in America, by the use of caustic

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soda, but by means of sulphuric acid and fuller's earth.

"Processes of refining soy-bean oil for edible purposes have been devised, but these, like those used for extracting the oil from the seed, have been kept secret; but they are thought in most cases to be by means of superheated steam."

"Importation of oil: In this connection it may be of interest to know that for the five years ending with 1916 there were imported into this country more than 174,000,000 pounds of soy-bean oil, which represented crushings amounting to more than 12,000,000 bushels. Of these, 47.6 per cent came through the port of New York; 36.1 per cent through Seattle [Washington]; 9.6 per cent through San Francisco [California]; 2.2 per cent through Philadelphia [Pennsylvania]; 1.6 per cent through Boston [Massachusetts]; 1.1 per cent through Chicago [Illinois]; and 1.3 per cent through all other ports of the United States. In 1916, 75 per cent of the importations came through the ports of Seattle and of San Francisco, the chief port of entry being Seattle, with 62.9 per cent of the total importation. During 1916 more than 98,000,000 pounds of soy-bean oil came in from other countries, 99.9 per cent of the total coming from Asia. Of the total amount imported from Asia, almost 72 per cent were shipped from Japanese ports. The total importations during 1916 were valued at little more than $5,000,000. It is interesting to note that at this time (October 20), because of the advance in linseed oil and the increased demand for soy-bean oil, strictly prime quality soy-bean oil is bringing 9.75 cents per pound or about 75 cents per gallon f.o.b. New York.

"Soy-Bean Meal as a Feed: The Animal Industry Division of this Station has been conducting considerable experimental work during the past year to determine the feeding value of soy-bean meal when fed to hogs and chickens. From results secured at the Branch Station in Edgecombe County, they conclude that both for rapidity and economy of gains this meal has proven itself as a superior product for part of the ration for hogs.

"In feeding trials with young chicks at the Pender Test Farm they found that when soy-bean meal was fed in equal quantities with wheat shorts and cracked corn mixed with sweet milk, the soy-bean meal proved to be a most valuable feed, and was found to be equal in value in the ration to rolled oats as a growth producer.

"They have found, too, in their experiments this year with pigs, that where one-third of the ration by weight consisted of soy-bean meal, and the other two-thirds of cracked corn, the bodies of the pigs became firmer than was the case with a parallel lot fed a ration made up of two-thirds cracked corn and one-third wheat shorts. From the results thus far secured by them, they have been led to conclude that soy-bean meal when fed properly does not produce soft-bodied hogs, as has been thought by some" (Continued). Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

158. Williams, C.B. 1916. Soy-bean products and their uses (Continued–Document part III). *North Carolina Agricultural Experiment Station, Circular* No. 34. p. 1-7. Dec.

• ***Summary:*** (Continued): "Soy Beans and Products for Human Food: "Soy beans, before crushing, and the meal secured by crushing, seem to have great possibilities in the way of different human foods. They are not only rich in food nutrients, but when properly prepared make very appetizing products.

"From the soy beans themselves, or from meal after the oil has been largely removed, macaroni, milk, cheese, a coffee substitute, and flour for making biscuits and muffins may be secured. The soy-bean flour gives best results when mixed in the proportion of 1 to 3 with wheat flour or corn meal.

"In China and Japan the soy bean has been largely used for human consumption from the earliest times. In Europe and America it has been used to some extent, in recent years, for this purpose. In this country some enterprising manufacturers are putting out prepared pork and beans, part of all of the beans being soy beans. A regular preparation of these which the writer has tried proved to be of as high grade as could be desired.

"In Eastern countries the beans are used largely to take the place of beef in the diet of the people. Because of their richness in protein they are used to supplement rice, which is deficient in this nutrient. Tofu (vegetable cheese), Natto, yuba, and miso are staple foods made from soy beans.

"Muffins made from soy-bean flour have been found to be very palatable. To make these, take about ½ cupful of soy-bean flour, about 1½ cupfuls of wheat flour, ½ teaspoonful of salt, 2 eggs, 1 teacupful of sweet milk, two rounded teaspoonfuls of baking powder, and 1½ tablespoonfuls of melted (but not hot) butter. These should be beaten well together, adding the melted butter last. Then bake in gem pans placed in a hot oven. This quantity will make about twelve muffins.

"The chief value of the flour lies in its high content of protein (muscle-forming material) and mineral matter, one pound of it containing as much protein as two pounds of meat. Bread made from the soy-bean flour in Germany, where it is being largely used at the present time, secures about the same amount of food value as six dollars spent for meat. The flour seems to have especial value in the preparation of foods for delicate infants which have difficulty with digesting cows' milk, and for persons suffering with diabetic troubles."

A diagram (p. 7) shows "Products secured from the crushing of a ton of soy beans by the oil mill, and the material made from these products." One ton yields 1,650 lb of meal, 32 gallons of oil, and 120 lb of trash and moisture. From the meal one can make food (human and animal), fertilizer, and celluloid. The human food can be macaroni, flour, sauce, milk, cheese, coffee, and lard. From the oil one

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can make food (cooking oils, butter [margarine?]), paints, enamels, blown oil (linoleum, India rubber substitutes, varnishes), and soap stock (soaps, glycerine).

Note: This is the earliest English-language document seen (Aug. 2016) that contains a diagram of this type. Address: Chief, Div. of Agronomy, North Carolina Agric. Exp. Station.

159. Morse, W.J. 1917. Re: 300 soy bean varieties introduced from China, Manchuria, Japan and Korea in winter of 1914. Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., Jan. 4. 2 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: During the winter of 1914 this office received about 300 introductions of soy beans from China, Manchuria, Japan and Korea. Variety tests conducted with these introductions showed that most of these were new sorts and very few identical with each other or with previous introductions. These varieties have now been tested out at Arlington Farm [Virginia] for three years and many of them show very great promise either as hay or seed varieties in comparison with those varieties now generally grown in this country. These varieties have been analyzed for oil and protein and it seems possible to obtain excellent oil varieties for southern conditions.

"In view of the great interest now taken throughout the South with the possibilities of the soy bean as an oil seed, we think it an opportune time to begin to test about 40 of the very best of the above-mentioned introductions at the southern stations. Our plan would be to test out a rod row of each of these, using as a check the Mammoth Yellow variety. Careful data should be kept on each variety as to yield of hay and seed and perhaps the most essential characteristics of the variety, as maturity, habit, etc. The analysis work can be arranged with the Bureau of Chemistry here, and no doubt valuable data gathered on the best oil-producing strains. For taking notes on these varieties at the different stations we have a uniform note-book which contains printed forms covering the essential points of the test. Two books would be furnished each station so that records could be had by this office and also by the station.

"We shall appreciate it very much if you will write us in the near future your opinion regarding such as test.

"Yours very truly..."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agricultural Experiment Stations, 1899-1928. North Carolina. Box 26. P.I. 66, Entry 68.

Sent to Soyinfo Center by Matthew Roth, Dec. 2016. Address: Scientific Assistant [Bureau of Plant Industry, Washington, D.C.].

160. Morse, W.J. 1917. Re: We recently received many new soybean varieties. Letter to Prof. D.J. Burleson, Agricultural Experiment Station, Auburn, Alabama, Jan. 4. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Burleson: During the winter of 1914 this office received about 300 introductions of soy beans from China, Manchuria, Japan and Korea. Variety tests conducted with these introductions showed that most of them were new sorts and very few identical with each other or with previous introductions. These varieties have now been tested out at Arlington Farm [Virginia] for three years and many of them show very great promise either as hay or seed varieties in comparison with those varieties now generally grown in this country. These varieties have been analyzed for oil and protein and it seems possible to obtain excellent oil varieties for southern conditions.

"In view of the great interest now taken throughout the South with the possibilities of the soy bean as an oil seed, we think it an opportune time to begin to test about 40 of the very best of the above-mentioned introductions at the southern stations. Our plan would be to test out a rod row of each of these, using as a check the Mammoth Yellow variety. Careful data should be kept on each variety as to yield of hay and seed and perhaps the most essential characteristics of the variety, as maturity, habit, etc. The analysis work can be arranged with the Bureau of Chemistry here, and no doubt valuable data gathered on the best oil-producing strains. For taking notes on these varieties at the different stations we have a uniform note-book which contains printed forms covering the essential points of the test. Two books would be furnished each station so that records could be had by this office and also by the station.

"We shall appreciate it very much if you will write us in the near future your opinion regarding such a test.

"Yours very truly, Scientific Assistant."

Note: On March 2 Morse wrote Burleson much the same letter again since he had not received a reply to the first letter dated Jan. 4. Morse notes that "perhaps the letter might have gone astray" and that "Thus far all [stations] have indicated their desire to take up this test."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence with State Agricultural Experiment Stations, 1899-1928. Alabama. Box no. 1.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Scientific Assistant.

161. Morse, W.J. 1917. Re: Soy beans received in the winter of 1914 from China, Manchuria, Japan and Korea. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Jan. 4. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Mooers: During the winter of 1914

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this office received about 300 introductions of soy beans from China, Manchuria, Japan and Korea. Variety tests conducted with these introductions showed that most of them were new sorts and very few identical with each other or with previous introductions. These varieties have now been tested out at Arlington Farm [Virginia] for three years and many of them show very great promise either as hay or seed varieties in comparison with those varieties now generally grown in this country. These varieties have been analyzed for oil and protein and it seems possible to obtain excellent oil varieties for southern conditions.

"In view of the great interest now taken throughout the South with the possibilities of the soy bean as an oil seed, we think it an opportune time to begin the test of about 40 of the very best of the above-mentioned introductions at the southern stations. Our plan would be to test out a rod row of each of these, using as a check the Mammoth Yellow variety. Careful data should be kept on each variety as to yield of hay and seed and perhaps the most essential characteristics of the variety, as maturity, habit, etc. The analysis work can be arranged with the Bureau of Chemistry here, and no doubt valuable data gathered on the best oil-producing strains. For taking notes on these varieties at the different stations we have a uniform note-book which contains printed forms covering the essential points of the test. The books would be furnished each station so that records could be had by this office and also by the station.

We shall appreciate it very much if you will write us in the near future your opinion regarding such a test.

"Yours very truly, Scientific Assistant."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agricultural Experiment Stations, 1899-1928. S.C.–Tenn. Box no. 33.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

162. Mooers, C.A. 1917. Re: Soy beans received in 1914 from China, Manchuria, Japan and Korea. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Jan. 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: In reply to your letter of January 4, I will say that we will be pleased to try all the promising new varieties of soybeans that you can send us.

"You will remember that we put out in the neighborhood of 30 new varieties, that you were so kind as to send us, in nursery rows for trial the past season. Some of them were promising and will be continued this year. Are the new varieties which you mention additional to those which we have already received?

"Yours very truly, Chemist & Agronomist."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agricultural Experiment Stations, 1899-1928. S.C.–Tenn. Box no. 33.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Chemist and Agronomist, Univ. of Tennessee Agric. Exp. Station, Knoxville, TN.

163. Morse, W.J. 1917. Re: Soy beans received from China, Manchuria, Japan and Korea. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Jan. 12. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Mooers: Replying to your letter of January 9, advising that you will test out the new varieties of soy beans mentioned in my letter of January 4. I will say that I am listing your name to receive these varieties. The new varieties mentioned will include some of the 30 new varieties sent you the past season.

"I am inclosing a form of the notes which I think is desirable to take at each of the stations. This printed form is to be used in note book of 50 pages each, similar to the sorghum card inclosed. I wish you would kindly look this form over and if you think any corrections or additions ought to be made, I will be very glad to have them.

"Yours very truly, Scientific Assistant."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agricultural Experiment Stations, 1899-1928. S.C.–Tenn. Box no. 33.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

164. Morse, W.J. 1917. Re: Soybean varieties obtained by Cromer / Indiana directly from Japan. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, March 6. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "Dear Prof. Cromer: In looking over my notes taken on the soy bean variety tests at your station the past season I find reference to a number of new varieties which were obtained by you directly from Japan. I should like to obtain, if possible, an ounce or two of seed of each of these different varieties, if you find it convenient to spare this amount of seed. I wish to test them out in comparison with some of our introductions from Japan and Korea in our variety tests at Arlington Farm [Virginia].

"I should also like to obtain a one or two ounce sample of the Chestnut, Mongol, Black Champion, and Sable varieties.

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"Inclosed is a franked tag which may be used in sending this seed and which requires no postage."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agric. Exp. Stations, 1899-1923. Box 12–Illinois-Indiana. Folder–Indiana Experiment Station–#6.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

165. *International Review of the Science and Practice of Agriculture* (*International Institute of Agriculture, Rome*). 1917. International trade in feeding stuffs: Annual Review No. 3. 8(4):489-551. April 1. See p. 490-91, 502-05, 535-43. [29 ref]

• ***Summary:*** The Introduction begins: "This third *Annual Review* gives the *International Trade in Feeding Stuffs* up the end of 1916 as far as the present conditions allow, and according to the scheme established in the send Review (1).

"Two new headings have been introduced: soya and soya-cake, brewing residues; for these are given, under the heading *coefficients*, the factors used to calculate the production of concentrates on the basis of the available supply of raw materials."

The section titled "Production of concentrated foods for livestock," under coefficients (p. 491), states: "Soya cakes–For countries importing soya, the production of cakes has been estimated at the rate of 80% of the net importation."

Three tables (p. 502-04) give figures in metric tons for 1912 to 1916. The first table, titled "Trade in soya [soybeans]" (p. 502) gives figures as follows: (a) Producing countries: China (exports), Korea (exports), and Japan (production, imports, exports). (b) Importing countries: Germany, Belgium, Denmark, United States, France, Netherlands (imports and exports), United Kingdom (imports and re-exports), Russia, and Sweden. The largest exporter of soybeans in 1912 is China (661,004 tonnes), followed by Korea (98,674). The largest importer in 1912 is United Kingdom, followed by Germany, Netherlands, Denmark.

The second table, titled "Trade in soya cake" (p. 503) follows the same format with the same countries as the first table. The largest exporter of soya cake in 1912 is China (493,477 tonnes), followed by Korea (1,063). The largest importer is Japan (518,056), followed by Netherlands (23,852).

The third table, titled "Production of soya cake in importing countries" (p. 504) gives estimated figures for Germany, Belgium, Denmark, United States, France, Netherlands, United Kingdom, and Russia. The largest producer in 1912 was the United Kingdom (143,431 tonnes), followed by Germany (77,014) and Denmark (27,185).

166. *Weekly News Letter* (*USDA*). 1917. Use native soy beans. Imported soy beans are mixture of many varieties and undesirable for seed. 4(47):8. June 27.

• ***Summary:*** "During the past few months very large quantities of Manchurian and Korean soy-bean seed have been received at Pacific coast ports and distributed to some extent in different parts of the United States. Although imported mainly for industrial purposes, it has been brought to the attention of the United States Department of Agriculture that some of the seed has been offered for planting purposes at prices much below those of American-grown beans. Much of this seed is exceedingly undesirable. The farmer is advised not to plant imported seed, as disappointment with the crop will almost certainly result.

"Throughout the Orient where the beans are largely produced the seed is bought up by the merchants and stored at railway stations. No grading is attempted, the stored beans being of all varieties and mixed more or less with sand and trash. The exporters buy the beans from the merchants simply by weight, but before shipment the beans are graded only as to color of seed and cleaned. Nearly every lot contains several varieties resembling each other only in seed color.

"The United States Department of Agriculture has tested over 1,000 varieties of soy beans received from different parts of the Orient, and the majority of these are much inferior to the best varieties commonly grown in the United States. Even small lots of imported seed have been found more or less mixed, in some cases as many as 12 distinct varieties being found in one sample... Such seed sometimes produces plants ranging from 10 to 30 days apart in time of maturity.

"In the United States much attention has been given to the breeding of pure adapted varieties, and there are now about 20 satisfactory sorts on the market." Address: Washington, DC.

167. *USDA Bureau of Plant Industry, Inventory.* 1917. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from January 1 to March 31, 1914. Nos. 36937 to 37646. No. 38. 105 p. Aug. 17.

• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. (*Glycine hispida* Maxim.)

"37036-37058. From Chusan, Chosen (Korea). Presented by Rev. George H. Winn, Presbyterian Mission. Received Jan. 28, 1914.

"37036 and 37037. Soja max (L.) Piper. (*Glycine hispida* Maxim.)

"37036. 'No. 1. *Yulgochi* bean. Very hardy, will grow and produce where the ordinary beans will not amount to much.'

"37037. 'No. 2. *Kambool*. Very commonly found in the markets.'

"37038 and 37039. Phaseolus angularis (Willd.) W.F.

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Wight. Adzuki bean."

"37040 to 37055. Soy bean.

"37040. 'No. 5. Brown mottled bean; carefully cultivated and given sufficient fertilizer.'

"37041. 'No. 6. Brown. Planted around the edges of the rice fields or where there is a small corner that can be utilized, they are very hardy and will grow and produce where the ordinary beans will not amount to much.'

"37042. 'No. 7. Large white-eyed bean; carefully cultivated and given sufficient fertilizer.'

"37043. 'No. 8. Large green bean. The larger beans are all carefully cultivated and given sufficient fertilizer.'

"37044. 'No. 9. Black mottled brown bean. As a rule, the smaller beans are planted around the edges of the rice fields or where there is a small corner that can be utilized. They are very hardy and will grow and produce where the ordinary beans will not amount to much.'

"37045. 'No. 10. White mottled black bean; carefully cultivated and given sufficient fertilizer.'

"37046. 'No. 11. Ordinary green bean. As a rule, these beans are planted around the edges of the rice fields or where there is a small corner that can be utilized. They are, however, often planted in fields. They are very hardy and will grow and produce where the ordinary beans will not amount to much.'

"37047. 'No. 12. Brown mottled bean; often planted around the edges of rice fields and where there is a small corner that can be utilized; very hardy and will grow and produce where ordinary beans will not amount to much.'

"37048. 'No. 13. Large blue bean; carefully cultivated and given sufficient fertilizer.'

"37049. 'No. 14. Large black bean; carefully cultivated and given sufficient fertilizer.'

"37050. 'No. 15. Small black bean; grown around the paddy fields. It is cultivated in larger areas because it is supposed to be extra nourishing, and some seem even to suppose it has medicinal properties, but I fear there is not much to it.'

"37051., 'No. 16. The larger beans are all carefully cultivated and given sufficient fertilizer.'

"37052. 'No. 17. The red bean; carefully cultivated and given sufficient fertilizer.'

"37053. 'No. 18. Black mottled yellow. Small beans which are planted around the edges of the rice fields or where there is a small corner that can be utilized; very hardy and will grow and produce where the ordinary beans will not amount to much.'

"37054. 'No. 19. Maroon bean. One of the larger beans, all of which are carefully cultivated and given sufficient fertilizer; but this is not very commonly found.'

"37055. 'No. 20. Ordinary white bean. One of the larger beans; carefully cultivated and given sufficient fertilizer.'"

"37062 and 37063. Soy bean. From Harbin, China. Presented by Mr. Southard Warner, American consul, at the request of the American consul at Newchwang. Received Feb. 5, 1914.

"See report on the 'Soya Bean of Manchuria,' 1911 [by Norman Shaw, Dairen].

"37062. Grown south of Harbin.

"37063. Grown north of Harbin."

"37069 to 37083. From Tientsin [Tianjin], China. Presented by Dr. Yamei Kin, Peiyang Woman's Medical School and Hospital. Received Feb. 6, 1914.

"37074 and 37075. Soy bean.

"37074. '*Yüeh ya tou,* literally 'moon-tooth' bean, so called from the edge of the green peeping outside of the black thick skin like the crescent moon in the sky. Is largely used for making bean sprouts, which they say requires a bean that is not mealy or farinaceous, as that kind becomes mushy in the process of germination and has no taste left. Also is good for feeding animals, requiring to be lightly steamed before feeding, not boiled, for then the oil escapes and the flavor is lost. This kind is valued for its oil, which it contains in a great amount, and for making bean curd. This must be grown in a well-drained clay soil; black or moist earth will not do.'

"37075. '*Cha tou.* Specially used for making bean curd and bean sprouts.'"

"37077. Soy bean. '*Huang tou.* Used for making bean curd as well as starch and vermicelli.' Note: #37078 is Mung bean (*Phaseolus aureus* Roxb. [Roxburgh], *Lü tou*).

"37080. Soy bean. '*Ching tou.* Used only for the oil expressed and fodder purposes.'"

"37228 to 37325. Soy bean. From Seoul, Chosen (Korea). Presented by Mr. George H. Scidmore, American consul general. Received Feb. 17, 1914.

"'I submit the following information, which has been obtained, for the most part, from the Director of the Department of Agriculture, Commerce, and Industry, of the General Government of the Chosen. The same officer has very kindly supplied samples of 98 varieties of soy beans.

"'The usual period during which the seed is sown extends from the middle of May to about July 10. In case the sowing is postponed till the latter part of that period, the fields from which wheat has already been harvested are used. The soil is first prepared by plowing and is then shaped into small hemispherical hillocks about 4 ft in diameter. The seed is then planted in drill holes on the top of these hillocks, 6 or 7 inches being left between drill holes and 5 or 6 seeds being sown together in a hole. As a general rule, no manure or other fertilizer is used, but when it is desired to enrich the soil ashes are most commonly employed. After the plants have sprouted sufficiently, the shoots are thinned out so as to leave two or three only to each drill hole. This process takes place at the time of the first weeding. The ground surrounding the plants is gone over with a hoe or other implement two or three times to turn over the soil and to weed the field. The process outlined above gives briefly the

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method of cultivation generally in use throughout Chosen, and is applicable whether the beans are planted in separate fields by themselves or in the same fields with other crops.

"'It is used mainly for its food value, the oil, and the residue as a fertilizer after the oil has been expressed. It is valuable as a food product for both men and cattle, the latter finding it a very excellent fodder when the whole plant is used. The principal food products for human consumption derived from the soy bean are bean paste [jang, Korean miso], soy [sauce, kan jang], bean curd, meal, etc.'" There follows a long list of 98 new soybean introductions from Korea, grouped by seed color; the first four are representative of the rest:

"37228. 'A1. *Six Months.* Yellow. From South Chusei Province, Koshu district.'

"37229. 'A2. *Widower.* Yellow. From North Heian Province, Seisen district.'

"37230. 'A3. *Broad River.* From South Heian Province, Junan district.'

"37231. 'A4. *White.* Yellow. From North Zenra Province, Chinan district.'

"37232. 'A1. *Early Yellow.* Yellow. From North Heian Province, Kokai district.'

Note: This is the earliest English-language document seen (April 2021) that uses the term "bean paste" to refer to Korean soybean paste (*jang*).

Other interesting names among these 98 introductions from Korea are: *Rengyo Egg, Large-Grained White, White Rat's Eye, Rich and Virtuous, Large Date, Indigo, Bluish, Barbarian Blue, Clasped Hands, Clear Blue, Black Rat's Eye,* and *Thousand Tied.* A tally of the seeds by color shows: Yellow 35. Green 22. Gray 17. Black 16. Striped 8. Note that Yellow seeds comprise only 35.7% of the total by color. Address: Washington, DC.

168. *USDA Bureau of Plant Industry, Inventory.* 1917. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from January 1 to March 31, 1914. Nos. 36937 to 37646. Continued. No. 38. 105 p. Aug. 17.

• ***Summary:*** Continued: "37326 to 37376. From Pyeng Yang, Chosen (Korea). Presented by Rev. W.M. Baird, Union Christian College, through the American consul. Received 17 Feb. 1914.

"'Bean seeds. I have been unable to find out their characteristics. Many kinds of seeds are grown here. I was able to secure some privately; also at one of the public exhibitions I was able to secure from Honorable Matsunagi, governor of this province, who was the patron of the fair, samples of all the seeds exhibited there, but without descriptions.' (Baird.)

"37326 to 37356. Soy bean. 37326. Green. 37327. Brown. 37328. Small black. 37329. Large black. 37330. Cream with tan markings. 37331. Small black. 37332. Large black. 37333. Small green. 37334. Chocolate color, large. 37335. Cream mixed with brown and green. 37336. Chocolate color. 37337. Green. 37338. Cream with black saddle. 37339. Black with white veining. 37340. Green. 37341. Yellow. 37342. Small brown. 37343. Black and white. 37344. Small yellow. 37345. Large yellow. 37346. Black. 37347. Small brown. 37348. Small black. 37349. Yellow. 37350. Dark brown. 37351. Small dark brown. 37352. Black. 37353. Greenish yellow. 37354. Yellow. 37355. Yellow. 37356. Dark brown. There follows (37357 to 37366) ten adzuki beans of many colors.

"37395 to 37404. From Kongju, Chosen (Korea). Presented by Rev. Wilbur C. Swearer, Methodist Episcopal Church. Received Feb. 26, 1914. Quoted notes by Mr. Swearer.

"37396 to 37404. Soy bean.

"37396. 'No. 2. *Date* bean. Round brown bean. Sown during the first part of April and reaped at the end of Aug. or the first part of Sept. Cultivated about the same as the *cherry pea* [S.P.I. No. 37395], only in hills about a foot apart. None of these beans do well if planted too close together. This bean fertilizes the ground well; grows to a height of 2 ft. Pods are short and rough and contain 3 or 4 beans each. None of the soy beans are pole beans. This bean is much smaller than usual, owing to the fact that last summer there was very little rain.'

"37397. 'No. 3. *White Chestnut* bean. Round yellowish white bean. A favorite with the Koreans. Cultivated the same as the *Date* bean [S.P.I. No. 37396]. Used as food for animals and people. Appearance of vines similar to the *Date* bean.'

"37398. 'No. 4. *Big Green* bean. Round, flat, yellowish green. Sown in June and harvested in Oct., they grow 2 ft high. Cultivation similar to that of the *Date* bean [S.P.I. No. 37396]; pods are also similar.'"

"37399. 'No. 5. *Black-Eyed* bean. Small, yellowish, green bean, with black eye. Can be sown in drills; beans 2 or 3 in apart. The Koreans take these beans after they are dried and place them in water in the house and eat them after they have sprouted, sprout and all, as a vegetable.'

"37400. 'No. 6. *Rat's-Eye* bean. Small, round, black bean. Sown in the last part of April, in hills several inches apart, they grow 1 ft high. There are four or five beans in a pod. The people sometimes eat them raw, claiming they have medicinal properties. Usually they are sprouted and eaten as a vegetable.'

"37401. 'No. 7. *Black Chestnut* bean. Round, flat, black bean. Sown either in April or in June, they are fed to animals or are eaten. This bean is much smaller than usual, owing to the fact that last summer there was very little rain.'

"37402. 'No. 8. *Castor Oil* bean. So named because the Koreans think it resembles the bean of that plant. Black, with the skin cracked and white streaks showing through. This is also a favorite with the Koreans, both for animal food and for man. This bean is much smaller than usual, owing to the fact

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that last summer there was very little rain.'

"37403. 'No. 9. *Large Black-Green* bean. Round, dark-green and black. Sown in the middle of May. Cultivation similar to that of the *Date* bean [S.P.I. No. 37396]. This bean is much smaller than usual, on account of lack of rain the past summer.'

"37404. 'No. 10. *Pheasant-Leg* bean. So named because the marking on it resembles those on the leg of a Mongolian pheasant. Small, round, brown bean. Sown the last part of May, not too close together. People eat them usually after they have sprouted them in the house.'"

"37563. Soy bean. From Songdo, Chosen (Korea). Presented by Rev. W.G. Cram, the Anglo-Korean School. Received March 19, 1914. *White Manchurian soy bean."*

"37570 to 37576. From Vladivostok, Siberia. Presented by Mr. John F. Jewell, American consul. Received March 16, 1914. Seeds grown in the Ussuri district along the Ussuri Railroad; quoted notes by Mr. Jewell.

"37570 to 37574. Soy bean.

"37570. 'No. 1. Chinese bean, grown in the village of Chernigovka by P.J. Monostirniy.'

"37571. 'No. 2. Chinese bean, grown in the village of Petrovka.'

"37572. 'No. 3. Chinese bean, grown by St. Troitzky monastery at Shmakovka.'

"37573. 'No. 4. Yellow bean, *Ko-yi.'*

"37574. *'Khei.'"* Address: Washington, DC.

169. Langdon, William R. 1917. Bean and pea crops in the Hokkaido. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*) 20(193):654-55. Aug. 18. Submitted June 15.

• ***Summary:*** "The island of Hokkaido is Japan's principal producing district for beans and peas. An increased foreign demand for these products, which resulted from the war [World War I], stimulated production in Hokkaido enormously. The high prices that foreign purchasers are willing to pay for beans and peas, it is said, have created large fortunes for some of the Hokkaido growers.

"The areas under cultivation for the growing of these products in Hokkaido during 1916 were: Soya beans, 207,344 acres; small red beans, 107,539."

"Last year's production and prices: The production of beans and peas in Hokkaido in 1916 in long tons of 2,240 pounds each, by varieties was: Small red beans (*akashozo* or *adzuki*), 27,000; medium red beans (*dainagon*), 2,200; soya beans (*daizu*), 89,000...; large red beans (*kintoki*) 18,000...; total production of all kinds of beans and peas, 219,460 tons. These statistics were compiled by the local administration of Hokkaido."

A substantial increase in area cultivated to beans and peas in Hokkaido is expected next year, but the "1917 crop of soya beans in Hokkaido and the mainland of Japan is expected to be about the same as that of 1916."

"The total beans and peas for Japan proper, excluding Chosen [Korea] and Taiwan, in 1915, according to the official statistics of the Japanese Department of Agriculture and Commerce was: Soy beans, 18,848,283 bushels, valued at $16,247,118; small red beans [azuki], 4,771,183 bushels, valued at $5,002,667..."

A table shows total exports of beans and peas from Japan in 1915 and 1916. Exports of soya beans were 1,056,616 pounds worth $25,009 in 1915, and 1,715,347 pounds worth $38,823 in 1916. Address: Vice Consul, Yokohama, Japan.

170. H.W.C. 1917. Hope farm notes: Cow peas vs. soy beans. *Rural New-Yorker* 76:1008. Aug. 25.

• ***Summary:*** The author is conducting a contest between "Black-eye cow peas and Wilson Early Soy bean... to see which is more valuable as a food or manurial plant... I think the Soy bean will finally come out ahead." It stands upright and is easier to harvest. "The Soy beans are not generally eaten as food, though they can be used in various ways. As stock food they are very useful."

"They even make an artificial milk out of the bean." After the war between Japan and Russia, the "crop has made it possible for Korea and Manchuria to get on the map as respected and prosperous provinces. Just as Alfalfa has made the strip of limestone land through Central New York rich and famous, I believe the heavy culture of Soy beans will bring back prosperity to any section where the soil has begun to fail and where Red clover and Alfalfa have not done well. I do believe that dairymen and poultrymen have in this Soy bean a plant which will come close to solving the problem of providing fat and protein foods."

"This Wilson's Early Soy is a small black bean. I have carried a handful in my pocket. Whenever I meet some friend moping around with what they call a grouch, I offer him a few beans. 'Here try my new remedy for that tired feeling. Nature's true remedy for the liver; swallow them whole. Don't stop to chew!'

"In many cases people have become so used to dosing that they will swallow three of these raw beans. They do look something like a black capsule. In some instances I have met these parties a few days later and they say: 'That was fine dope you gave me. Where do you get it? I want more!' I have no doubt that a black Soy bean with full faith will do more for health than a barrel of medicine taken because one has acquired the dope habit." Address: New York.

171. *Board of Trade Journal* (*London*). 1917. Japan (Corea). Inspection of rice and soya beans for export. 99:326. Nov. 8.

• ***Summary:*** There are new regulations concerning the inspection of soya beans exported from Corea, or from one province of Corea to another. "H.M. Consul-General at Seoul (Mr. A.H. Lay C.M.G.) has forwarded a translation

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of amended regulations (published in the 'Official Gazette' of 8th September) for the inspection of rice for export to foreign countries or to Japan or for conveyance from one province of Corea to another. These regulations (Order No. 62 of the Government-General of Corea), which take effect from 1st October, 1917, are more detailed than those they replace (i.e., Order No. 4- of 1915), and provide for the grading of rice into five classes, viz.–superior, first, second, and third class, and that which does not come up to standard and the exportation or conveyance of which is consequently prohibited. The Order does not for the time being apply to the Provinces of Kogen (Kong-won) and North and South Kankyo (Hambyeng), the three divisions of the country in which the production of rice is less than elsewhere.

"H.M. Consul-General has also forwarded a translation of Order No. 63 of the Government-General, which applies to the whole of Corea and takes effect from 1st October, 1917, making regulations for the inspection of soya beans, these regulations being practically identical with those contained in the above-mentioned Order referring to rice.

"The above-mentioned translations may be consulted by British firms interested at the Department of Commercial Intelligence, 73, Basinghall Street, London, E.C. 2." Address: British Consul-General at Seoul.

172. Morse, W.J. 1917. Re: Soybean varieties and recipes. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, Nov. 8. 1 p. Typed, without signature (carbon copy). [1 ref]
• ***Summary:*** "Dear Professor Cromer: I have your letter of November 3, advising that you will send me seed of all the varieties of soy beans that matured with you–that is, of those varieties requested in the previous letter. I shall be very glad to give you the results of the analyses as it will not be contrary to the policy of the office to give such information where seed is obtained from and grown by an experiment station.

"Concerning the recipes for using soy bean flour or meal, I am taking pleasure in enclosing a few of the best ones. I might say that the Office of Home Economics has in press at the present time a publication treating quite fully on the digestibility and uses of the soy bean meal. This publication also gives a considerable number of recipes. It is quite likely that this publication will be ready for distribution before the new year.

"Very truly yours, Scientific Assistant (WJM:P)"

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agric. Exp. Stations, 1899-1923. Box 12–Illinois-Indiana. Folder–Indiana Experiment Station–#6.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Forage Crops Investigation, Bureau of Plant Industry, Washington, DC.

173. *Board of Trade Journal* (*London*). 1918. Japan (Corea). Soya beans. 100:778. Jan. 3.
• ***Summary:*** "H.M. Consul-General at Seoul writes that the 1917 crop of soya beans in Corea is estimated at 14,094,545 bushels, as compared with 14,668,197 bushels in 1916. The decrease in the crop is attributed to scarcity of rain in the spring." Address: British Consul-General at Seoul.

174. *Chemische Umschau.* 1918. Technologie: Fettgewinnung, Fettwirtschaft [Technology: Obtaining fats and oils, and their economics]. 25(5):53-54. May. [Ger]
• ***Summary:*** Soybean oil: During the years 1912-1914 England imported 192,000 tonnes (metric tons), 78,000 tonnes, and 72,000 tonnes of soybeans, and Germany imported 96,000, 106,000, and 64,000 tonnes of soybeans. In 1915, naturally [due to World War I], German imports came to an end, while English imports amounted to 174,000 tonnes. In 1913, Japan's soybean production was about 5.4 million tonnes; exports [of soybeans] from China were 624,000 tonnes and from Korea 95,000 tonnes.

175. Murray, James. 1918. The farm and farm crops: Soy beans for Quebec. *J. of Agriculture and Horticulture* (*Quebec, Canada*). June 1. p. 3.
• ***Summary:*** "The Soy Bean (Glycine soja) has not been generally recognized as adapted to climates as cool as that of Quebec and as most of the varieties on the market are only suitable for growing in warmer climates this is as it should be... we now have at least one variety which we can confidently recommend as suitable for the climate of Montreal..."

"The Soy Bean is an exceedingly important crop in Manchuria, Japan and Korea and is exported in large quantities from these countries."

"Like the ordinary bean, the soy bean is an annual that cannot be planted until danger of frost is over,–about the first of June [in southern Quebec].

"In the countries where soy beans are grown extensively they are used largely for human food... In this country where the production is likely to be on a small scale for some years their principal use will be for human food either as baked beans or in a ground condition [as flour] for making muffins, biscuits, etc. In using them as baked beans they may be used without pork as the large percentage of fat which they contain makes the use of additional fat unnecessary.

"In preparing them it is important that they be soaked over night *in a large quantity of water,* and this water poured off before they are boiled. The large quantity of water is necessary to dissolve out of them a disagreeable flavor which they possess naturally. Otherwise they are cooked in exactly the same way as ordinary beans." Note: No; they must be cooked much longer than ordinary beans.

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"In the Cereal Department of Macdonald College considerable work has been done in selecting varieties for earliness and yield, and seed of one variety that will mature here every year is now available in limited quantities. This variety is known as Quebec No. 92. To those who wish to try them the Department is willing to send samples of one pound as long as the available supply lasts."

Photos show: (1) Mature plants of Quebec No. 92 soy beans. (2) A field of soy beans in midsummer.

176. *Board of Trade Journal* (*London*). 1918. Japan (Corea). Bean crop, 1917. 101:262. Aug. 22.
• ***Summary:*** "According to a report received from H.M. Consul-General at Seoul, the bean crop of Corea for 1917 amounted to 19.366,124 bushels. Of this total soya beans accounted for 14,583,159 bushels, being a decrease of 5 per cent. as compared with the previous year.

"The official figures of the bean and pea crop of the island of Hokkaido (Japan) for 1917 have also been announced. The yield of beans was 1,016,666 koku (5,042,663 bushels), valued at yen 22,305,661, and that of peas 612,973 koku (3,040,346 bushels), valued at yen 13,307,662.

"Compared with the preceding year, the output of beans shows an increase of 549.856 koku (2,727,286 bushels), valued at yen 11,983,243, and that of peas 317,075 koku (1,572,692 bushels), valued at yen 4,962,639. (Yen = 2*s.* 0*d.* at par)." Address: British Consul-General at Seoul.

177. *Millard's Review of the Far East* (*Shanghai*). 1918. Chosen and Manchuria are prosperous. 6(1):39. Sept. 7.
• ***Summary:*** S. Minobe, governor of the Bank of Chosen, told an "interesting story of the continued prosperity and increased agricultural development of Chosen and Manchuria."

"Cotton also brought up the total of Chosen's exports [to Japan]... The export of [soy] beans, tobacco, ginseng, cocoons, livestock, and other agricultural products also increased by from 10 to 200 per cent."

"While the export of beans and bean cake [from Manchuria] to Japan was exceedingly active, American orders for bean oil reached such an enormous amount that the whole production of the country appeared hardly sufficient to meet all of them. This export of bean oil to America was carried on briskly throughout the period despite the difficulty attending transportation."

178. Winkler, Gustav. 1918. Die Sojabohne: Aus einem Vortrage... gehalten in der Hauptversammlung der Gartenbau-Gesellschaft Frankfurt a.M. am 17. April 1914. Zweite Auflage [The soybean: From a lecture... presented at the main meeting of the Gardening Society of Frankfurt am Main, on 17 April 1914. 2nd ed.]. Mainkur bei Frankfurt am Main, Germany: Published by the author. ii + 28 p. Illust. 22 cm. [4 ref. Ger]
• ***Summary:*** On the cover: "Die Sojabohne der Mandschurei [The soybean of Manchuria]. Much of this lecture (as stated on the title page) was based the following English-language article, translated into German by Werner Winkler (Gustav's son) in 1913: Shaw, Norman. 1911. "The soya bean of Manchuria." *Shanghai, Statistical Department, Inspectorate General of Customs. China Imperial Maritime Customs. II. Special Series* No. 31. 32 p.

Contents: A 2-page insert at the front. Photos show: (1) The author (with a large white beard and moustache) with a many-branched soybean plant, stripped of its leaves, mounted on a 2 x 3 foot wooden board, from his beanfield (*Winklers Bohnenfeld*) at Mainkur. This one plant grew from May 10 to Oct. 15, 6 months, producing 242 pods containing 503 completely mature soybeans. This line was acclimatized for 6 years and cultivated in the soil for 5 years. (2) The author standing and holding (with the roots facing upward) one soybean plant in each hand. In his right hand is an acclimatized soybean which produced 58 beans in 100 days. In his left hand is a plant grown from Chinese seeds of 1912-13 which produced 224 flowers and no seeds in 100 days. (3) A many-branched soybean plant, stripped of its leaves, from Winkler's beanfield, affixed to a board. Grown from Chinese seeds harvested in 1911/12. It grew from 15 May 1917 until Oct. 1, five months. 105 pods produced about 250 completely mature soybeans. From seeds that were not yet acclimatized grown on cultivated soil. (4) A similar looking plant from Winkler's beanfield. Grown from Chinese seeds harvested in 1911/12. It grew from 15 May 1918 until Oct. 15, five months. 160 pods produced about 350 soybeans. The seeds were not yet completely ripe because of bad, raw weather in 1918.

Foreword to the 2nd edition. Introduction. Diagram in the shape of a rhombus / diamond, showing how the various colored soybeans change from one color into another (adapted from Shaw 1911, p. 2). Description of the diagram: Discusses: (1) Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No. 98. 30 p. + 5 plates. May 27. (2) Hosie, Alexander. 1910. *Manchuria: Its People, Resources, and Recent History.* London: Methuen & Co. xii + 293 p. Hosie describes 3 types of soybeans: Yellow, with 3 subvarieties. Green, with 2 subvarieties. Black, with 3 subvarieties.

The rest of the contents is fairly similar to that of the 1st edition (1914), but the details within many sections are greatly expanded. On the back cover is a photo of two soybean plants attached to a board, one month after planting the seed, Summer 1917; 15 May to 15 June. In the Supplement (p. 26-28), the author summarizes the results of his 8 years of soybean cultivation in Frankfurt; he concludes that it can be grown with good results in southern Germany. Frankfurt am Main is about midway between the northern and southern tips of Germany.

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Note: This booklet is owned by the Johann Christian Senckenberg university library at Frankfurt am Main, Germany. Address: Mainkur bei Frankfurt am Main, Germany.

179. *Bulletin Economique de l'Indochine* (*Hanoi*). 1918. Les exportations de soja et de coton de Corée [Exports of soybeans and cotton from Korea]. 20(130):477. New series. Extract from Board of Trade. [Fre]

• ***Summary:*** According to the English consul in Seoul, the soybean harvest in 1917 has risen to 14,094,545 bushels (36 liters/bu), down from 14,668,197 in 1916. The drop was due to lack of rain in the spring of 1917.

180. Takenob, Y. 1918. Japan Year Book. Tokyo: Japan Year Book Office. 784 p. See p. 303, 492-93, 514, 530-31, 574, 584-85, 606-07, 611-12, 614, 691, 713, 721, 736, 782. 13th annual issue. [Eng]

• ***Summary:*** This book gives statistics for the Japanese empire: Japan Proper, Korea, and Formosa. The Preface is dated 31 Aug. 1918.

At the front of the book are 34 pages of large ads on pages enumerated with Roman numerals. At the rear of the book are 49 pages of large ads on pages similarly enumerated.

Near the front is a page of "Weights, measures, and moneys." 1 koku = 10 to = 100 sho = 4.65389 gallons (liquid) (U.S.A.) = 180.39 liters.

Page 303 shows how inflation in Japan during the great European war is making it difficult for regular families to make ends meet. The price of common foods such as "Sugar, soy, etc." has increased by 50% from June 1914 to Feb. 1918.

Page 584-85. The section on "Brewing industry" gives information about soy sauce plus production statistics for sake, beer, and soy [sauce] from 1913 to 1916.

Page 493. A table titled "Prices of principal commodities," 1914-1916 shows that the price of soja beans decreased from 11.55 yen per koku in 1914 to 10.28 yen per koku in 1916. The price of red [azuki] beans and miso also decreased. But the price of soy [sauce] increased from 24.91 yen per koku in 1914 to 25.05 yen per koku in 1916.

Page 492. A section titled "Guilds of stable commodities" lists: "The principal production guilds as classified according to the kind of commodities handled were as follows at the end of the year 1913:–Raw silk, 238; Rice, 68; Artificial fertilizers, 30; Paper, 24; Porcelain, 22; Medicines, 23; Weaving, 138; Timber, 32; Soy and miso, 31; Charcoal, 26; Matting, 20; Total, incl. others, 975."

Page 530-31. In the chapter on "Agriculture." A table shows production of soy beans, potatoes, and sweet potatoes, 1912-1916 (in 1,000 koku). Production of soy beans increased from:

3.511 million *koku* in 1912
2.993 million *koku* in 1913
3.664 million *koku* in 1914
3.807 million *koku* in 1915
3.750 million *koku* in 1916

The text immediately after the table (p. 531) states: "Among subsidiary farm crops there is perhaps nothing which plays so important a part in the Japanese kitchen as soy beans..."

Pages 573-74. A table of industrial companies classified by amount of investment states for "Soy and miso." Number of companies: 281. Paid up capital: 6.653 million yen. Reserves: 552,000 yen.

Pages 606-07 show record tax revenues in 1917-18, including 5.28 million yen from soy [sauce].

Pages 611-12. Discuss the history of taxation in Japan, including the tax on soy. The system is said to be irrational, and excises taxes applied to daily necessities, such as soy, place an unfairly heavy burden on the poor.

Page 614 repeats basic information about "6. Tax on Japanese soy [sauce]."

Page 691. The chapter on "Chosen (Korea)" states (p. 691): "Barley and soya bean.–Barley covers 584,664 cho, yielding 4.600,000 koku. Soya and other beans are exported chiefly to Japan for manufacturing soy, the export amounting to about 5,000,0O0 yen annually; the acreage is 553,077 cho and the yield 3,200,000 koku [415,252 metric tons]." Address: Prof. at Waseda Univ. and Late of the *Japan Times,* Tokyo, Japan.

181. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*). 1919. Improved seed beans for cultivation in Manchuria. 22(61):1232. March 14.

• ***Summary:*** Source: Clipping from the *Manchuria Daily News,* 21 Dec. 1918, transmitted by Consul A.A. Williamson, Dairen. The South Manchuria Railway Co. Agricultural Experiment Station "succeeded in improving the seed [soy] beans a few years ago, and has been distributing 30 to 40 koku (154 to 205 bushels) of the improved beans throughout Manchuria, and the new variety is now very favorably received. This year at Szupingkai 400 koku (2,048 bushels) were harvested and shipped to Kobe where they were so well received that advance orders for next year's crop are coming in.

"The improved variety has the advantage of containing more oil and being uniform in shape and size. It possesses a very fine luster. Furthermore, the raising of this variety is known to bring in about 15 to 20 per cent greater crop from the same area of land. At the place of production it fetches 20 sen (10 cents) more per koku than other varieties. Naturally there is now an increasing demand for the seeds of the new bean, which the experimental station is unable to supply. Some newspapers warn that the new variety is a strong rival to the Chosen [Korean] or Hokkaido beans, but the

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Manchurian beans are produced for the purpose of obtaining oil, and the new variety is specially fitted for that purpose, while the Chosen or Hokkaido beans are used for food." Note: Hokkaido, Japan's northernmost main island, has long been a leader in soybean production in Japan.

182. Holland, J.H. 1919. Food and fodder plants. *Bulletin of Miscellaneous Information* (*Royal Gardens, Kew*) Nos. 1&2. p. 1-84. April 16. See p. 11-12. [5 ref]
• ***Summary:*** Great Britain imported large quantities of soy oil before World War I to make up for the shortage of cottonseed oil needed to manufacture soaps: 875,526 hundredweight from Manchuria, 816,032 hundredweight from China, and 43,209 hundredweight from Manchuria. Note: A hundredweight is 112 pounds weight.

"Considerable interest has been taken in the cultivation in England, but results of experiments made at Cambridge, Midland Agricultural College, South Eastern Agric. College, Wye, &c., go to show that no variety so far has been found that can be relied on to produce seed here.

"In Japan and China they [soy beans] are largely known in the preparation of the sauce known commercially as 'Soy,' and they make there a preparation used as a substitute for milk, and from this a food product call 'Tofu,' which in turn forms the basis of the bean cheeses of Japan. The meal [flour] in this country is used in the manufacture of biscuits and in making a bread for special use in diabetes; but the principal use here is for the extraction of the oil of which the beans contain about 18 per cent., suitable for soap-making and in general as a substitute for cotton seed oil, the residue being a valuable cattle feed.

Also discusses the adzuki bean (*Phaseolus angularis*, Wight). "This bean appears to have been coming into the market recently in quantity. Trade samples have been submitted to Kew for name as 'Dainagon Azuki Beans.'" They are important human food in Japan, Korea, China, and Manchuria, cultivated for the purpose.

183. Fairchild, David. 1919. A hunter of plants. *National Geographic Magazine* 36(1):57-77. July.
• ***Summary:*** The story of the life and work of Frank N. Meyer, USDA agricultural explorer, including descriptions of his four expeditions. He drowned on 2 June 1918 in the muddy waters of the Yangtze River. "His first expedition in the years 1905-1908 was into North China, Manchuria, and northern Korea; his second, in 1909-1911, through the Caucasus, Russian Turkestan, Chinese Turkestan, and Siberia; his third, in 1912-15, through northwestern China into the Kansu Province to the borders of Tibet, and his last expedition in search of plants began in 1916..."

Photos show: (1) A "courtyard filled with jars in which a mixture of soy-beans, wheat, and salt is fermenting to make soy sauce. The mixture is protected from the sun and rain by cleverly woven hoods of split bamboo. Mr. Meyer made a careful study of this great soy-bean sauce industry and introduced a large number of varieties of the bean" (p. 66). (2) Frank N. Meyer with a branch of Taiyuan jujube in his hand (Shansi, Aug. 1914). He first saw orchards of this new fruit in China in 1906 (p. 76). Address: Agricultural Explorer, in Charge of Office of Foreign Seed and Plant Introduction, USDA.

184. Arnold, Julean. 1919. Commercial handbook of China. 2 vols. Washington, DC: Government Printing Office. 629 p. + 472 p. Dep. of Commerce, Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 84.
• ***Summary:*** In Vol. 1: The "Letter of submittal" from the Department of Commerce, Bureau of Foreign and Domestic Commerce, states that the Bureau "realizes keenly the desirability of an immediate, vigorous, and systematic effort to promote American trade with this great friendly nation in the east of Asia. Such an effort... must be based on the most recent and dependable economic information. To supply that information is the purpose of this handbook.

"This handbook, the most detailed publication of its kind ever issued by the Department of Commerce, will appear in two volumes." The basic organization will be by each of the 17 American consular districts.

Digital searches for "soy" or "soya" or "beans" or "bean curd" or "bean cake" or "bean oil" will result in many hits and a vast amount of information. For example:

Pages 42, 45: A table titled "Commercial statistics for China as a whole," under "Exports, sundries" includes:

"Bean cake" (pounds). For 1913. Quantity: 1,575,792,400 pounds. Value: $18,197,871.

"Bean cake" (pounds). For 1918. Quantity: 2,182,241,744 pounds. Value: $35,650,215.

"Bean curd" (pounds). For 1913. Quantity: 4,846,543 pounds. Value: $144,849.

"Bean curd" (pounds). For 1918. Quantity: 3,765,591 pounds. Value: $265,141.

"Beans" (black, green white, yellow, other kinds) (pounds). For 1913. Quantity: 1,376,795,200 pounds. Value: $16,983,422.

"Beans" (black, green white, yellow, other kinds) (pounds). For 1918. Quantity: Yellow (#1): 849,479,313 pounds. Value: $17,106,454. Values are also given for Other kinds (#2), White (#3), Green (#4), and Black (#5): 13,481,033 pounds. Value: $295,796.

"Oil, Bean" (pounds). For 1913. Quantity: 65,575,600 pounds. Value: $2,720,637.

"Oil, Bean" (pounds). For 1918. Quantity: 393,621,508 pounds. Value: $29,802,630.

"Soy" (pounds). For 1918. Quantity: 820,531 pounds. Value: $45,871.

Page 115: "Canton Consular District." "Other native industries of Canton that give employment to large numbers of people in the aggregate are:... The making of a Chinese

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sauce called 'soy,' which is made from a certain bean which as been boiled slowly and to which wheat or barley flour is added (soy is exported for the use of Chinese living abroad and also for the making of certain foreign sauces and condiments);" [such as Worcestershire sauce?].

Page 200: "Export trade:... The leading products shipped from Hongkong to all parts of the world are:... beans,...soy, tapioca flour, tea..." Pages 202-03: Trade between Hongkong and the United States during 1918. Hongkong Consular District. Value in 1913: Soy. Shipped to the United States: $51,595. Shipped to the Philippine Islands: $1,430. Shipped to Hawaiian Islands: $1,140.

In the section on "Mukden Consular District" under "Agriculture" we read: (p. 216): "Soya beans furnish material for bean oil, bean curd, and bean sprouts, besides serving as a food when boiled. Bean oil is used locally for cooking and as an illuminant; the bean oil for export is employed in soap and olive-oil manufacture, while in the mixing of paints it serves as a substitute for cotton and linseed oils. Bean cake is used as fertilizer and as food for cattle. About 70 per cent of the output of beans is annually exported, the rest being consumed locally. The annual production of bean cake and bean oil in the Mukden consular district is estimated at 433,992 and 54,279 tons, respectively.

"It is estimated that one-eighth of the beans exported are shipped to Hongkong, the Straits Settlements, and Europe, three-eighths to South China ports, and the remaining four-eighths to Japan. Of bean oil, Europe, China ports, and Japan are buyers in about equal proportions. A somewhat smaller quantity goes to the United States. Bean cake exported from Manchuria is marketed almost exclusively in Japan, Taiwan, and South China."

Page 365-66: "Amoy Consular District." Manufacturing and other industries. The Amoy Tinning Co. (Ltd.) and The China Canning Co. (Ltd.): The output of these two factories includes "soy and soy sauce."

Page 380. The section on Agriculture in Antung states: "Soya beans and their products, bean oil and bean cake, are exported, principally to Japan, Chosen (Korea), and South China ports."

Page 391. The section on Antung, Beans states: "The value of the beans and bean products exported from Antung during the year 1918 constituted 27 per cent of the total value of exports and amounted to $4,941,982. The bean that constitutes the great bulk of this export is known commercially as the soya bean and is grown practically throughout this entire district.

"The bean crop ripens earlier in the southern section of the district than in the northern but is practically all harvested in normal years by the end of September. However, because of the superior transport facilities enjoyed during the winter, when roads and rivers are firmly frozen, it is at this time that the bean harvest is assembled at the various interior towns which serve as collection centers and from which it is forwarded to Antung in the spring.

"The soya bean is exported in three forms–as 'raw beans' (natural condition), as bean oil, and as bean cake.

"The proportion of the export of beans, cake, or oil that goes to any given destination varies from year to year according to several determining factors. However, the following statement, which can only be regarded as approximate and not as exact, gives a general idea (through average percentage) of the destinations of the soya bean products exported from Antung: Beans–Japan, 76 per cent; Shanghai, 6 per cent; Chosen (Korea) 5 percent; other Chinese ports and Dairen, 13 per cent. Bean cake–Japan, 72 per cent; Shanghai, 20 per cent; Chosen, 1.8 per cent; other Chinese ports and Dairen, 6.2 per cent. Bean oil–Japan, 31 per cent; Shanghai, 36 per cent; Chosen, 21 per cent; other Chinese ports and Dairen, 12 per cent. It will be seen that Japan and Chosen (Korea) receive eight-tenths of the beans, almost three-fourths of the bean cake, and slightly more than one- half of the bean oil exported.

"Beans are exported packed in gunny bags which, when filled, weigh about 175 pounds; bean cake in the form of large, round, flat cakes weighing on an average 75 pounds; and bean oil in empty 5-gallon kerosene oil cans, two of which are packed in a wooden case.

"Most of the beans exported are doubtless milled and transformed into cake and oil on reaching their destination. Bean oil is put to many uses, but one that is of common interest is as the base of practically all table sauces. Bean cake is principally used as a fertilizer for rice and in China as a cattle food.

"The trade in beans is a highly speculative one, since the market is contingent on two factors, the bean crop and the price of rice in Japan. When it is anticipated that the price of rice in Japan will be high, brokers will buy 'forward' beans from the large Chinese firms in Antung. This form of speculation is one that has great charm for Chinese merchants, and there are few firms in Antung that do not 'take a flier' occasionally in beans."

Page 394. The section on "Antung–Import trade" states: "Four circumstances have combined to raise the city of Antung to its present importance as a port for the importation of foreign merchandise into Manchuria: (1) The completion of the Chosen Railway, which, through Chosen, connects the Yalu River with Japan; (2) the opening of Antung as a port for foreign trade in 1907; (3) the completion of the standard-gauge railway from Antung to Mukden in 1911; and (4) the erection of the 3,100-foot steel bridge across the Yalu River in the same year, by means of which the Chosen and South Manchuria Railways now furnish a through service from Fusan to Changchun. When this system of railways was completed Antung at once became the natural gateway through which all rail-borne merchandise from Japan enters Manchuria. When the one-third reduction in duty on goods imported into Manchuria from or through Chosen went into

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effect in 1913 the rail route through Antung became cheaper for the Japanese exporter than the water route through Dairen or Newchwang. This advantage of the Antung route was further enhanced when, in 1914, the South Manchuria Railway granted a special discount, amounting to 30 per cent, on 11 specific through imports from Japan via Chosen when carried over its Antung-Mukden branch."

Note: As of Jan. 2014 Antung (now known as Dandong), is in China, a prefecture-level city in southeastern Liaoning province, and is the largest Chinese border city. It is a port city on the Yalu River, which divides China and North Korea. The population is more than 1 million people.

Page 397. Antung Consular District. Exports include soy.

Page 478: "Shantung Province is the original home of the soya bean and the bean-crushing industry in this part of the world, and until the possibilities of Manchuria were discovered and developed this Province led the industry." "Manufacture of vermicelli: The principal crude native industry is the manufacture of Chinese vermicelli from a small green bean known as the 'lu tou' [mung bean]. This vermicelli is manufactured not only in large factories but also by individual farmers and in the homes of the natives in all parts of the Province."

Page 517-19: Dairen Consular District, Agriculture. The principal crops and their yield per acre: soya bean, 4.5 bushels. "The principal fertilizers are manures and bean cake (the residue after the oil has been pressed from soya beans)." "Soya beans, and the bean oil and bean cakes manufactured therefrom are the principal agricultural products exported from this district... The soya beans raised in this district are of four kinds, the yellow soya, the small green soya, the black soya, and the red mungo. They are not considered as edible beans in their natural states. Some of them are exported raw to Japan, to be manufactured either into 'soy' (a sauce largely used by the Japanese) or into bean oil (used in making soap and for various other purposes) and bean cake (largely used as fertilizer on rice and sugar-cane fields). However, the greatest proportion of the bean products are manufactured in Dairen and other parts of the Leased Territory, and the subject will be considered later under 'Industries' and 'Exports.'" Address: Commercial Attaché, Peking, and various American Consular Officers, China.

185. *Millard's Review of the Far East.* 1919. [Editorial: The soya bean]. 10(7):261-63. Oct. 18.

• ***Summary:*** This editorial, which starts on the front page of this issue, begins: "China sells to America between fifteen and twenty million dollars worth of soya-bean oil annually. Most of this vegetable oil originates in Manchuria and is used in America for various purposes, chief of which is for food purposes and in the manufacture of soaps. The beans from which this oil is derived are produced by the Chinese farmers in Manchuria. The production of the beans is the sole extent of China's interest in this great industry, the rest of the transaction being handled by the Japanese. The Chinese farmer sells his beans to a Japanese dealer and they are collected at the port of Dairen. The oil is extracted either in Dairen or the beans are sent to Japan where the process is handled. The oil is shipped to America to the port of Seattle [Washington], in Japanese boats. The financial transaction is handled through the Japanese banks. The American manufacturer using the oil hands his check for the shipment to a Japanese merchant, and the Japanese merchant in turn pays the Chinese farmer for his beans. The Japanese are to be complimented for their part in the development of this business in Manchuria which is in their 'sphere of influence.' But in complementing them we naturally stop to consider what benefit China obtains from this international trade transaction. The Chinese farmer, of course, obtains his money for the beans, but since the Japanese have a monopoly of the business, the Chinese farmer must accept the price offered by the Japanese. If the Chinese farmer desires to spend his bean money for foreign merchandise, he may purchase American products, but his opportunities for doing so are practically nil, for the simple reason that he lives in a Japanese 'sphere' and very few American firms are able to do business there.

The point to all this is that out of this great business that has grown to such remarkable proportions in the last few years, the Japanese are the real gainers though being in the strategic position of middle-man-monopolist. The great profits derived from the buying and selling of the product go to Japan. In selling his beans the Chinese farmer must deal with one buyer, a Japanese. In buying the oil the American manufacturer must buy from one dealer, a Japanese. Both China and America, the producer and the user of the article are at the mercy of a middle-man who takes his toll both ways. The American dollar does pay for the beans, but it is in the form of a Japanese yen when it is handed to the Chinese farmer. If this international transaction between China and America were normal, the American money for the beans would come back to China in the form of American machinery and other manufactured products. Thus both nations would benefit. As it stands the profit goes to Japan and because of Japan's 'special position' in Manchuria, the Chinese farmer must purchase Japanese manufactured articles or do without. If Manchuria were open territory or if the 'open door' really applied in Manchuria there would be American, British and French buyers of beans in the ports of that territory. The competition would always assure the Chinese farmer a good price for his beans. On the other hand the American manufacturer who needs the vegetable oil, would have the advantage of buying from several dealers and he would not be at the mercy of a middle-man who dictates the price.

"These practical facts should demonstrate to both America and China the importance of keeping the trade route

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open. There is absolutely no reason or desire to exclude Japan from the transaction, but that country should enjoy no advantage that the ability of her merchants in open competition with other world traders are not able to earn on their merits.

"The trouble with Japan is that she desires to dominate the Orient both economically and politically for her own private advancement and She desires to dominate China in order that the resources of this country may become subject to her and on the other hand she desires to force other nations to come to Japan and submit to her monopoly in order to obtain China's raw products for western mills or to sell these products in China. This is Japan's policy in respect to the Asiatic mainland whether it is in Siberia, Korea, Shantung, Fukien, or all China. Wherever Japan's foothold is established others must get out. She develops the country, but it is in her own sole interest. The Chinese or Korean merchant in a Japanese 'sphere' has no chance. The citizen hasn't even the opportunity of attending a Japanese school established in that territory. They are for Japanese only. The Japanese policy is exactly the opposite of American policy in the Philippines where the Filipino has all the opportunities for education and trade. The Japanese in contending for a Monroe Doctrine for Asia, overlook the fact that all nations, Japan included, enter South and Central America on an even footing with the United States.

"If more evidence is needed of Japan's determination to Koreanize China, it may be found in her post offices all over this country. Wherever the Japanese go in China they take a Japanese postal staff with them."

"One possible explanation of why the Japanese have always tried to have their own post offices in all parts of China is that they want to transfer messages and parcels of a confidential nature from their agents to Tokyo without the knowledge of the Chinese authorities."

186. *Kangyo Mohanjo Kenkyu Hokoku* (*Bulletin/Research Report of the Industry Model Station*). 1919. Gaichu ni kansuru chôsa [Researches on injurious insects]. No. 2. 82 p. + plates. (Suwon, Korea). [Jap]*
• ***Summary:*** An English-language summary states that this report describes the life-histories of, and preventive measures for dealing with various insects in Korea. "*Serica* sp. occurs once a year, the adult beetles occurring from April to June. It hibernates in the larval stage or occasionally as an imago. It attacks barley, tobacco, cotton, hemp, soja bean, cabbage, peach and mulberry."

187. *USDA Bureau of Plant Industry, Inventory.* 1919. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from January 1 to March 31, 1916. Nos. 41685 to 42383. No. 46. 97 p.
• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ.

"42058-42065. From Keijo, Chosen (Korea). Presented by Miss Katherine Wambold. Received February 28, 1916. Descriptive notes by Miss Wambold.

"42059. *'Kong.* Cooked, pressed, hung all winter to rafters, then soaked in a brown liquid called *chang,* used as a salty sauce on food. It is parched then eaten. A few partly cooked grains are often scattered in the rice, as we use raisins in a rice pudding." Address: Washington, DC.

188. *Market Reporter* (*The*) (*USDA*). 1920. Price of soy beans advances in Japan. 1(2):32. Jan. 10.
• ***Summary:*** The droughts during the summer damaged soy-bean crops in Manchuria and Chosen [Korea]. "Spot cargo is still quoted at 9.4 to 9.5 yen per picul of 133.33 pounds (about $0.036 per pound). Forward quota range up to 9.64 yen per picul ($0.037 per pound).

"Old crops are much preferred by buyers because they are of a better quality, and, although they are quoted at higher figures, their sale is brisker than that of the new crop. The soy-bean oil trade is dull and inactive, as European buyers do not buy and only consignments to the United States are now being made from Dairen." Address: Bureau of Markets, Washington, DC.

189. Parry, Charles A. 1920. Parry, Charles A. 1920 Travel sketches, LXXXIII–Bean that made Manchuria famous: A factory at Shimizu–The bean of many qualities. *Japan Advertiser* (*Tokyo*). *Jan. 25. p. 7.* Jan. 25. p. 7. [Eng]
• ***Summary:*** Contents: Introduction. Sweet and nasty. "Not now." The tea port. History of a bean. Substitutes. Big business. Japanese place names. On 26 Nov. 1919 the author traveled by train from Tokyo to the port city of Shimizu, on Suruga Bay, in Shizuoka prefecture (about 90 miles southwest of Tokyo). "Shimizu is one of the 36 treaty ports, and it was opened along with now fewer than 26 others, in 1899. The name means 'clear water'... My chief object in coming to Shimizu is to visit the Suzuki Company's Bean Oil Factory, for which I have obtained permission by courtesy of the Japan Tourist Bureau. This consists of several large buildings, erected three years ago, including a central office and two mills which being built in a castellated Gothic style, make a picturesque adjunct to the scenery as they rise by the calm waters of Shimizu Bay. The mills deal at present with two only of the many products of the wonderful manchurian [sic] or soy bean, called in Japanese daizu (glycerine [sic, Glycine] hispida) the crushed bean and the oil." The two mills are capable of treating 300 tons of beans per day. The process is secret. "I am informed that factories for the extraction of this oil exist only in Japan and Manchuria; but the Suzuki Co. has a branch office in New York, and the business is rapidly extending."

"The oil is used for frying, for lubricating, for water-proofing clothes, for medicine, as a butter substitute, and in the manufacture of soap, candles, guncotton, and artificial

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rubber; though it can hardly yet be said to be on the market." For culinary purposes it is not as good as the ordinarily used goma (sesame) oil, being much lighter and requiring the use of a deep saucepan. Yet it costs only about 62% as much as sesame oil; the latter costs ¥1.60 per sho (1.58 quarts).

"At present its chief use is for making soap, for which it is taken at a less refined stage, of a dark brown color while the finished product is light yellow. The oil is at present little used in Japan because little known; its retail sale seems to be limited to the neighborhood of the factories. Of these there are three, the two others being at Yokohama and Kobe, both established only last year.

"One large shed is devoted to storing the crushed beans (*kasu*) after the oil has been extracted, large piles of which lie about... The chief use of this at present is for cattle-food; but it is now to be manufactured into flour, useful for mixing in various proportions with wheat flour."

"The daizu [soy] bean has long been known in Japanese cookery in the form of 'kiriako' [sic, kinako] ('yellow powder') to make which the entire bean is slightly roasted and pulverized; then used for mixing with flour to make light cakes, for giving savor to boiled rice, etc. The prices are not yet determined, the cost of manufacture not being known; but it will be cheaper than flour, as well as more nutritious, and will help to relieve the scarcity of rice.

"Substitutes: Other products of the bean are: tofu, the white bean-curd, used universally in Japan and, until recently, almost absurdly cheap; also used in the forms of age-dofu (fried in cottonseed oil), yake-dofu (baked) [yaki-dofu (grilled)], and the curious gori-dofu [kori-dofu], 'frozen tofu,' also called koya-dofu (from koya-san), tofu sprinkled with hot water, frozen, dried, and cut into small cakes; miso, the cheap condiment made of daizu beans fermented with yeast and barley; and soy, Japan's only sauce. A later addition to the list has been to-nyu, or tofu-milk [sic, "bean milk], a very passable substitute for cow's milk at half the price; and still more recently tofu-butter. The whole bean, parched and boiled, is an excellent coffee-substitute, yielding when parched just to the right degree, much of the aroma of that fascinating drink without any of its deleterious effects."

Note 1. This is the earliest English-language document seen (Aug. 2013) that uses the word "to-nyu" or the term "tofu-milk" to refer to soymilk; the Japanese word is *tônyû*.

Note 2. This is the earliest English-language document seen (April 2013) that uses the term "gori-dofu" or the term "koya-dofu" to refer to dried-frozen tofu.

"The present demand for been cake in Japan is met by the three factories of the Suzuki Co. that at Shimizu supplying central Japan, Yokohama Northern and Kobe Southern.

"There are several varieties of the bean known as white, yellow green and black, the first two being the most used. The plant is as yet little grown in Korea and Japan.

"Big Business: The Shimizu factory, which is the largest of the three, employs about 300 workpeople on day and night shifts. This new bean-industry is, however, only the latest among many activities of the Suzuki Co. which ranks among the great industrial concerns of the world, the third largest in Japan, standing next to the Mitsui and the Mitsubishi, and employing a total of over 3,000 clerks and 100,000 workpeople. It deals also in rice, wheat flour, sugar, sake-brewing, coal, timber, metals, camphor, wool, cloth and manure besides numerous small lines. It has three dockyards, at Harima, Toba and another; a coal-mine in Kyushu; copper mines at Hibi (Okayamaken) Hiroshima (Yamaguchiken) and Dairi (Fukuoka ken) also mines of zinc and iron; while its steel works (*seikojo*) at Kobe are the largest in Japan."

"Shimizu is well situated for growth being midway between the ports of Yokohama and Yokkaichi and serving a prosperous hinterland. Its chief exports are tea and oranges and its imports coal and timber." Address: Japan.

190. Kline, Charles E. 1920. Oil-bearing seeds and nuts in the Shanghai District of China. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*) 23(98):519-22. April 26.

• ***Summary:*** The chief plants yielding vegetable oils in China are [soy] beans, cotton seed, peanuts, rapeseed, sesamum seed, tea seed, and woodnuts (filberts).

The number of oil mills in China is increasing, and those in northern China treat mainly soya beans, while those in central China produce the other varieties of oil mentioned. The oil mills do not work year round, since there is not sufficient seed available, and also since the high summer temperatures cause the oil to become rancid.

The total capacity of oil mills in Shanghai is 5,400 piculs/day (321 tons/day).

Tables show: (1, p. 520) The quantities of oil, oilseeds, and oil cake exported from the port of Shanghai during the years 1917 and 1918. 1 picul = 133.33 lb. For [soy] bean oil: In 1917–2,351 piculs worth $26,482. In 1918–5,771 piculs worth $71,601. For [soy] bean cake: In 1917–11,213 piculs worth $27,246. In 1918–282 piculs worth $800.

(2, p. 520) The quantities of oil and cake exported from China to the countries of destination; the year (or years) is not given. Both the weight (in piculs; 1 picul = 133.33 lb) and value (in dollars) are given for each destination. In descending order of weight exported:

[Soy] bean oil–United States (incl. Hawaii) 2,136,746 piculs. Japan (incl. Formosa [Taiwan]) 87,673. Korea 23,611, Russia 19,802. Canada 4,001. France 2,132.

Note: This is the earliest document seen (May 2014) that gives statistics for trade (imports or exports) of soybeans, soy oil, or soybean meal with Taiwan.

[Soy] bean cake: Japan (incl. Formosa) 15,150,706 piculs worth $33,383,750. Korea 635,362 piculs worth $1,292,174. Russia 578,960 piculs worth $968,829. Siam

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1,412 piculs worth $4,625. United States (incl. Hawaii) 27 piculs worth $54. Canada 9 piculs worth $17.

(3, p. 521) Ocean freight rates from Shanghai to various ports. Figures are given for bean oil and bean cake in 1917, 1918, and 1919 shipped to San Francisco [California], London, and Marseille, Naples & Venice (Italy). Present prices (total) are about five times as great as those at the beginning of the war. Address: Vice Consul, Shanghai [China].

191. Kirjassoff, Max D. 1920. Vegetable-oil-bearing materials of Manchuria. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*) 23(161):180-85. July 10.
• ***Summary:*** Contents: Introduction. Manchurian production of soya beans–exports of soya beans and products. All materials produced by cultivation–local consumption. Marketing raw materials–inspection–shipments. Methods of purchasing raw materials–brokerage. Storage–transportation methods and costs. Prices paid producers–economic conditions of farmers. Crushing of raw materials–prices paid at crushers. Production capacity of oil mills–types of mills and methods of operation. Quality of oil produced–production of bean oil and cake at Dairen. Fuel used in mills–activity of mills. Number of employees–wages. Marketing of products–Dairen exports of bean cake and oil. Prices of bean oil and cake. Ocean freight rates–export charges, insurance, etc. Increased United States demand–market for oil machinery.

"The oil-bearing materials produced in Manchuria are soya beans, perilla seed, peanuts, hempseed, castor beans, sesame seed, flaxseed, sunflower seed, and rapeseed." Estimates indicate that "about 1,500,000 tons of soya beans are produced in South Manchuria and about 800,000 tons in North Manchuria, or a total of 2,300,000 tons for the whole Province."

Tables show: (1) Exports of soya beans, bean cake, and bean oil each year from 1914 to 1919 (p. 180). (2) Exports of bean-cake each month from Oct. 1918 to Sept. 1919 from Dairen (Manchuria) to Japan (by far the largest), United States, Straits Settlements, China, Korea, and total (p. 184). (3) Exports of bean-oil each month during the same time to Japan (by far the largest), Europe, United States, China, Korea, and total. (4) The prices (in silver yen per picul or piece of cake) of beans, cake, and oil during the same period. Mentions the increasing demand for the oil in the United States. Address: Consul, Dairen [Manchuria].

192. Dill-Crosett Inc. 1920. Beans: Importers, exporters, factors in (Ad). *Bean-Bag* (*The*) (*Lansing, Michigan*) 3(2):35. July.
• ***Summary:*** A ¼-page ad. They handle 10 varieties of California beans and 16 varieties of Oriental (Japanese and Korean) beans including Daifuku, Kintoki, and Soya. Also peas. Address: 235 Pine St., San Francisco, California.

193. *Board of Trade Journal* (*London*). 1920. Korea. Estimates of soya bean and millet crops. 105:609. Nov. 18.
• ***Summary:*** "H.M. Consul-General at Seoul, in a recent report to the Department of Overseas Trade, states that according to an official estimate of the soya bean and millet crops in Korea for the current year, the yield [production] is expected to amount to 25,062,230 bushels, and 31,976,295 bushels respectively." Address: British Consul-General at Seoul.

194. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*). 1920. Review of Far Eastern commercial press. 23(292):1124. Dec. 13.
• ***Summary:*** "Soya bean and millet crops in Chosen (Korea): An official estimate of these two crops for the current year, according to the *London and China Telegraph*, places the production of soya beans at 25,062,230 bushels and of millet at 31,076,295 bushels."

195. Choson Unhaeng. comp. 1920. Economic history of Manchuria. Seoul, Chosen: Bank of Choshin. x + 303 p. Illust. Portraits. Folded color map. 20 cm.
• ***Summary:*** A digital version of this book is available on HathiTrust. The word "soya" appears on 19 pages: p. 146 (7 times), 137 (5 times), 138 (4 times), p. x, p. 142, 145 (3 times), p. 72, 138, 140, 148, 216, 303 (2 times), p. vi, 18, 52, 124, 134, 144, 217 (1 times each).

In the chapter on Agriculture (p. 124-60), the long section on "Soya beans" appears on pages 137-148. In this section the terms "bean cake" and "bean oil" appear many times. A large table (p. 147-48) shows the export of soya beans, [soya] bean cake, and [soya] bean oil from Dairen, Newchwang, and Vladivostok from 1908 to 1917.

The term "bean cake" or "bean cakes" appears on 26 pages: p. 144 (4 times), p. 18, 19, 142, 183, 184 (3 times), 20, 28, 140, 143, 186, 187, 215, 216, 218 (2 times), p. vii, 137, 138, 147, 148, 177, 186, 219, 224, 294, 299 (1 time each).

The word "soy," referring to soy sauce (Japanese shoyu) appears only on p. 142, where we read: "(6) Uses of Beans, Bean Cake, and Bean Oil in the Far East: (a) Beans: Perhaps the Japanese are the greatest consumers of beans in the world as an article of diet. Every morning they take soup made of miso which is prepared from beans. For the seasoning of their food they seldom use salt, using instead bean sauce, the chief ingredients of which are beans and salt. Thus the Japanese eat beans in one form or another at least three times a day. An extensive use is also made of beans by the Chinese, who make them into the Chinese paste *chiang* which they habitually eat with fish, meat, and vegetables. But the more

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expensive Chinese soy, which corresponds to the Japanese shoyu, is only used by wealthy families and restaurant keepers, and is not consumed by the very poor. Another product of beans which is widely used in both Japan and China is tou-fu [tofu, doufu] or bean-curd."

"(b) Bean oil is used extensively in cooking. Although it is inferior to rape and sesamum oils for this purpose, these oils cannot compete with it in point of price; the recent advance in price, due to the foreign demand, may however–if sustained, as seems certain–go far to change the positions of the oils relatively to each other. In spite of its unpleasant characteristic odour and unpalatability, the poorer classes in China consume it in its crude state, but among the rich it is boiled and allowed to stand until it has become clarified.

"As a lubricant bean oil is used for greasing axles and parts of the native machinery in use in the arts and crafts. Other uses in South China are for the making of waterproof cloth, and paper umbrellas and lanterns, and the oil is also mixed with lacquer for the manufacture of varnish and printing ink.

"(c) Bean Cake: Bean cake, which is but the residue after the oil has been expressed from the beans, was of comparatively little value to the Manchurian farmers, who used to feed their stock with it, before the discovery of its great value as a fertilizer. First in the sugar plantains in the provinces of Fukien and Kwangtung [southeast China], and then in the plantations in Java and the South Sea Islands, it was used as a fertilizer, and for centuries it has been an important article of trade with those places. But the great importance it has since attained in Manchuria's foreign trade dates from the conclusion of the Sino-Japanese War, when it began to be exported to, Japan for use in the paddy fields there. Soon it was found that it possessed fertilizing qualities superior to those of the fish manure of past ages which, containing too high a proportion of oil for the purpose for which it was used, was liable to breed insects hurtful to the crops, and so great grew the demand for it in Japan that the relative position of the oil and the cake was changed at one time, the cake becoming the principal product and the oil a by-product, though the tendency now is for the oil to regain its former position, owing to the growing demand for it in the Western markets. The results of the analyses made of bean cake in three different places show the following chemical composition." Analyses were conducted by: (1) Government laboratory, Japan. (2) Agricultural Institute, Scotland. (3) South Manchuria Railway Co. Composition: Water 11.0 to 15.3%. Albuminoids [proteins] 42.1 to 45.2%. Fat 5.2 to 9.6%.

"The Chinese farmer does not yet use bean-cake in his rice field, and in Manchuria it is only used for vegetable-growing. Thus Japan owes much to Manchurian bean-cake for the productiveness of its naturally sterile soil.

"As cattle feed bean cake is used in Manchuria for horses and mules–only, however, when very hard work is being done, and is mixed with bran and *kaoliang* stalk. Its use as cattle feed in Japan still belongs to the experimental stage. Two novel uses of soya beans have been discovered by Mr. Suzuki of the Central Laboratory of the South Manchuria Railway Company. The one is the making from it of a new sort of paint, named Solight, and the other, a chemical composition called Tantalse, which imparts its waterproof characteristic to the cement, mortar, or concrete with which it is mixed, or to paint upon which it is applied. The merits of Solight are enumerated thus: it may be applied as it is; it dries quickly, that is in about half an hour; it has no bad odour like paint; its easy combination with any color; its cheapness.

"Beans are also used in soap-making, and there are already several soap factories in Dairen which use beans as the chief material. The uses of beans are studied by many Japanese institutions and individuals, and many new discoveries have been made; indeed there seems to be no end to their uses."

196. Dep. of Finance (Okurashô). 1920. Financial and Economic Annual of Japan (20th). Tokyo, Japan: Government Printing Office. 199 p.

• ***Summary:*** The section on "Food problem, adjustment of prices, etc." (p. 6) begins: "Amidst this general activity of economic market, the balance of trade for the first time since 1915 was returned against Japan, and it seemed as if a dark, ominous cloud appeared in the horizon. In practice, however, the economic circles, spoiled by continued prosperity, did not take heed of this warning, but persisted in viewing the situation through rose-coloured spectacles. Speculative mania, luxury in living and abnormal rise of new enterprises were [the] order of the day, together with further advance in prices of commodities" [inflation]. The price of rice rose so high there were rice riots last year. "In November an Imperial ordinance was issued to exempt till November 1920 soy beans, raw beef, eggs and cotton fabrics and yarns from import duties, and also to restrict the export of cotton yarns."

Table 1 (p. 8) gives statistics on the tax on soy [sauce]. In 1920-21 it is estimated to be 5.83 million yen, compared with an estimated 5.25 million yen in 1919-20. This is an increase of 79,685 yen.

Table 3 (p. 14-15) gives the Japanese government revenue from the tax on soy sauce each year from 1907-08 (5.47 million yen) to 1920-21 (estimated 5.83 million yen).

In the section "Tax on liquors" we read (p. 20): "VI. Soy [sauce] tax: The tax is levied at the following rates upon persons manufacturing soy (Japanese sauce): -

"Soy yen 1.75 per koku of Moromi.

"Tamari yen 1.65 per koku manufactured.

"In 1900, the tax on soy for household use was created, the rates of which range from sen 50 to yen 4 according to the amount of manufacture. No person whatever is permitted to manufacture for household use more than five koku of soy

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per annum."

Page 24: "In view of the advance of prices and the consequent unrest as to living, such daily necessaries as soy beans, raw beef, eggs, cotton yarn and cotton fabrics were further placed on free import list, effective till November 30th, 1920."

Table 19 (p. 46) gives annual area (in *chô*) and production (in *koku*) of soy beans (and of "small red beans" [azuki]) from 1909 to 1918. (Note: 1 *koku* = 44.8 gallons = 180 liters. 1 *chô* = 2.45 acres = 0.992 hectares. 1 *kwan* [*kan*] = 8.72 lb). Sample figures were as follows:

1909–479,771 *chô* and 3,766,962 *koku*.

1913–475,284 *chô* and 2,993,095 *koku*.

1918–482,207 *chô* and 3,451,820 *koku*.

Table 33 (p. 62) gives the index number (relative amount) of wages by profession. A "soy-maker" earns 155.6, which is about average among food and drink workers.

A table (p. 67) gives the amount of various manufactured goods made in Japan from 1909 to 1918. The amount of Soy [sauce] increased from 2,197,708 *koku* in 1909 to 2,630,498 *koku* in 1918.

Table 53 (p. 94) gives the value (in yen) of "Chief commodities exported" from 1906 to 1919. For Soy [sauce] the export value increased from 952,840 yen in 1906 to 968,819 yen in 1919.

Table 54 (p. 96-97) gives the "Value of chief commodities imported" (in yen) from 1906 to 1919. For Soja-beans the import value increased from 9,018,173 yen in 1906 to 22,042,824 yen in 1919.

Table 56 (p. 102) gives the "Value of chief commodities imported from various countries" (in yen) from 1913 to 1919. For Soja beans in 1913 the value of imports were: From China: 3,828,508 yen. From Kwantung [Guangdong] province (in southern China): 2,988,212 yen. From Asiatic Russia: 326,874 yen. From other countries: 80 yen. By 1919 Kwantung province was by far Japan's biggest source (14.7 million yen), followed by China. Asiatic Russia, and Other countries.

Table 73 (p. 140) gives the prices of principal commodities from 1912 to 1919. During this period, the price of

Soja beans increased from 10.49 yen per *koku* to 20.81 yen per *koku.*

Red beans [azuki] increased from 14.49 yen per *koku* to 36.60 yen per *koku.*

Soy [sauce] decreased from 88.18 yen per *koku* to 40.61 yen per *koku.*

Miso increased from 0.44 yen per *kwan* to 1.02 yen per *kwan.*

Seed-oil [mainly rapeseed] increased from 46.34 yen per *koku* to 105.24 yen per *koku.*

Oil-cake [mainly rapeseed] increased from 2.72 yen per 10 *kwan* to 5.70 yen per 10 *kwan.*

Table 74 (p. 141) gives the index number of prices of commodities from 1912 to 1919; the index number for each commodity in 1912 is 100. During this period, the price of

Soja beans increased in price by 98%.

Red beans [azuki] increased by 158%.

Soy [sauce] decreased by 68%.

Table 75 (p. 141) gives the prices of principal commodities in Tokyo from 1909 to 1918, including Soja beans, red beans, and soy [sauce].

Table 76 (p. 143) gives the index numbers of prices of commodities in Tokyo from 1909 to 1918.

Miso increased by 182%.

The section on Chôsen [Korea], under "Agricultural products" states (p. 174): "Chosen is a wholly agricultural country, and farming is its most important industry. The fields of Chosen are almost always cultivated on a small scale and are owned by the Yan-pan and richer classes. Rice is the staple agricultural product, followed by barley, Italian millet, soy beans, wheat, and red beans. There are also such special products as cotton, tobacco, hemp, and ginseng. The cultivation of fruit-trees has of late produced very good results; and the area of their cultivation is gradually extending. Silk culture which had hitherto been in a very poor condition, is now, in consequence of official encouragement, being carried on everywhere. Both these are engaged as subsidiary industries by the agricultural class. Live stock is also raised as a by-product of agriculture, and cattle, horses, goats, and pigs are found everywhere in the country; but stock farming is not pursued as an independent enterprise. The cattle are well known for their great size and good quality; and a large number of them are annually exported to Japan Proper and Asiatic Russia."

Note: According to Piper & Morse (1923, p. 13) a table in this document (which we cannot find) gives five-year averages of acreage, production and yield of soybeans in Japan for the following years: 1897-1901, 1902-1906, 1907-1911, 1912-1916, and 1917-1919. The average annual production of soybeans is about 18 million bushels, grown on 1.1 million acres, with a yield of 15-16 bushels per acre. Address: Japan.

197. Hunnicutt, Benjamin Harris. 1920. Instruccoes praticas para a cultura do feijao soja [Practical instructions for the cultivation of soybeans]. Rio de Janeiro, Brazil: Ministerio da Agricultura, Industria e Commercio. Servico de Informacoes. (Papelaria e typographia Villas Boas & Co.). 7 p. Printed in Rio de Janeiro by Papelaria e Typographia Villas-Boas & c. [Por]

• ***Summary:*** This booklet begins: For the production of grain / seed, beans are the most important legume that are adapted to temperate climates. In view of its value for forage or for oil and for human consumption, its cultivation is destined to become very broad in Brazil.

Agricultural history.–Soybeans are very old in Japan, Korea and Manchuria, where there is no more plant in the

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wild. In these countries it is used as human food and for the extraction of oil Soy beans were introduced in the United States in 1829, but their culture did not attract attention until 1854. The variety Mammoth was introduced in 1882 and, since then, there has been more interest in the planting of that legume. Address: Prof., Director, Escola Agricola de Lavras.

198. Takenob, Y. 1920. Japan Year Book. Tokyo: Japan Year Book Office. 810 p. See p. 528, 545, 604, 635, 711, 744. Tenth annual issue. [Eng]

• ***Summary:*** The full title of this book is: "The Japan Year Book: Complete cyclopedia and general information and statistics on Japan and Japanese territories for the year 1920-21."

This book gives statistics for the Japanese empire: Japan Proper, Korea, and Formosa.

Page 545. In the chapter on "Agriculture." A table shows production of soy beans, potatoes, and sweet potatoes, 1914-1918 (in 1,000 koku). Production of soy beans increased from:

3.664 million *koku* in 1914
3.807 million *koku* in 1915
3.750 million *koku* in 1916
3.695 million *koku* in 1917
3.451 million *koku* in 1918. Address: Prof. at the Waseda Univ. and Late of the *Japan Times*.

199. Meekins, Lynn W. 1921. Favorable outlook for American trade in Manchuria. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*) 24(41):983-93. Feb. 18. See p. 989-91.

• ***Summary:*** "The South Manchuria Railway Co., the largest purchaser of American products, proposes to spend more than $200,000,000 gold upon improvements and extensions of its enterprises within the next five years... In spite of Japan's special advantages in Manchuria there is an excellent opportunity for the marketing of many lines of American goods,..." Manchuria is made up of three provinces having an area of some 365,000 square miles.

"American trade with Dairen–Dairen versus Vladivostok: The share of the United States in the trade of Dairen is much larger than that shown by the Maritime Customs statistics, owing to the extensive shipments of goods to and from the United States credited to Japan as the country of immediate destination and origin. The direct trade between Dairen and the United States exceeded $38,000,000 in 1919, of which imports [to Dairen] comprised two thirds and exports one third."

"As between Dairen and Vladivostok, at present a greater risk is involved in using the Vladivostok route. Costs of handling cargo at that port are higher than at Dairen; there is no market at Vladivostok itself for produce shipped there, wharves and warehouses are inadequate, and shipping services are irregular. Until these conditions are improved Dairen will probably continue to handle most of the exports of Manchurian products, as well as the imports of American goods for sale in Manchuria.

"If Vladivostok were made a free port and provided with facilities which Dairen now enjoys, full advantage could be taken of it as a real open door to Manchuria. Vladivostok, rather that Dairen, offers the more promising outlook to American firms seeking non-Japanese business in Manchuria and eastern Siberia."

"It is estimated that 2,500,000 tons of soya beans are produced annually in the three Provinces of Manchuria. The wheat and millet crops generally approximate 1,000,000 tons each. The Japanese firm of Suzuki & Co. has sold 100,000 tons of Manchurian wheat to the United Kingdom and 50,000 tons to Italy during the last few months."

"The products of the soya bean include bean curd [tofu], flour, milk, cheese, soy sauce, oil, and cake. The Chinese are concerned chiefly with the food products mentioned and the Japanese use large quantities of the cake for stock feed and fertilizer. The United States is the principal purchaser of the oil, a substitute for cottonseed and linseed oil employed in the manufacture of soap and paint and also as a lubricant."

"How bean trade is conducted: In Tiehling and Sunkiatai (Fengtien) and Kwanchengtze (Kirin) there are about 300 Chinese wholesale bean companies whose capital averages from $100,000 to $200,000 Mukden currency. Four Chinese banks–the Bank of China, the Bank of Communications, the Government Bank of the Three Eastern Provinces, and the Hsing Yeh Bank of Mukden–negotiate loans upon the joint guarantee of two of these companies without security; other Chinese banks require in some cases that the beans be pledged. Such loans are for three months or six months, sometimes one year, and the rate of interest has been less that 10 per cent. The Japanese banks lending money to bean dealers are the Yokohama Specie Bank and the Bank of Chosen [Korea], the former issuing Newchwang notes and the latter gold notes. It is estimated that between 60 and 70 per cent of the loans made by the Japanese banks is to Chinese and between 30 and 40 per cent to Japanese companies.

"The bean business may be said to commence in September, when buyers visit the producing districts and pay from 10 to 20 per cent of the stipulated price in advance. To the towns mentioned above, from 1,000 to 2,000 cartloads of beans are brought daily from November to January. The average price during the past two years has been $2 Mukden currency per 27 catties (36 pounds), exclusive of the production tax and the cost of transportation to Dairen and Newchwang. Mukden currency–that is, small coin dollars–exchanges for Mexican dollars at an average value of $1.40 to $1. At the present rate they are equivalent to about 40 cents in United States currency.

"Owing to the lack of good roads in Manchuria the

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beans must be carried to the market centers during the winter months, when the fields and streams are frozen. By March the crop has been collected and stored and exports become most active.

"Through the system of mixed storage, the South Manchuria Railway Co. has effected a great improvement in the handling of beans. When brought to the railway stations the beans are examined and graded according to quality and size. A certificate issued to the depositor entitles him to draw from the mixed-storage depot at Dairen or Newchwang an equivalent amount of beans of the same quality and size. The bags used in packing are also examined, and when the grade of bags deposited and that of the bags delivered is different the loss or gain thereon is adjusted by paying to or collecting from the depositor the difference in value. The new system saves the railway the trouble of transporting and storing each consignor's cargo separately. It also saves the shipper from the risks attending delay in transportation and from searching for his goods after they have arrived at their destination.

"Production of oil: The 60 bean mills at Dairen produce daily nearly 400 tons of oil and 3,700 tons of cake. Newchwang and Harbin are next in importance as oil-mill centers. The most widely used method of production is the expression system, by which one picul (133.33 pounds) of beans yields about 12 pounds of oil and 122 pounds of cake (in two equal pieces of 61 pounds each). By the chemical extraction system one picul of beans yields an average of 17 pounds of oil and 116 pounds of meal. The specific gravity of the oil is from .922 to .930.

"Sapan-wood, hemp seed, sesamum, and bean oil are being used by the Manchuria Paint Factory in Dairen, organized in February, 1920, with a capital of 1,000,000 yen, to manufacture paints for the South Manchuria Railway Co. and for various markets. The daily output is about 7,000 pounds, or 250 tins containing 28 pounds each. The colors produced include white, 'iron rust' red, and brown.

"The Japanese initiated the export trade in soya beans from Manchuria and developed the business to its present proportions. These middlemen, conversant with oriental ways, studied occidental needs and learned enough about western business methods to deal successfully with American and European firms. their strong position is due to their control of railways, their banking connections, their oil mills, and, in general, their special organization in South Manchuria for handling the business. Eventually it may be possible by exporting beans and oil through Vladivostok for Chinese sellers and American buyers to deal directly with each other. Meanwhile the most effective methods to be employed involve the development of selling and buying organizations able to cope with the situation now existing."

"About two thirds of the population of Manchuria is in the Province of Fengtien, which composes, in general, South Manchuria." Address: Trade Commissioner, Peking.

200. Suzuki, Keiko. 1921. Daizu no shihan ryû o shôzuru genin ni tsuite [Studies on the cause of "shihan" (purple speck) of soybeans]. *Chosen Nokaiho* (*Chosen* [*Korean*] *Agricultural Association Report*) 16(2):24-28. Feb. [Jap]
• ***Summary:*** Suzuki believed that the cause of the purple speck [stain] disease of soybeans might be due to the mechanical stress exerted by the pod in consequence of unequal growth between pod and seed. Thus, climatic conditions were considered the chief cause of the disease. Note 1. Suzuki was wrong. Kikuchi soon showed that the real cause of the disease was a fungus of the genus *Cercospora.*

Note 2. This is the earliest document seen (Feb. 2006) concerning the purple stain of soybeans.

Note 3. Wikipedia says (Oct. 2014 at Cercospora) that "*Cercospora kikuchii*–causes leaf spot and purple seed stain on soybean." Address: Korea.

201. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1921. Bean trade reports from the Orient. 3(10):34. March.
• ***Summary:*** Source: Commerce Reports. Discusses the effects of World War I on the trade of soya-beans, soya-bean oil, and [soya] bean cake from Manchuria.

There was a decline in shipments of soya bean oil due to "the high rate of exchange in Dairen and the low rate of exchange between the United States and Europe." Much of the oil imported from Manchuria "by the United States was shipped to Europe in the form of sauces, etc. Moreover, when the armistice was declared, large stocks of soya-bean oil were accumulated in the United States.

"Bean oil and bean cake industries: At present there are 20 bean-oil mills in Antung, with an estimated total capital of $1,077,000 and a daily capacity of 22,100 bean cakes (weighing about 62 pounds each) and 160,251 pounds of bean oil. These mills employ 1,100 men, paying to the great mass of laborers an average monthly wage of $8.60 with food and lodging and to some of the expert workmen operating hydraulic presses, etc, as much at $36.40 per month with food and lodging.

"At present there are 20 [soya] bean-oil mills in Antung, with an estimated total capital of $1,077,000 and a daily capacity of 22,100 bean cakes (weighing about 62 pounds each) and 160,251 pounds of bean oil. These mills employ 1,100 men, paying to the great mass of laborers an average monthly wage of $8.00 with food and lodging and to some of the expert workmen operating hydraulic presses, etc. as much at $36.40 per month with food and lodging.

"Of the 20 mills operating in 1919, 2 were equipped with locally-made hydraulic presses and the remainder with native hammer and wedge presses and hand-operated screw presses. All the mills are equipped with steam or oil driven rollers for crushing beans, most of the engines being of Japanese make with a few large engines of English make. The new mills are obtaining equipment in Darien from a

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Chinese machine shop which specializes in bean-oil presses and allied material. Until the world trade in vegetable oils has settled into its new post-war channels, there is small likelihood of supplanting present equipment in Antung mills by more modern machinery.

"Bean cake as fertilizer: The local bean-oil market was greatly stimulated by the war; and while local trade will probably suffer a setback from post-war readjustments, the trade in bean cake seems more certain, as Chosen (Korea) and Japan are using increasingly large quantities for fertilizing rice fields, the high prices for rice strengthening this demand. In urging its use by farmers, the Japanese Government estimates that Korea's rice output may be increased 40 per cent, thus assisting materially in solving Japan's food problem."

202. *Commerce Reports* [*USA*] (*Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce*). 1921. Japanese trade and economic notes. 24(84):252-53. April 12.
• ***Summary:*** "Export of beans and bean products from Dairen during 1920:" A table shows the exports (in piculs) of [soya] beans, bean cake, and bean by destination. The three leading destinations are Japan, England, and Egypt. Others are Hongkong, Dutch East Indies, Sweden, Denmark, Holland, France, Korea, United States.

203. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1921. A line on how China [soya] bean trade is conducted. 3(11):25. April.
• ***Summary:*** "In Tiehling and Sunkiatai (Fengtien) and Kwanchengtze (Kirin) there are about 300 Chinese wholesale bean companies whose capital averages from $100,000 to $200,000 Mukden currency. Four Chinese banks–the Bank of China, the Bank of Communications, the Government Bank of the Three Eastern Provinces, and the Hsing Yeh Bank of Mukden–negotiate loans upon the joint guarantee of two of these companies without security; other Chinese banks require in some cases that the beans be pledged. Such loans are for three months or six months, sometimes one year, and the rate of interest has been less than 10 per cent. The Japanese banks lending money to bean dealers are the Yokohama Specie Bank and the Bank of Chosen [Korea], the former issuing Newchwang notes and the latter gold notes. It is estimated that between 60 and 70 per cent of the loans made by the Japanese banks is to Chinese and between 30 and 40 per cent to Japanese companies.

"The bean business may be said to commence in September, when buyers visit the producing districts and pay from 10 to 20 per cent of the stipulated price in advance. To the towns mentioned above, from 1,000 to 2,000 cartloads of beans are brought daily from November to January. The average price during the past two years has been $2 Mukden currency per 27 catties (36 pounds), exclusive of the production tax and the cost of transportation to Dairen and Newchwang. Mukden currency–that is, small coin dollars–exchanges for Mexican dollars at an average value of $1.40 to $1. At the present rate they are equivalent to about 40 cents in United States currency.

"Owing to the lack of good roads in Manchuria the beans must be carried to the market centers during the winter months, when fields and streams are frozen. By March the crop has been collected and stored and exports become most active.

"Through the system of mixed storage, the South Manchurian Railway Co. has effected a great improvement in the handling of beans. When brought to the railway stations the beans are examined and graded according to quality and size. A certificate issued to the depositor entitles him to draw from the mixed-storage depot at Dairen or Newchwang an equivalent amount of beans of the same quality and size. The bags used in packing are also examined, and when the grade of bags deposited and that of the bags delivered is different the loss or gain is adjusted by paying to or collecting from the depositor the difference in value. The new system saves the railway the trouble of transporting and storing each consignor's cargo separately. It also saves the shipper from the risks attending delay in transportation and from searching for his goods after they have arrived at their destination."

204. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1921. Soy bean makes its way north to colder climes. 3(11):51-52. April.
• ***Summary:*** "The soy bean, an Asiatic importation, popularly associated with the South, is making its way north, and is being well received.

"Most of the varieties first brought to this country were from parts of Asia, whose climate corresponded more nearly to the southern states. Within the last seven or eight years the department [USDA] has obtained about 300 introductions of soy beans from Manchuria, Korea and Japan, some of which grew as far north as the 52d parallel. The most promising northern varieties are the Black Eyebrow, the Mandarin, and the Manchu, all native to a latitude of about 46 degrees, on account of which they are adapted to our most northern states. A large number of samples of Black Eyebrow soy bean were sent to northern farmers last year, and out of 551 reports returned more than 400 were favorable. Reports promise a great increase in acreage in northern states this year. Seedsmen are laying in supplies of these more northern varieties; but many farmers, if unable to obtain northern seed, will plant old varieties, such as Ito San. From 90 to 95 per cent of soy beans are raised for hay, silage and pasture, although they are prolific seed producers."

205. Takimoto, S. 1921. Daizu no saikin-sei hanten-byô [Bacterial spotting disease of soybean]. *Byochu-gai Zasshi* (*J. of Plant Protection, Tokyo*) 8:237-41. May. [Jap]
• ***Summary:*** This preliminary note calls attention to a

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spotting bacterial disease of soybean in Japan. The disease is said to be caused by a new bacterium which is not identical to *Bacterium glycineum, B. soyæ,* or *Pseudomonas glycineum* Nakano. The name of the causal bacterium is not given. Address: Chosen Kangyo Mohanjo.

206. Hoshino, T. 1921. Wealth of Manchuria not in beans alone: Yields of various crops being greatly increased as vast areas become cultivated. *Trans-Pacific* 4(6):72-76. June.
• ***Summary:*** "Soy beans and kaoliang are by far the two most important products of Manchuria. Broadly speaking, the latter feeds the people while the former fetches them money, so they may be well compared with silk and rice in Japanese economy. But beans do perhaps more for Manchuria than silk does for Japan, for, without beans, the trade of Manchuria would shrink at once to one-half its actual amount...

"According to one authority a total of no less than 5,126,655 acres or about 19 per cent of all the cultivated land in Manchuria is devoted to the cultivation of beans, and the yield, averaging 21 bushels per acre, amounts to something like 108,000,000 bushels, of which 70 per cent is produced in South Manchuria. Though South Manchuria thus produces far more beans than North Manchuria, they are mostly grown in its northern part, the districts bordering on North Manchuria... Something like 2,000,000 bushels are added to the crop every year...

"The most important food-stuff of the native population, kaoliang, ranks next to beans even as an article of trade, though, last year for once, it was ousted from the position by wheat. It is also the principal grain food of the numerous animals so important in Manchurian agriculture. Out of it is made kaoliang spirit, the most popular drink in the country. The stalk is used for fuel and roofing material, and is also women into Chinese mats, indispensable in native households.

"Before soya beans attained their present importance, half the total area of the cultivated land in Manchuria is said to have been devoted to Kaoliang."

The main livestock animals in Manchuria are pigs (5,298,647), horses (1,769,968), oxen (888,374), sheep (586,128), mules (552,018), and donkeys (508,596).

Photos show: (1) Endless piles of sacks of soybeans at Changchun. A white horse pulling a cart stands in the foreground. (2) New Dairen Wharf Office, opened Nov. 1920. (3) Exterior of Suzuki company's chemical [solvent] extraction bean mill. (4) Junk wharf at Dairen; the junks have very tall rectangular sails. Address: Research Manager, Bank of Chosen, Seoul, Korea.

207. *Boston Daily Globe.* 1921. Beans make Manchuria famous: Soya variety cause of the boom city of Dairen, waste land 30 years ago, now port of 3,000 ships a year. July 24. p. 49.
• ***Summary:*** From New York Times: "The soya bean is making Manchuria famous. There are acres of soya beans in bags in the Dairen warehouses piled several feet high. The traveler sees great stacks of them at Changchun [Chang-chun; W.-G. Ch'ang-ch'un] awaiting shipment by rail, where they are piled 20 feet high and spread out as far as the eye can reach.

"All over Manchuria caravans move slowly across the plains bringing the beans into town. Almost all Manchuria exports are shipped from Dairen, and here steamers are constantly being loaded with the big flat bean cakes for export, imperceptibly decreasing the immense quantities piled in towering columns like giant poker chips on top of a table.

"The soya bean is bringing prosperity as well as fame to Manchuria... The soya bean is rapidly becoming the greatest single of the country Dairen and Yingkou are the big centers of the industry. The native oil and bean-cake factories are called yu-fang. There are no less than 60 yu-fang in Dairen and 21 at Yingkou.

"Manchuria is now considered one of the most promising sections of China. The South Manchuria Railway, which runs through Manchuria and Korea, is the only railway in the Orient boasting an all-American equipment of locomotives, coaches and rails.

"Dairen [Dalian], the southern terminus of the South Manchurian Railway, is on the western [sic, eastern] shore at the extreme southern end of the Liaotung Peninsula. It is less than 38 miles from Port Arthur [Lüshun], on the eastern [sic, southwestern] shore of the peninsula.

"Where the city of Dairen now stands was wasteland barely a generation ago. The harbor is free from ice all the year round... the water is deep enough to allow the largest steamers coming into the inner harbor at all times. Three thousand vessels arrived in Dairen last year. In 1919 the total trade of the port was $360,000,000. Dairen is now third in the order of China's custom ports."

208. *Light of Manchuria.* 1921. Manchuria Enlightening Society. Whose organ the "Light of Manchuria" is. No. 13. p. 54-55. Sept. 1.
• ***Summary:*** "What actuates us in our endeavours to open up Manchuria and Mongolia lies in realizing our ultimate ideal in the enlightenment and development of Manchuria and Mongolia. It will not do only to develop the natural and industrial resources, but the ethical and intellectual culture of the inhabitants must also be carefully husbanded and nourished, so that both mind and matter may be developed in harmony.

"It is urgently important that the truths regarding Manchuria and Mongolia should be made known clearly not only to Japan and China, but also to Europe and America. On this account, the establishment of the Manchuria Enlightening Society is bound to have a serious significance of international character."

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The Society also helps travelers and observers wishing to visit Manchuria, Mongolia, Siberia, Chosen (Korea), China, etc. All officials of the Society are Japanese.

209. Grinenco, Ivan; Capone, Giorgio. eds. 1921. Produits oléagineux et huiles végétales: Etude statistique sur leur production et leur movement commercial [Oleaginous products and vegetable oils: Statistical study on their production and trade]. Rome, Italy: Institute Internationale d'Agriculture, Service de la Statistique Générale. xxxii + 421 p. See p. XX-XXI, 140-41, 144-47, 442-43, 480-81. Sept. 15. Index in front. [Fre]

• ***Summary:*** In Sept. 1921 the IIA (*Institute Internationale d'Agriculture*) published this monograph in French. Two years later, by popular demand, an updated English-language edition was published. Contents: Introduction. Northern hemisphere: Europe, America, Asia, Africa, Oceania (Hawaii, Guam). Southern hemisphere: America, Asia, Africa, Oceania. Recapitulative tables of commerce, 1910-19. Note 1. All import and export statistics are given in quintals. 1 quintal = 100 kg.

The soybean (introductory information, p. xxii-xxiii, xxxii). Northern hemisphere–Europe. Germany (imports of soybean and soy oil 1910-14, p. 4). Denmark (production of soy oil in 1917, p. 17; imports and exports of soybeans and soy oil 1910-19, p. 18-20). France (imports and exports of soybeans and soy oil 1910-19, p. 28-31). Great Britain and Ireland (treated as one country; imports, exports, and reexports of soybeans and soy oil 1910-19, p. 32-35). Norway (imports of soybeans 1910-19, p. 47). Netherlands (Pays-Bas, imports and exports of soybeans and soy oil 1910-19, p. 49-52). Romania (In 1915 production of soybeans on 3 hectares was 3,600 liters). Russia (in Europe and Asia, imports of soy oil 1909-17, p. 70-71). Sweden (imports and exports of soybeans and soy oil 1910-19, p. 74-76).

Note 2. This is the earliest document seen (April 2020) that gives soybean production or area statistics for Eastern Europe (Romania).

America: Canada (imports of coconut, palm, and soy oil {combined} for the production of soap {in hectoliters} 1915-19, p. 88-89). Cuba (various attempts have been made to introduce the soybean, p. 94).

United States (area and production in 1909 {659 ha}, then from 1917-1920, p. 97-98). An overview of soybeans in the USA (p. 103, 105) states that the soybean, known in the USA since 1804, has become of great economic importance during the past few years. It is becoming popular mainly as a forage plant, but also for its seeds, for extraction of oil, and for making other products. Statistics have been published regularly since 1917. The census for 1909 showed 659 hectares cultivated in soybeans. During the years from 1917 to 1919 the cultivated area surpassed 60,000 ha. The three main states for soybean cultivation are North Carolina, Virginia, and Mississippi, which in 1919 cultivated respectively 33,185, 12,141, and 3,238 hectares; this was almost 75% of the total cultivated to soybeans in the USA. In 1910, the seeds were used for the extraction of oil in the USA, and for the first time the seeds were imported from Manchuria. In 1915, domestically grown soybean were used as a source of oil. This industry is developing rapidly, because the extraction of the oil is easily adapted to existing facilities that press oil from cottonseed and linseed. A table (p. 106) shows production of 16 vegetable oils in the USA from 1912 to 1917. Soybean oil production (in quintals) has increased from 12,537 in 1914, to 44,996 in 1916, to 190,843 in 1917. Figures are also given for peanut oil, sesame oil, etc. Other tables (p. 108-10) show imports, exports, and reexports of soybeans and soy oil from 1910 to 1919.

Asia: China (exports of soybeans and soy oil 1910-19, p. 161-62). French Indo-China (overview, esp. Cambodia and Tonkin, p. 187). Japan (area planted and production of soybeans 1877-1919, p. 190; overview, p. 191; production of soy oil 1909-18, p. 192; imports and exports of soybeans and soy oil 1910-19, p. 192-93). Korea (area planted and production of soybeans 1909-1918, p. 194; imports and exports of soybeans and soy oil 1909-11, p. 195). Formosa [Taiwan] (area planted and production of soybeans 1901-06, p. 196; imports and exports of soybeans and soy oil 1909-17, p. 197. In 1901 10,888 ha produced 8,056,400 liters of soybeans. In 1904 21,960 ha produced 24,401,700 liters of soybeans). Note 3. This is the earliest document seen (Jan. 2005) that gives soybean production or area statistics for Formosa (Taiwan; ceded to Japan in 1895 after Japan won the Sino-Japanese War).

Kwantung [Kwantung Leased Territory in Manchuria] (area planted and production of soybeans 1911-17, p. 198. In 1911 14,627 ha of soybeans produced 102,112 quintals. In 1916 29,902 ha produced 153,995 quintals of soybeans).

Africa: Algeria (in recent years, trials have been made to introduce soybean culture to Algeria, p. 238). Egypt (imports of soy oil 1919, p. 244-47).

Southern hemisphere–America: (Note 4. Soy is not mentioned at Argentina, Brazil, or any other South American country). Asia: Netherlands Indies. (A) In Java and Madura, the area planted to soybeans was 162,800 ha in 1916, 175,696 ha in 1917, and 157,844 ha in 1918. Gives imports of soy oil (1,085 quintals in 1914) and exports of soybeans (46 quintals in 1913) (p. 297-98). (B) In outlying territories, gives imports of soybeans from 1913 to 1919 (p. 299). Africa: Southern Rhodesia (attempts have been made to introduce soybeans and several other oil plants from temperate climates, p. 317). Oceania: Soy is not mentioned at Australia, New Zealand, British New Guinea, former German New Guinea [later Papua New Guinea], or any other country in southern Oceania. (p. 297). Recapitulative tables–Imports and exports from 1910-1919. Soybeans, p. 368-69. Peanuts, p. 370-75. Sesame seeds, p. 376-79. Palm

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fruits (*Amandes de palme,* from which palm oil is obtained), p. 392-93. Peanut oil, p. 414-17. Corn oil, p. 416-17. Sesame oil, p. 418-19. Soy oil, p. 420-21. Other oils covered in detail by this book are: Cottonseed, hempseed, linseed, rapeseed (*colza* and *navette*), poppy (*pavot* or *oeilette*), castor, olive, coconut, palm, and other–non-specified. Address: 1. Doctor of Agronomics; 2. Doctor of Economics. Both: IIA, Rome, Italy.

210. Satow, Sadakichi. 1921. Researches on oil and proteids extraction from soy-bean. *Tohoku Imperial University, Technology Reports* (*Sendai, Japan*) 2(2):1-124 (41-164). Oct. 28 cm. [Eng]

• ***Summary:*** Contents: 1. General description of the soy-bean: The use of the soy-bean (as a food-stuff [shoyu, miso, tofu, natto], soy bean oil [for the manufacture of soap, hydrogenated oils, paints, varnishes, oil-cloth, and rubber substitutes], and bean cake or waste residue from the manufacture of soy-bean oil [nitrogenous fertilizer, as a cattle food, Solite–a water-based paint]). 2. Classification and analysis of soy beans and their standardization: By color, by protein / proteid content, conclusion of analysis (the best soy-bean varieties are Tsurunoko and Kauro grown in Hokkaido): Standardization of the raw material, content of proteids, color of the raw material, moisture, regularity of the grain, specific gravity of the soy-bean, impurities. 3. Microscopical observations of soy-beans: Colour reactions of cellular substances, distribution of proteids and fatty acids, distribution of fatty oils. 4. Oil extraction (p. 17): Influence of hulls, influence of moisture, influence of oxidation, comparison of the dissolving power of various solvents, to find the best conditions for the extraction of oil by means of benzine, how to extract the oil technically without denaturing the proteids and how to remove the retained solvent, on the apparatus employed in oil extraction, working of the extracting apparatus, recovery of solvent by application of the vacuum system, separation of oil from the solvent and oil refining, reserving the oil-freed soy-bean meal.

5. Isolation of proteids out of oil-freed soy-bean (p. 35): General discussion, necessary and sufficient conditions for the extraction of proteids (on the quality of isolated proteids [plasticity, solubility, coloration], on the purity of isolated proteids, to obtain a maximum yield).

Note 1. This is the earliest English-language document seen (Jan. 2021) that uses the term “isolated proteids” (or “isolated proteid”) to refer to a type of isolated soy protein.

6. The extraction of proteids by means of water (p. 41): General properties of bean meal, on gummy substances and their properties (saccharo-colloids, incl. stachiose [stachyose], araban, galactan; p. 43), quantitative estimation of water-soluble proteids and carbohydrates, determination of the volume of water necessary for the extraction of soluble carbohydrates, relation of the duration of extraction to the quantity of extractable proteid and carbohydrates, effect of the process of water-extraction. 7. On the extraction of proteids by means of alkaline reagents: General properties of glycinin against alkaline reagents, classification of alkaline reagents, comparisons of dissolving power of alkaline reacting compounds, relations of the plasticity and coloration of the proteid to various kinds of extracting agents, standardization of plasticity of isolated proteid, on the relations between plasticity and chemical reagents, comparative experiments relating to the extracting process by means of sodium sulfite and sodium hydroxide.

8. The determination of the concentration, quantity, and other factors of $Na_2SO_3$ [sodium sulfite] in the process of extraction (p. 69): Determination of the concentration of sodium sulfite, the determination of the relation between the plasticity of the protein and the concentration of sodium sulphite, to determine the relation between the yield and the time of extraction, to find out the actual yield of proteid, as well as the volume of sodium sulfite solution provided the bean meal is previously extracted by water, then extracted with sodium sulphite, conclusion of this chapter. 9. Extraction of proteids by means of caustic alkalies [alkalis] (p. 80): To determine the concentration of the caustic soda [sodium hydroxide] solution, determination of the relation between the time of extraction and the yield of proteid, to determine the volume of caustic soda, the systematic extraction of proteids (using water, sodium sulphite, or alkali). 10. Clarification of extracted proteid solution and precipitation thereof (p. 86): Precipitation of proteids, precipitation by means of alkaline earth metals (such as magnesium sulphate), by means of colour base (such as malachite green, methyl violet, brilliant green, auramine, or new fuchin), by means of alcohol, by means of heating, by means of formaldehydes, by means of fermentation, by means of acids (choice of acid, yield of precipitated proteid, quality of proteid). 11. Quantitative investigations on the precipitation of proteids (p. 101, 11 experiments with summary of conclusions). 12. Effect of heating on the yield of proteid (p. 115). 13. Separation of excess water from the proteidal precipitate (p. 118). 13A. Process for drying the proteidal mass and for drying the residue (p. 121). 14. Pulverizing the dried proteid (p. 122). 15. Recovery of carbohydrates from waste liquid (p. 123).

World soybean production (in short tons): Manchuria 1,850,000 (25% is used in Manchuria as food; 75% is exported to all parts of the world in the form of “bean cakes or bean meal”). Japan 450,000. Korea 322,500. Kantoshu 15,400. Total of the above: 2,640,000 tons valued at more than 200 million Japanese yen (p. 2).

The author investigated the use of soy-bean proteins in plastics. There are upwards of 30 varieties of soybeans which may be classified into yellow, blue, and black. The first contain the most protein and oil, the last the least. The protein content varies from 35-40.5% and the oil content from 15.4 to 20.9%. The mean analysis of 16 different

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varieties was: Water 10.2%, proteins 37.8%, oil 18.9%, carbohydrates 23.5%, fiber 5.2%, and ash 4.4%. The carbohydrates consist mainly of non-reducing sugars with little or no starch. The cell membrane consists of galactan or hemicellulose, with a little free cellulose. The presence of the hulls in the crushed bean reduces the speed of extraction of the oil and the yield, and gives the oil and protein a brown color. Note 2. This is the earliest document seen (Dec. 2015) containing the word "hemicellulose." *Webster's Dictionary* defines hemicellulose, a word first used in 1891, as "any of various plant polysaccharides less complex than cellulose and easily hydrolyzable to simple sugars and other products." The sugar molecules in this polymer each contain 5 carbon atoms.

Oil extraction: Benzene is the most suitable commercial solvent; the solvent must not be recovered by direct steaming of the meal, but by the use of a vacuum.

Protein extraction: The soluble carbohydrates are removed from the meal by washing with very dilute acetic acid. The protein is then extracted in 3 stages, i.e. with water, with 0.2-0.4% sodium sulphite solution, and with 0.2% sodium hydroxide solution. 20-30% of the total available protein is extracted in the first stage, a further 50% in the second, and the total yield is about 95%. The protein is finally dried at the lowest temperature and highest vacuum and in as short a time as possible. The dry protein is very tenacious and can only be ground in high-speed disintegrators; it is then suitable for the manufacture of plastic materials, lacquer, enamel, or imitation leather. The soluble carbohydrates, which amount to 10-12% of the meal treated, can be worked up into syrup or converted into alcohol or lactic acid by fermentation. The bean residue consists of fiber, galactan, and protein and can be used for cattle feed or as an ingredient of linoleum-like products.

Continued. Address: Kôgakuhakushi.

211. Satow, Sadakichi. 1921. Researches on oil and proteids extraction from soy-bean: Illustrations and tables (Continued). *Tohoku Imperial University, Technology Reports* (*Sendai, Japan*) 2(2):1-124 (41-164). Oct. 28 cm. [Eng]

• ***Summary:*** Continued: Illustrations show: (1) The cells of the soy-bean (after Winton, p. 55). (2) The effect of various chemicals on soy-bean cells (8 figures, after p. 16). (3) A rotary drum extractor used with solvent and a vacuum system (p. 68). (4) An endless belt system for drying proteid precipitate.

Tables show: (1) Percentage of proteids and fat found in 23 samples of beans. The varieties are: Akakiji bean, Nagaaneko bean, Kintoki bean, Shônembo bean, Biruma ingen bean, Chûnembo bean, Maru uzura bean [speckled], Naga uzura bean, Kumamoto ingen bean, Azuki, Chûnaga uzura bean, Aneko bean, Shiromarufuku bean, Green pea, Dainenbô bean, Daifuku bean, Chûfuku bean, Red pea, Black soy-bean (38.61%), Yellow soy-bean from Manchuria {2 samples, 38.65% and 39.12%}, Yellow soy-bean from Korea (41.00%, and 22.826 fat–the highest fat of any bean tested), Yellow soy-bean from Hokkaido, Japan (41.92%–the highest proteid of any bean tested) (p. 6-7). (2) Previous analyses of the chemical composition of 16 soybean samples from Manchuria, Korea, and Japan. For each, gives the district, variety (mostly yellow but one "Blue variety"), water, proteids, fat, carbohydrate, fiber, ash, name of analyst (an organization) (p. 8). (3) Analyses by Sato of the chemical composition of 14 soybean varieties from Manchuria, Korea, and Hokkaido (Japan). For each, gives the varietal name, growing region, "moisture, total protein, soluble proteose, available protein, non-proteidal nitrogenous matter, fat, nitrogen-free extract, fiber, ash, color and shape (all yellow), producing organization (Korean Central Experimental Station or Sapporo), date of production. Named varieties include: Harupin, Shoshu bean, Utsuzan bean, Ampen bean, Chogei bean, Ryusan bean, Turunoko [Tsurunoko], Kanro, Yoshioka, Otanizi [Otaniji] (41.92% total protein and 37.53% available protein, both the highest of any bean tested) (p. 11). (4) Effect of hulls on solvent extraction of soy-bean oil with 3 varieties: Kanro, Otaniji, Yoshioka (p. 18). (5) Influence of moisture on solvent extraction (ether) of soy-beans (p. 19). (6) Effect of using benzine in place of ether in solvent extraction of soy-bean oil. The best moisture content is 7.5% to 12.5% (p. 20). (7) Substitution of vacuum drying for open air drying in removing moisture. Shows that the smaller the quantity of moisture contained in the bean, the greater the yield of oil, provided that the oil is protected from oxidation (p. 22). (8) Effect of different solvents on oil extraction: Carbon bisulphide (flammable and expensive), ether (flammable and expensive), benzine (boiling point 75ºC), carbon tetra chloride [tetrachloride]. (9) Separation / distillation of benzine from oil solution (p. 34).

(10) Chemical composition of "soy bean meal" from which the hull and oil have been removed (p. 42). (11) Composition of carbohydrates or saccharo-colloids, based on S. Yukawa (p. 43). (12) Composition of para-galacto-araban / gummy substances in 9 varieties (p. 44-45). (13) Percentage of water-extractable substances and reducing sugars in flattened and powdered soy-beans (p. 46-47). (14) Sugars in soy-beans (p. 48). (15) Proteids and soluble carbohydrates in soy-beans (p. 49). (16) Effect of acetic acid in retarding dissolution of the globulins (p. 50). (17-18) Dissolving power of alkaline reagents on proteids in bean meal (p. 54-56). (19) Effect of reagent on plasticity and coloration of proteids (p. 56).

(20-22) Amount of proteid extracted in 3 consecutive extractions, or with pressure (p. 63-65). (23) Effect of 4 consecutive washings in removal of ash (p. 66, 68). (24-26) Percentage of proteid extracted with sodium sulfite after 1 or 2 hours (p. 70-71). (27) Concentration of sodium sulfite, mark of plasticity [rating], and color of precipitate (p.

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73). (28) Relation between time of extraction and yield of nitrogen and proteid (p. 74). (29-30). Yield of proteid with water or sodium sulfite and 5 or 6 consecutive extractions (p. 76).

(31) Test to maximize yield of proteid using sodium sulphite solvent; the weight of the solution must be 16 times that of the meal, and the yield will be 52.20 (p. 78). (32) Effect of adding acetic acid on yield (p. 79). (32-33). Effect of caustic soda (sodium hydroxide) on percentage of proteid extracted (p. 81) (34-37) Relation between time of extraction and yield of proteid using caustic soda (p. 82-83). (38) Volume of caustic soda consumed by different volumes of bean meal solution (p. 83). (39) Volume of caustic soda solution needed in three extraction processes: water, sodium sulphite, or alkali (p. 85).

(40) Extraction with magnesium sulphate for 1, 2, or 3 hours (p. 90). (41) Percentage of proteids precipitated by different precipitants; "isolated proteid," "glutinizing chemicals" (p. 95) (42). Effects of sulphurous acid, formaldehyde, and formalin (p. 96). (43) Effect of different precipitants on quality of precipitate; "sulphurous acid gives proteid of the whitest and best quality, and most suitable for the manufacture of plastic products" (p. 100). (44) Yields of proteid with different volumes of sulphurous acid; all yields are very unsatisfactory (p. 103). (45-47) Effect of adding sulfur dioxide to sulphurous acid at various concentrations; remarkable increase in yield (p. 104-06). (48-51) Precipitation of water extracted protein using acetic acid (p. 107-10). (52-55) Effect sulphuric acid for precipitation of proteids (p. 111-14). (56-57) Effect heating on yield of proteids (p. 116-17).

Note: Horvath (1937) states: "The extraction of protein from soybean meal, its subsequent precipitation and properties, as well as its industrial applications have been extensively studied by S. Satow, and the results published (in English) in 1921-23 in two voluminous reports [*Technology Reports, Tohoku Imperial University* (Japan): 2(2) and 3(4)]. These reports continue to serve as an unsurpassed source of information on this subject, and a number of discoveries during the last 15 years can be traced to the researches of Satow." Horvath then summarizes many of Satow's key findings. Address: Kôgakuhakushi.

212. *Olien, Vetten en Oliezaden* (*Amsterdam*). 1921. Wereldproductie van Sojaboonen [World production of soybeans]. 6(22):254. Nov. 26. [Dut]

• ***Summary:*** The most recent [1920] annual statistics for world production of soybeans are (in metric tons): China 3,352,400. Japan 430,933. Korea 348,000. United States 58,000. Total 4,189,333 tons.

In 1918, Japan absorbed 77% of the Chinese production, American and Europe 7%, and China itself 16%.

During the last 10 years the amount of soya oil exported from China has risen from 25,000 tons to about 400,000 tons. Before the World War, this oil was sent to England, the United States, Belgium, Japan, and Russia. During this same decade, exports of soya-cake have increased from 400-500 tons to over 1 million tons.

213. *Oil and Colour Trades Journal* (*London*). 1921. The soya bean industry of S. Manchuria: Consular news. 60(1207):2080. Dec. 3.

• ***Summary:*** "The annual production of soya beans in Manchuria is estimated at 2,500,000 tons, of which about three-fourths is exported, 30 per cent. in the form of beans, and the balance in the form of bean cake or bean oil." A table shows the weight (in piculs) of these three products exported in 1919 and 1920. For 1920: Beans 10,224,437. Bean cake 21,479,033. Bean oil 1,805,107. The total value of exports in 1920 was approximately 92,350,000 taels.

Until the Russo-Japanese War of 1904-05 [soya] beans were only exported from South Manchuria in the form of bean cake and bean oil, and the sole market for them was in China, the cake being used as a fertiliser in the sugar-cane fields of the Canton and Fukien [Fujian] Provinces, and the oil chiefly as a food and an illuminant. The valuable properties of bean cake as a fertiliser were then discovered in Japan, to which the market for the product extended, the demand from Japan soon exceeding that from China. In 1908 a trial shipment of beans to England also opened the eyes of British oil-seed manufacturers to the value of the soya bean for the same purposes for which cotton and linseed oil were used, with the result that in that year 400,000 tons of beans were shipped to England. Since then the trade has never looked back. The demand soon extended to the Continent of Europe, and finally to America, which for a time became the chief market for bean oil, though the exports to that country have laterally declined."

A second table shows the destination and amounts of beans, bean cake, and bean oil exported from South Manchuria in 1920. The destinations (listed alphabetically) are: Denmark, Dutch Indies, Egypt, Germany, Great Britain, Hong Kong, Japan and Korea, Netherlands, United States, Chinese ports, other countries. The top four importers (in piculs) of soya beans are Japan and Korea (5,637,882), Chinese ports (2,490,727), Denmark (682,297), and Dutch Indies (546,186). The top four importers (in piculs) of bean cake are Japan and Korea (17,781,698), Chinese ports (3,430,483), United States (182,669), and Denmark (83,285). The top four importers (in piculs) of soya bean oil are Netherlands (616,204), United States (460,379), Japan and Korea (279,823), and Chinese ports (167,598).

This "table includes the exports by steamer from Dairen, Newchwang, and Antung and across the Korean frontier through Antung, Hunchun, and Lungchingtsun, but excludes those by native jung which were also considerable and went almost entirely to South China. All the exports to Europe and America and the bulk of those to Japan were shipped from

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Dairen, while Newchwang was the chief port of shipment for the exports to Chinese ports. The export of bean oil to the Netherlands is a new trade. It is possible that the ultimate destination of the bulk of the oil was Germany."

Source: *British Consular Report.*

214. Bank of Chosen, Seoul, Korea. 1921. Economic history of Manchuria, compiled in commemoration of the decennial of the Bank of Chosen. Seoul, Korea: Bank of Chosen. x + 303 p. See p. 137-48, 183-87. Illust. No index. 20 cm. [Eng]
• ***Summary:*** In Chapter 5, titled "Agriculture," the section on "Population" (p. 140) notes that Manchuria has a population of 20,112,110, which averages about 53 per square over the whole country. A table compares this with population densities of 618 in England and Wales, 589 in Belgium, 374 in Japan (Mainland), and 31 in the USA. However Manchuria's population is growing rapidly; it increased by at least 6 million during the 10 years ending in 1916. A table (p. 135) shows that [soy] beans are typically used in the second year of a four-year rotation on large farms. In 1916 and 1917 an experimental agricultural station of the South Manchuria Railway Company asked some "dozen farmers in the neighbourhood of Szupingchieh and Kungchuling to cultivate native seeds of soya beans according to the purely native method, and the result was in 1916, 4.104 bushels, and in 1917, 3.724 bushels per *tan* (0.245 acres). Now the average bean crop in Korea is about 2.978 bushels, and in Japan 4.02 bushels per *tan...*"–quite similar. In Japan, intensive methods are carried to the extreme, however "in Japan the farmer does not generally devote their best land to bean cultivation" (p. 135).

The section on "Agricultural products" (p. 135) begins: "Of the cereals and pulse which Manchuria produces the principal are [soy] beans, *kaoliang*, and millet, and these are followed by maize, sorghum, buckwheat, wheat, rice, and peas." Other products include sesamum seeds. A table (p. 136) shows the amount (in bushels) of each of these major crops produced in 1915 in Mukden, Kirin, Amur, and total. For soybeans this was 39.2, 17.6, 17.1, and 74.0 million bushels, respectively. Exports of soybeans are 79.11 million bu from South Manchuria, 29.67 million bu from North Manchuria, and 108.78 million bu total. Note: Chinese characters are given with every place name.

The subsection titled "Soya Beans" (p. 137-48) has the following contents: The importance of beans and their products. Cultivation of soya beans. Amount of production. Different species [sic, colors, and varieties]. Composition of different varieties. Uses of the soya bean. Uses of beans, bean cake, and bean oil in the Far East. Uses of beans and their products in Europe and America.

The section titled "Manufacturing products of Manchuria" contains a subsection (p. 183-87) on [soya] "Bean oil and bean cake" which begins: "The industry has a very remote origin and we have it on record that, as early as 1860, Swatow, a port in South China, imported from Manchuria bean cake to the amount of 379,009 piculs, valued at $783,762 (Chinese)."

The oil-mill (*yufang*) is found almost everywhere in Manchuria. The traditional method of making soya bean oil and cake involves steaming the beans then pressing out the oil. The modern method involves using a solvent, benzene. "Then, by heating the compound, the oil is separated from the benzene. By this method nearly all the oil in the beans is extracted, and not only is there no waste of oil, but the residue, in this case not in the form of cake but in bulk, is better fitted for manure, since the small quantity of oil remaining in it makes its absorption underground so much the easier; moreover, the trouble of breaking it up into pieces before using it is spared. The drawbacks to the new method lie in its requiring a greater working capital, and the necessity for packing the residue for shipment, thereby greatly adding to the shipping expenses. The new method is at present employed by only one company in Dairen, Suzuki & Co., which firm by the way operates the largest bean-mill in Manchuria."

A table (p. 185) gives statistics for the following in four locations in Manchuria: No. of soya bean mills. Capital (1,000 yen). No. of workmen. Production of bean cake (1,000 pieces, value in 1,000 yen). Production of bean oil (1,000 pieces, value in 1,000 yen). The four locations are: Dairen, Kwantung Province (Dairen excluded), Railway Zone, Total of the above three. More than half of the 105 mills are in Dairen.

Photos (between p. 138-39) show: (1) A field of soya beans. (2) Piles of soya beans in the open air, Kaiyuan. (3) Soya beans awaiting shipment at Dairen wharves. Tables show: (1) Composition of yellow and green soy beans (p. 141). (2) Composition of bean cake based on analyses by laboratories in Japan, Scotland, and South Manchuria Railway Co. (p. 144). (3) Exports of soya beans, bean cake, and bean oil from 1908 to 1917 from Dairen, Newchwang, Vladivostok, and total (p. 147-48).

Photos (between p. 184-85) show: (1) The Suzuki Bean Oil Factory at Dairen. (2) Casks of bean oil awaiting shipment on Dairen wharves.

Note: This book, like others in this series, was written by Mr. Tokuji Hoshino, manager of the Research Department, Bank of Korea; however his name does not appear on the title page, but only in the Foreword. Also published in 1920. Address: Korea.

215. Rouest, Leon. 1921. Le soja et son lait végétal: Applications agricoles et industrielles [The soybean and its vegetable milk: Agricultural and industrial applications]. Carcassone (Aude), France: Lucie-Grazaille. 157 p. Illust. No index. 25 cm. [42 ref. Fre]
• ***Summary:*** Contents: Preface, by Louis Forest. Introduction–What is soya? 1. History of the dissemination

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of soya: In 1712 the naturalist Kaempfer introduced soya, introduction of soya to France and Europe, soya is cultivated in Austria in 1875 by Prof. Haberlandt, soya is the object of many trials in France from 1876 to 1881, the study and acclimatization of soya becomes widespread, the causes of setbacks in the cultivation of soya.

2. Cultivation of soya: Botanical characteristics of soya, the varieties of soya, Chinese varieties and soya in China, Japanese varieties and soya in Japan, American varieties and soya in America (varieties: Mammoth, Hollybrook, Ito San, Guelph, Haberlandt, Medium Yellow, Wilson, Peking, Tokio, Mandchu [Manchu], Black Eyebrow, Barchet), soya in Europe–France and Italy, seven varieties of soya tested in France, soya in the experimental farms for new crops (*les Fermes Expérimentales de Néoculture;* Many varieties from the USA were tested, including Manchu, Wilson Five, Haberlandt, Tokio, Virginia, Hato [Hahto], Early Medium Green), the cultural and geographical appearance of soya, its production worldwide, planting soybeans, heat units (*degré thermique*) and the germination of soya, the importance of spacing between plants, number of seeds per hectare, soya during its vegetative stage, the vegetation of soya compared with that of the haricot at high altitudes, rolling the seeds and types of crop maintenance, growth of the plant, acclimatization, the enemies of soya.

3. Composition of the soybean plant. 4. Soya forage: Green soya forage, soya hay, soya as a plant for soil improvement. 5. Harvesting soybean seeds: Maturity of the seed, harvesting soya, the food value and composition of soya seeds. 6. Soya as an oil plant: Richness in oil, defatted soybean cake, imports and exports of soya cake from 1915 to 1919 (Imports to: Sweden, Canada, Korea, Japan, Formosa. Exports from: England, China, Korea), production of soya cake from 1915 to 1919 (Denmark, Great Britain and Ireland, Netherlands, Sweden, USA, Japan, Formosa, Korea, Java and Madura).

7. Soymilk: Its manufacture (in 1910-1913 Li Yu-ying installed a factory named "La Caséo-Sojaïne" at Vallées {Asnière-Seine} near Paris. Rouest visited this factory and saw them make soymilk, which was filtered using a filter-press resembling those used in sugar refineries), its properties and composition, composition compared to other types of milk, powdered soymilk, soymilk in the nursing and feeding of animals, soymilk related to tuberculosis in animals and in humans, soymilk would allow the milk and butter from animals to be reserved exclusively for human foods and could be used for raising many piglets, manufacture of non-dairy milk in Canada (a factory is now under construction). 8. Soya in Industry: Soymilk and soy casein, Sojalithe (like Galalithe).

9. Soya in human nutrition: Soy flour and its applications (incl. Li Yu-ying's usine de la Caséo-Sojaïne, and bread made of soya and wheat), soya compared to dry legumes (such as lentils, haricots, peas, beans), soya used as a legume (green vegetable soybeans; whole soybeans), the food value of soy sprouts, preserves and confections made from soya, soya chocolate and coffee, the amount of nutrients produced by soya and other crops from a unit of land, a meal of soya served in France (prepared and served some years ago by Li Yu-ying's soyfoods plant La Caséo-Sojaïne for the major print media, the medical press, the National Society for Acclimatization, etc.; it consisted of 2 soups {one with 'soya meat' and one with soymilk}, 2 entrees {an omelet with smoked soya ham, and fritters stuffed with soy meat}, soy [actually mung bean, *lüdou*] sprouts in a salad and sauteed, 3 desserts {soya cake, biscuits, and confection}, and soy coffee; a recipe for each is given; soya meat is smoked tofu).

10. Use of soya in East Asia: Tofu (*fromage végétal*), soy-based condiments (such as natto {Ping ming Natto and Tokio-Natto}, miso, Chinese miso or tao-tjiung [doujiang], and shoyu {Soyou or Schozou}), making soy sauce in Kwantung, China (from Groff).

11. The opinions of several authors concerning soya (from the French medical and hygienic press): Introduction–E. Maurel. Soya and soy bread in diabetic diets–Dr. Dujardin-Beaumetz, Dr. Bloch, Dr. J. Le Goff, L. Beille, M. Gautier. Soya used as a bean–M. Gautier. Soy sauce used in place of meat extracts. The state of cheese. The popularization of soya in Europe–A. Paillieux.

Conclusions: The influence of cultural technology on variation. Appendix: Advice to experimenters on the acclimatization of soya in France. Other methods of obtaining early-maturing soybeans.

The author concludes (p. 140): We must make every effort to acclimatize soya in France. We must develop the will and learn from past mistakes. Most soybean varieties now available in France are too late. We must get varieties from Manchuria, whose climate is similar to that of southeastern France, and from the northeastern USA. It is urgent that, in the near future, we start a Soybean Experiment Station to take responsibility for this work. The setbacks since 1830 can be overcome by present science and genetics. The first step is to introduce better varieties.

On the last page is a full-page advertisement for various seeds sold by Mr. Rouest, including 30 varieties of soybeans (*Soja hispida*)*;* the names of the individual varieties are not given.

Illustrations show: (1) A soy bean plant with many pods (title page). (2) Flowers and pods of the soy bean plant (p. 29). (3) Soy pods and beans (p. 30). (4) A soy bean plant drawn by a Chinese artist (p. 32, from Li Yu-ying). (5) Pods of the Hato [Hahto] variety of soy bean (p. 51). (6) Germinating soy bean seeds (p. 54, from Li Yu-ying). (7) Soy bean roots with nodules (from a photo by Dr. Le Goff; p. 73). (8) Soy bean pods, opened to show 3 beans in each (p. 82).

Tables show: (1) Production of soybeans by color

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in China in 1916 and 1917 (p. 35, in quintals, from the International Yearbook of Rome, Vol. 1, 1919): In 1917: Yellow 4,069,822. Other 953,012. Green 181,190. White 71,234. Black 40,066. Total: 5,315,324.

(2) Percentage composition of various oilseed cakes (p. 95, from Kellner). (3) Imports and exports of soybean cake, by country, from 1915 to 1919 (in quintals, p. 96). Imports are given for Sweden, Canada, Korea (from 1916), Japan, and Formosa [Taiwan]. Exports are given for England (6 quintals in 1915), China (including Manchuria, by far the biggest exporter, from 1916), and Korea (from 1916).

(4) Production of soybean cakes, by country, from 1915 to 1919 (p. 97, in quintals, based on statistics from the International Bureau of Agriculture, Rome, 1919). In descending order of production in 1915 (in quintals): Japan 5,439,337. Korea 3,209,238. Great Britain and Ireland: 1,513,059. Denmark 921,782. Java and Madura 503,025. Note that China is not listed. Netherlands 144,523. Formosa [Taiwan] 62,131. Sweden 1,733. USA 0, but 501,822 in 1916.

Note 1. When Alsace was occupied by the Germans during World War I, the Rouest family moved from Alsace to Paris. Mr. Rouest brought soybeans from Africa and adapted them to France. He paid for the publication of this book.

Note 2. On the title page of this particular book is the signature "L. Rouest" following the inscription "A M. Meuninier, Hommages de l'auteur." Address: Directeur des Fermes Expérimentales de Néoculture, Carcassonne (Aude), France.

216. Rouest, Leon. 1921. Le soja et son lait végétal: Applications agricoles et industrielles [The soybean and its vegetable milk. Agricultural and industrial applications]. Carcassone (Aude), France: Lucie-Grazaille. 157 p. Illust. No index. 25 cm. [42 ref. Fre]

• ***Summary:*** This is a summary of interesting points throughout this book. The main early use of soy in Europe was more therapeutic than nutritional (p. 3); it was used mainly in diabetic diets.

Nothing remains of the early trials conducted 20 years ago in France and Austria. The reasons for the crop's failure were lack of understanding of the laws of acclimatization and genetics, and the fact that soya (*soja*) was introduced as a new food legume, when actually it can only be utilized as a forage plant and industrially (for oil, cakes, and casein). Later, when the plant has been adapted, when it is understood that soya is not being propagated to competed with other dry legumes, that it is not being cultivated to extract from the seeds a vegetable milk for people, but simply as a forage plant–and the most remarkable one that exists (p. 3).

The English are trying to acclimatize soya to their colonies, especially those in southern Africa. In 1908 some 200,000 tonnes (metric tons) of soybeans were exported from China [including Manchuria] to Europe, followed by 500,000 tonnes in 1909. One can extract from soybean seeds a vegetable milk (*lait végétal*) which has the same value as animal milk for use in raising young animals. Its seeds and forage are also fine for raising farm animals and for industrial products. The author thanks all those who have helped him to acclimatize the soybean to France and to create new varieties of soya in France (p. 4).

Introduction of the soybean to France and to Europe (p. 6-7): A good but brief review of the literature on this subject. In 1739 Buffon was made director of the Jardin des Plants in Paris. Shortly thereafter, Christian missionaries in China sent him specimens of seeds and plants. The soybean must have been among them. The soybean has very probably been cultivated at the Museum since 1779, certainly in 1779 and later from 1834 to 1880. In 1855 Baron de Montigny was charged by the Society for Acclimatization to distribute five varieties of soya sent from China by Mr. Montigny; these were from northern China. The plants first bore seeds in France in 1854; their acclimatization is assured. In 1857 Mr. Lachaume transmitted to the Society for Acclimatization details of the success he obtained at Vitry-sur-Seine with soy culture. The seeds were planted in 1856. In 1858 a report to the Society for Acclimatization indicated that the acclimatization of the soybean was complete. In 1859 Mr. de Vilmorin reported on cultural trials sent from China by Mr. Perny. The varieties matured too late. The same year Dr. Turrel harvested soybeans at Toulon. In 1862 the Society for Acclimatization received seeds from Mr. Guillemin; the yellow soybean was said to be used for making tofu. Following the events of 1870, the cultivation of the soybean in France was apparently discontinued. Note 1. The brief war of 1870 between France and Bismark's Germany ended in France's defeat and the ceding to Germany of Alsace-Lorraine.

In the long section on Prof. Haberlandt's work with soya, starting with his cultivation of it there in 1875, is a quotation from him: "I don't know, in this history of cultivation, any example of a plant which has, in so few years and to such a high degree, excited such general interest" (p. 8).

From 1876 to 1881, the soybean was the object of numerous trials in France by the Society of Horticulture at Etampes (Seine-et-Oise). During this same period, one Dr. H. failed with varieties sent from Japan but succeeded in cultivating a yellow soybean sent from China, and used the latter to make his own tofu (*fromage végétal*) for use at home. In 1880 Messrs. Vilmorin-Andrieux introduced in their catalog a species cultivated in Austria-Hungary (p. 17-18).

In 1878, Japan, China, and the Indies (*les Indes*) presented all the varieties of Soya at the Universal Exposition, and their seeds filled more than 20 boxes. In 1880 the National Society for Acclimatization was able to distribute soy in France and tests were conducted in 24

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regions; they were largely successful, especially in central and southern France (p. 19-22).

Tests were then abandoned from this time until about 1888, when the soybean started to grow in the southern states of the USA. That same year Messrs. Lecerf and Dujardin-Beaumetz first had the idea of using soy bread in diabetic diets (p. 22).

Causes of setbacks in soybean culture (p. 24-27): First, the varieties used matured too late and were not acclimatized in a progressive manner. We must choose varieties from northern China and adapt them to the south of France (*le Midi*) [which is on the same latitude as Toronto, central Wisconsin, or southern Minnesota]. From these, we must develop hybrids, and gradually move them northward.

The soybean has been ostracized in France. Major commercial, financial, and social interests have viewed with terror the production of an inexpensive food and have retreated into the egotistical "Malthusian agriculture." This is the truth! (p. 26).

Soy cheese is even feared by the cheese industry in France. They ask if they should abandon their excellent cheeses in order to adopt a vegetal cheese (*fromage végétal*).

A long quotation from the *Chinese Imperial Encyclopedia of Agriculture* (p. 34) gives the various colors of soybeans, including black, white, grey, and even some speckled / mottled with blue. The black ones can be used for medicine. And they are used as an ingredient in the condiment called fermented black soybeans (*Chi* [*douchi*]), made of soybeans, ginger, and salt.

In 1910-1913 a factory named "La Caséo-Sojaïne" was installed near Paris. I (Rouest) visited this factory in which were installed all the modern conveniences (*tout le confort moderne*), and presented the best guarantees of hygiene. The milk was filtered using a filter press similar to those used in sugar factories (p. 99).

Note 2. Rouest has borrowed a great deal of material from earlier publications by Li Yu-ying, usually without acknowledgment and often arriving at very different conclusions, especially on the question of using soya to make human foods (Li) vs. foods and milk for animals (Rouest).

Rouest strongly recommends the use of soymilk to feed young domesticated animals. For us, soy will not replace green beans, milk or cheese. During World War I, the Germans were actively involved with the study of soymilk. A translation of an article from the *Schweizerische Milchzeitung* (Nov. 1918) tells how to make soymilk and tofu (p. 102). By using soymilk, there is no fear of transmitting tuberculosis. Address: Directeur des Fermes Expérimentales de Néoculture, Carcassonne (Aude), France.

217. Vlachos, William N.; Vlachos, Conrad A. 1921. The fire and explosion hazards of commercial oils. Philadelphia, Pennsylvania: Press of Otto Jones Co. 292 p. See p. 39-40, 270. Index.

• ***Summary:*** Soy bean oil is discussed in Chapter II, on drying oils. A table shows it has a flash point of 556ºF (the highest listed on p. 270). "Soy bean oil, also known as Soya Bean Oil, Soja Bean Oil, Chinese Bean Oil and Bean Oil, is imported into this country from Manchuria, Japan, China and Korea. In 1917 we imported 265,000,000 pounds, at a cost of about $27,000,000. More soy bean oil is imported by us than any other vegetable or animal oil. It is largely shipped from the Orient in metal cans packed in wooden cases. With us, its production is a comparatively undeveloped industry, but it will doubtless grow very rapidly. In fact, in 1914, we produced 2,764,000 pounds, and in 1917, 42,074,000 pounds, which certainly indicates a healthy growth.

"Soy beans, from which the Soy Bean Oil is expressed, have been cultivated in China since 2800 B.C., and are the world's most important oleaginous seeds. The beans (there are over 500 varieties) contain 18% to 20% of oil, but by pressing, only 10% to 13% is expelled. Extracting with solvents to obtain the remainder of the oil is done quite extensively, but it spoils the presscake, which is a very valuable cattle food.

"In recent years quite a large quantity of soy beans have been imported and soy beans have been planted to a considerable extent in the South. As the beans keep quite well, they can be pressed *after* the cottonseed oil season is over, which is an economic factor of considerable importance. Ordinary cottonseed oil machinery is excellently adapted for soy bean pressing, and the refining process is also quite similar.

"Chemically speaking, Soy Bean Oil lies midway between Linseed Oil and Cottonseed Oil. Its iodine value varies from 137 to 143, which is rather close to that of Linseed Oil, 173 to 201. It is classed by Lewkowitsch as a *drying* oil, that is, a film will dry in four days, but even then it is still tacky. It is mixed with tungstates and cobalt driers to accelerate the drying process.

"In this country it is mainly used as an adulterant of, or substitute for linseed oil, and, like linseed oil, it is boiled and blown. Soy bean oil is also used extensively in soap and candle making.

"It is also an excellent edible oil, but it has to be deodorized, as its beany flavor is objectionable. Soy bean oil is now hardened for use in butter substitutes."

218. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1922. Growth of soya bean industry. 4(9):16. Feb.

• ***Summary:*** "Ten years ago the exports of bean cakes from Manchuria totaled 400,000 to 500,000 tons, but the latest reports show that these figures have been increased to over 1,000,000 tons.

"Bean oil exports totaled 20,000 to 30,000 tons a decade ago, but of late they have been increased to 400,000. Prior to the outbreak of the war Great Britain, America, Belgium, Japan and Russia divided the exports, but now America and

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Japan are the only two foreign buyers.

"The following table of the last annual production of soya beans in the world is given by the *Bankers' Weekly* (Chinese): 1918 (in piculs)–China 50,286,000. Japan 6,464,000. Korea 5,220,000. United States of America 870,000. Total 62,640,000.

"According to the 1918 figures, Japan absorbed 77 per cent of the Chinese soya beans available for export, American and European markets took 7 per cent and the remaining 16 per cent were distributed throughout the various provinces of China."

219. *Times of India* (*The*) (*Bombay*). 1922. Korean progress: Agriculture and farming. March 24. p. A7.
• ***Summary:*** "It is in southern Korea and especially in the South-Western district that agriculture has prospered, the climate being comparatively mild. The cultivated area is only 10,640,000 acres, being about one-tenth of the total area. About 36 per cent. of this is rice paddy and the remainder farm-land. There is enormous scope for extending cultivation if the difficulty of irrigation, which is the greatest obstacle, is surmounted. Since 1907 [Korea is now a Japanese protectorate], Government have adopted a policy of encouraging the exploitation of state-owned uncultivated lands, by renting them from the state to anyone regardless of nationality for a term of not more than ten years, for tillage, stock-raising, afforestation [planting seeds or trees to make a forest on land which has not been a forest recently, or which never has been a forest; different from reforestation], etc. Rice is the main food of the Korean and is the staple product,... the annual produce being about 60 million bushels. Wheat is another crop. But that of Soya beans is important." In 1918, about 30 million bushels were produced, twice as much as in 1910. Soya oil and soap are made from these soybeans "in Japan to which they are chiefly exported."

220. *Bean-Bag* (*The*) (*Lansing, Michigan*). 1922. Build soy bean oil extraction plant at Peru, Indiana. 4(10):21. March.
• ***Summary:*** (Special to the Bean Bag). "Peru is to have a new industry, the first of its kind in the United States. This is a soy bean oil [solvent] extracting plant. Although this method is used to a small extent in Japan and Korea for the extraction of oil from soy beans, it is comparatively new. No such operation has ever been carried on commercially in this country.

"The men back of this movement are men who have helped to make the city of Peru. With such men in control it certainly augurs well for the new plant. The corporation is to be known as 'The Indiana Products Company,' and is composed of John Unger, John Kramer, Ernest Theobald and Henry Lutes. The plant is to be situated in a part of the building now occupied by the Unger-Kramer Box Factory at the west end of Second street. This building is ideally situated to house such a factory as there are both railroad facilities and wagon road direct to the door. This will allow for the shipping in of beans and also direct delivery from the farmer.

"For the last 18 months the soils and crops department of Purdue University has been attempting to get such a plant started in the state of Indiana. The farmers have been increasing their bean acreage faster than the seed demand will absorb and this has thrown a great many beans on the open market. This plant is largely a result of the work of Prof. Ward A. Ostrander, head of the extension service in the soils and crops department, of Purdue, and county agent L.E. Thome.

"Various educational meetings have been held and the proposition thoroughly discussed. As a result of these meetings the above men became interested in the scheme and as a result we have 'The Indiana Products Co.' This company will take the soy bean as it comes from the threshing machine, extract the oil with a Garrigue Rotary Solvent Extractor, thus leaving the residue to feed in the place of linseed oil meal, cotton seed oil meal, or tankage. If the farmer can thus raise his own supplement for the corn which he produces, the cost of the cattle, hogs or milk which he produces will necessarily be lowered.

"Many farmers fear that the establishment of such a factory will run in competition with the pork industry, as the oil extracted from the bean may be used as a lard substitute. This is hardly possible as last year over 200 millions of pounds of oil were imported into this country. If the American farmer can produce a small amount of this he will be building up his own soil and be using an American product besides.

"The Wm. Garrigue Company which is furnishing the plant, is a firm with a national reputation. Thus the local concern is assured machinery of the highest type."

221. Ockel, Reinhold. 1922. Die Oelindustrie Japans und der Mandschurei [The oil industry of Japan and Manchuria]. *Chemische Umschau* 29(26):201-02. June 28. (Chem. Abst. 16:3005). [Ger]
• ***Summary:*** "(Footnote: Lecture given in the Study Group for Fat Chemistry at the General Meeting of the Association of German Chemists (*Fachgruppe für Fettchemie auf der Hauptversammlung der Verein Deutscher Chemiker*), 1922.)

The oil industry in Japan is relatively small and insignificant. That of Japanese-occupied Manchuria is much more significant. It has an area of 1,456,000 English square miles and is therefore 2½ times as large as Germany. The export of soybeans (*Sojabohnen*), press cakes, and oil with a value of 21,754,000 Haikuan bushels [sic, probably Haikwan taels, a unit of value equal to the equivalent of 584.85 grains of pure silver, which in 1904 was worth 2 shillings 10 pence] in 1912 grew to 74,000,000 in 1918, and during the same period it grew from 11% of the total trade

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to 27% and from 25% of the export trade to 56%. According to the book published in 1921 by the director of the Bank of Chosen, which is the former Korea [translator's note: Korea under Japanese rule], *Oekonomische Geschichte der Mandschurei* [The Economic History of Manchuria], in 1915 the following were produced: 108,783,216 bushels, which equals approximately 3,000,000 [metric] tons of [soy] beans with a value of 306,765,843 yen, of which roughly 3/4 was exported and specifically 30% of the exports in the form of beans, and the remainder as cakes and oil. The beans went for the most part to China and Japan, the cakes to Japan, and the bean oil for the most part to Europe and America. According to a report about "Die Sojabohne Mandschuriens" ["The Soybean of Manchuria"] that was published in August 1920 by the South Manchuria Railway Company (*Südmandschurische Bahngesellschaft*) that was working with government support and 1½ billion yen, in the city of Dairen [today's Dalian, China], the former Dalay [sic, Dalny], 4,057 [metric] tons of beans were pressed daily in 60 pressing mills and from them, 386 [metric] tons of oil and 3,717 [metric] tons of cakes were obtained. In August of last year, the corresponding numbers were provided to me from the same company as 6,000 [metric] tons of beans and 600 [metric] tons of oil. The same report indicates that from every 60.4 kg (that is, 1 picul) of beans, 5.44 kg of oil and 2 pieces of cake of 27.78 kg each were obtained. Through extraction from 1 picul of beans, 7.7 to 7.93 kg of oil and 48.3 kg of bean meal were obtained. -

"The soybean introduced Manchuria into the trade community of the world," it says in the aforementioned book! I visited three oil mills in Dairen. The method of work is the same in all of them: the prewarmed beans, which look like little peas, are rolled by a pair of rollers into flat disks the size of a penny that are 2 mm thick. They are weighed out into lots of 29.6 kg each and spread out on a burlap cloth in a layer that is 6 cm thick. This rests on a flat iron grid under which a steam nozzle blows steam as long as is necessary for the steam to abundantly penetrate the seeds, such that even with cooler weather (24ºC), such a tropical heat prevails in the room that the Chinese laborers work completely naked in this room and take turns cooling off in a cold water bath that has been set in the floor and also wipe their faces with a cloth that is hung on a beam! The steamed beans are then thrown into a wooden ring that rests on two iron rings that sit on a sheet of metal. In these, a bundle of a species of reed that is as thick as a straw which is bound together at one end has previously been placed. These were purchased from Southern China at a high price. The hot beans are then stamped down with the bare feet while, at the same time, the two iron rings are raised up such that they encircle the cake with a space of around 3 cm. Then the man stamps down, removes the now empty wooden ring, brings the ends of the reeds together centrally over the cake, and pushes it with the bottom plate into the prepress, from which, after having been pressed together, two men then carry it to the finishing press in which one is placed on top of another until it is full, whereupon first 75 atmospheres and then 150 atmospheres of pressure are applied, under which they supposedly remain for 5 to 6 hours. When finished, they are approx. 9 cm thick and weigh 27.78 kg. Approximately 9% oil has run off, tainted by a protein solution and by 3% water that has been picked up from the cake. The protein in the oil at first caused difficulties for me with the refining. But with additional experiments in the laboratory in Oimachi near Tokyo, I overcame this and attained a good edible oil.

In order to remove the protein content if possible and to produce a consistent product, the railway company in Dairen built a large "mixed storage container". In this container, not only the oil that was pressed in Dairen, but that which had been pressed in all of Manchuria can be emptied out of the barrels. And then, after a lengthy sextuple zigzag path with two electrically driven pumps or two steam pumps, the oil is pumped through an eight foot tube that is somewhat flexible with a speed of 250 [metric] tons per hour into tanker ships. Some filter presses are also used there. At first, a concrete container was used, but then the oil contained water. Now an iron one is used. A part of the oil is filled into metal canisters with an automatic device with a large number of them filling simultaneously, and after having been soldered shut, these canisters are packed two to a crate.

Aside from the three oil mills, I also saw an extraction plant in Dairen which supposedly extracts 170 [metric] tons of beans per day and obtains 15% oil from them, of which 1% is as an emulsion for which only half price is attained. Some 2% of the oil remains as a residue which, however, according to [in English] Manschurian Soy Bean [sic], out of every 60.4 kg amounts to 7.7 [kg] of oil, and thus 1.4 kg or 7% is lost. In any case, the very easily soluble protein [is removed] with the condensation water with the steaming. Some 1% of the weight of the beans is lost to the benzene. The extracted product contains 22% water and is dried in a lower drier to 17% and an upper drier to 14-15%. Filling and emptying takes a half an hour, the extraction, 4 hours. The removal of the benzene by distillation takes 2 hours, the steaming 1 hour, so everything all together 7½ hours. A total of 16 extractors of 3 [metric] tons each is available from which of course 153½ [metric] tons could be extracted and not 170 [metric] tons, as had been indicated. One of the three oil mills of Dairen that were visited hydrogenated (*härtete*) its entire product of 10 [metric] tons. It produced the hydrogen according to the filter pressing process: 1,000 cubic meters with 275 kilowatt hours of municipal electricity, adulterated with 1% oxygen. The steam cauldron of the hydrogenation plant had a heating surface of 40 sq. m., that of the pressing works that could produce 4,000 cakes, 85 sq. m. The former employed 25 men, the latter 100.

In Kobe in Japan, there is also a hydrogenation plant. What is for the most part hydrogenated there in Japan is fish

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oil. Nowhere is anything refined there in advance.

Furthermore, in Wakamatsu, Japan, I visited a bean extraction plant which extracts 400 metric tons of oil and gets a yield of 16% from the beans. (American presses for cottonseed had just been set up.) Some 1½% of oil supposedly remains in the residue. A mixture was used of ½ naphtha and ½ benzene, from which 1%, calculated on the weight of the beans, is lost. Some 30% of the weight of the beans is consumed as charcoal [or carbon] (*Kohle*). The plant, the building, and the land, half of which is developed, cost 1,500,000 yen. Serving as a seed warmer were four gigantic, steam-heated screw conveyors. Then, as takes place everywhere, the beans are once again pressed flat to a thickness of 2 mm by means of a pair of rollers. In the refined oil, there is still ½% fatty acids. Some 2% of the oil is lost through neutralization, and the "deodorizing" that is carried out before this consists only of drawing off the benzene with a vacuum. The oil tastes horrible! The steam cauldron had a heating surface of 540 sq. m. There were 12 extractors with a load of 2.3 metric tons each. The duration of the extraction amounted to 2 hours; the steaming, 1 hour; the filling, 6 minutes; the emptying, 54 minutes; the entire batch, 4 hours. They indicated to me 40 to 50 batches in 24 hours (instead of the 72 that had been calculated) and 100 metric tons of beans as the daily capacity (Continued). Address: Dipl.-Ing.

222. Guillaumin, A. 1922. Les variétés de soya d'Extrème-Orient: Origine probable du soya [The varieties of soybeans in East Asia: The probable origin of the soybean]. *Revue de Botanique Appliquee & d'Agriculture Coloniale* 2(10):254-58. June 30. [10 ref. Fre]

• ***Summary:*** "The soybean (*Le Soya; Glycine Soja* Sieb. et Zucc., *Dolichos Soja* L, *Soja hispida* Moench, *S. angustifolio* Miq.) has been cultivated in the Far East since antiquity. Shen-Nung (*le Shénon*), written up by Houandi in about 3,000 to 3,500 years before Jesus-Christ, already mentioned the soybean. Since then, its culture has expanded to Indochina, India, Malaysia, Europe, America, and Africa.

"Long ago, in Austria and in France, varieties such as *Soja d'Etampes*, were selected for their high yield. In America, efforts have long been made to obtain, for the diverse climates, both forage varieties and seed varieties. And the U.S. Department of Agriculture has assembled in its test fields more than 500 varieties, of which about 20 are currently in commerce. Among the forage varieties are (Ball 1907): Early Brown, Black Eye Brown, Peking, Wilson Five, Virginia, Barchet, Biloxi, Laredo, Atoo San [sic, Ito San?], Tarheel Black, and Wisconsin Early Black. Among those grown for their seeds are: Ito San, Manchu, Elton, Medium Yellow, Mikado, Hollybrook, Haberlandt, Mammoth, Tokyo, Guelph, Austin, Easy Cook, Morse, Hahto, Early Medium Green, Mandarin, and Chiquita.

Note 1. This is the earliest document seen (March 2021) that mentions the soybean variety Black Eye Brown. However, it does not appear in Ball (1907) as stated, nor does any name even vaguely resembling it appear. The Black Eye Brown variety is mentioned in only 3 known documents, all published in France in 1922.

"Note that the forage varieties all have black- or dark-colored seeds, whereas the seed varieties have yellow or greenish seeds.

"In Turkestan it seems that the only varieties are ovoid (5.7 x 3.7 mm), brilliant yellow, with brown hilum and traversed longitudinally by a bright line." Note 2. Turkistan or Turkestan is an historical region of Central Asia, usually thought to comprise Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan, southern Kazakhstan, western China, and northeast Afghanistan.

Note 3. This is the earliest document seen (March 2021) concerning soybeans in Turkestan, or the cultivation of soybeans in Turkestan (not including Chinese Turkestan). This document contains the earliest date seen for soybeans in Turkestan, or the cultivation of soybeans in Turkestan (not including Chinese Turkestan) (1922). The source of these soybeans is unknown. Unfortunately, it is not clear in which part of Turkestan the soybeans were grown.

"In India, soybeans are cultivated in the United Provinces and at the foot of the Hamalayas from Kashmir to Darjeeling." David Hooper (1912) distinguished five different soybean races in India.

"In Cambodia, the only known variety is ovoid (6.3 x 4.2 cm), dull yellow, brown hilum, with a long, clear white line, known as *Sandek sieng* in Cambodian and *dau nanh in Annamite*. It is cultivated along the steep banks of the Mekong River.

"In Cochin China, the soybean is cultivated only on the red soils of the provinces of Chau-doc, Baria, and Bien-Hoa; in the western provinces, cultivation is insignificant and the seeds come from Cambodia. It seems that there is only one variety, closely related to that of Cambodia, called *dau nanh* or *dau-xa*, but it is not well established / widely grown, for it bears black or brown seeds.

"In the province of Baria one can obtain two harvests in a wet year–one in September, the other in December-January. In the province of Bien-Hoa, there is only harvest.

"In Annam, there is one variety similar to that cultivated in the lower parts of the provinces of Bin-dinh, Thua-hien, Dong-hoï, and Tanh-hoa.

In Tonkin, the soybean is known as *dau tuong;* in the [Mekong] delta, one can distinguish a small, ovoid variety (5.1 x 3 mm), with a yellow seed coat and a hilum surrounded by a brownish black aura that sometimes overflows the sides. In the region of Lang-son, on the plateaus 100-500 meters in height, it is replaced by a larger variety, ovoid (7.1 x 5 mm), dull yellow, and a hilum that is uncolored [pale] or brownish; one variety is also cultivated at Lao-kay.

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"In Laos, the soybean is known as *Mok toua kon* and *Ta tone,* according to Dr. Spire, but precise information is lacking.

In the territory of Kwang-cho-wan (French: *Kouang-tchéou-wan,* in southeast China) the soybean is cultivated in the region of Taï ping, at an altitude of 30 meters. It is planted in the spring and harvested in the summer. One can distinguish two varieties here. One is very elongated (8 mm x 4.6 mm), dull yellow with a very clear brown hilum, called *Wong tao* or *Wong tao tsaï* in Cantonese. The other is small, flat (6.4 mm x 3.7 mm), dull black, with a large hilum, called *Hat tao* in Cantonese; it is absolutely the same as the variety Nigra cultivated at the botanical gardens of Cluz (Romania), and in Trieste (Italy), but different from that which is cultivated under this name at the botanical gardens of Cracow / Krakow (French: *Cracovie*) (Poland), Tabor (Czechoslovakia), and Delft (Netherlands), which is fatter, more round (7 mm x 4.8 mm) and of a velvety black color.

Note 4. This is the earliest document seen (March 2021) concerning the cultivation of soybeans in Czechoslovakia (which became a country in 1918). This document contains the earliest date seen for the cultivation of soybeans in Czechoslovakia (June 1922). The source of these soybeans is unknown.

"In China, in Szechwan, only the yellow and green varieties are known. In the region of Shanghai, R.P. Courtois, of the Museum of Zi-ka-wei, has assembled an important collection of soybean varieties. Descriptions are given of varieties with the following colors and names: (1) Yellow: *Ta hoang téou* (large, yellow, almost round), *Kiu hoang téou* (ovoid, brilliant yellow). (2) Green: *Tsing pi téou* (roundish, 7.1 x 5.5 mm, clear green with clear hilum). (3) Brown: Large, ovoid (9.1 x 6.4 mm), reddish brown, with a slightly clearer hilum; no name given. (4) Black: Many varieties. (4A) Large ovoid seeds (9 x 4.3 mm), with large hilum; indigenous name unknown; (4B) A little smaller and bulging (8.3 x 5.4 mm), with ornate hilum and a longitudinal white line, named *Ta hé téou;* (4C) Ovoid (8.1 x 4.7 mm) with a wide hilum traversed by a white line, called *Hé téou;* (4D) Small (6.7 x 3.1 mm) and brownish black named *Siao hé téou;* (4E) And finally a very small, flat (6 x 2.7 mm), brownish black named *Ni téou.* By their shape, form, and color, the seeds of these last appear very similar to the American variety Laredo."

"In Europe, soya has its apostles, but it will never amount to anything more here than a small-time vegetable. Despite the Caséosojaïne at Vallées near Paris, France (Li Yu-ying, 1911) and the Soyama Werke at Bockenheim, Germany (1914), the milk, cream, butter, and cheese [tofu] made from soya will never be more than ersatz. The "soy bread" is only good for diabetics and the "soy ham" (*jambon de Soja*) in nothing but a weak imitation of pork. Soybeans themselves are indigestible and require a very long time to cook–even the yellow or white varieties. Soy sprouts (*germes de Soja*), which enjoyed some popularity before the war and deserved it, for they are a nice hors d'oeuvre, are actually nothing but mung bean sprouts."

Based on other sources (most of which are cited), the writer also discusses the soybean varieties of Manchuria (Hosie 1901), and Japan (Lemarié 1910), and discusses soybeans briefly in Korea, Philippines, Netherlands Indies.

In Europe, the soybean has its apostles: Caséosojaïne at Vallé near Paris (1911), and Soyama werke at Bockenheim (Germany) (1914). The latter makes milk, cream, butter and cheese (*le fromage de Soja* [tofu]), which are nothing but imitations. Soy bread has a good taste, especially for diabetics. Soy ham (*jambon de Soja*) is but a vague imitation of the pork product. The seeds, themselves, are hard to digest and take a very long time to cook, even the yellow or white varieties. As for the soy sprouts (*germes de Soja*), which enjoyed some popularity before the war, which they deserved as an agreeable hors d'oeuvre, they are nothing but young mung bean sprouts (*de jeunes germinations du Haricot Mungo*).

Also mentions foods such as soy sauce, fermented tofu, and tofu, made from soybeans in India, Indo-China, China, and Japan. Tofu is known as *dau phu* in Annamite, *tao fou* in, Cantonese, *téou fou* in Chinese, and *to fou* in Japanese. A significant amount was being exported from China before the war. In Manchuria soybeans occupy 1/5 of the cultivated land. Speculates on the origin of the soybean. Address: Asst. to the Crop Service, Museum of Natural History (Assistant du Service de culture au Muséum d'histoire naturelle).

223. *Christian Science Monitor.* 1922. Japanese finance conquers rich province of Manchuria: Practical monopoly of soya bean oil secured, while Bank of Chosen [Korea] issues most of paper money. Oct. 4. p. 4.

• ***Summary:*** "Harbin, Manchuria, Sept. 1–What Japan has accomplished in the peaceful pursuit of conquering Manchuria is eloquently shown in the statement of the companies operating and their aggregate capital. At the end of July, according to official figures, there were 458 companies with a subscribed capital of 634,230,000 yen, of which 408,480,000 was paid up.

"With the practical suzerainty that has been obtained over the Chinese Eastern railroad by the rate agreement now in effect, there will doubtless be a decided impetus given to the investment of capital in North Manchuria. The stock in the Russian steamship companies that ply the Amur has been bought by the Japanese, and they are being operated under the names of dummies..."

"Soya bean monopoly: Should diplomatic pressure cause the withdrawal of the rate that has caused so much concern, Japan will still have much of the best of the business and financial situation in the best province in all of China. The oil that comes from soya beans is almost exclusively in Japanese hands, for the reason that they control the cake, which is 90

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per cent of the total output. They have some competition in the raw beans, as the Danes are heavy purchasers, shipping them to Copenhagen [via the East Asiatic Company] to be milled. The Chinese oil mill owners are unprogressive and the use of obsolete machinery gives them a kind of cake that can only be used in Japan, the oil remaining therein causing sourness [rancidity] in long shipments.

"Many of the best buildings in Harbin are falling into Japanese hands through mortgage foreclosures." "Most of the business of Manchuria is done with Bank of Chosen paper money,..."

224. Scanlon, Jerry. ed. 1922. Chanler [Candler] preparing to have transport Logan sent to Baltimore to be transformed into training schools for boys. *San Francisco Chronicle*. Nov. 21. p. 10.
• ***Summary:*** This a collection of articles about shipping. The section titled "S.F.-Korea service" begins: "Within a short time San Francisco and Korea will be connected by a direct steamship service..."

"Yee said his associates are interested in buying flour, agricultural machinery, shoes, hardware, cotton textiles and kerosene. They want to sell San Francisco buyers mattings, bristles, soya beans, castor beans, linseed, bamboo furniture and hides."

Cargoes now destined for Korea are "handled four times in trans-shipment before reaching their destination, which sometimes results in complete loss of the commodities."

225. **Product Name:** Soy Sauce.
**Manufacturer's Name:** La Choy Food Products (Importer). Made in China.
**Manufacturer's Address:** Detroit, Michigan.
**Date of Introduction:** 1922.
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** Ad in *Soybean Digest*. 1944. Sept. p. 12. "Genuine soy sauce." Soybean Blue Book. 1947. p. 72-73. The 2¼ by 3½ inch display ad is titled: "Genuine Soy Sauce" from "LaChoy Food Products, Archbold, Ohio. Division of Beatrice Foods Company."

Shurtleff & Aoyagi. 1982. History of Soy Sauce. p. 105. "One of the earliest importers and marketers of soy sauce in America was La Choy Food Products. The company was founded to produce mung bean sprouts in Detroit, Michigan, by Mr. Ilhan New (a Korean) and Wally Smith. Soon they were doing a booming business and by 1922 they were importing fermented soy sauce from China in wooden barrels to use as a seasoning in their Asian food products. In the early 1930s they began buying HVP soy sauce from Huron Milling Co. (now Hercules) and A.E. Staley, and selling it in small bottles as La Choy Soy Sauce."

Note 1. See also the history of Oriental Show-You Company, which was started in 1918 in Detroit, Michigan, by Shinzo Ohki, a Japanese man, who began by importing shoyu and tea from Japan. In late 1922 he moved his business to Columbia City, Indiana, and began making his own shoyu there in 1924.

Joe Staudt. 1985. Horizons (Beatrice Grocery Group). Summer. p. 1-7. In 1920 Wally Smith and Ilhan New, two friends from the University of Michigan, founded La Choy Foods in Detroit. Their first product was bean sprouts. In 1922 the business was incorporated as La Choy Food Products. The first La Choy-owned plant was built in Detroit in 1937. The Archbold, Ohio plant was built on its present site in 1942. The Company's long association with Beatrice started in 1943, when La Choy was bought by the Chicago-based company and became Beatrice's first non-dairy operation.

Note 2. This is the earliest record seen (May 2021) concerning La Choy. Note 3. This is the earliest document seen (May 2021) concerning Koreans working with soyfoods outside of Korea.

226. Mori, Tamezô. 1922. An enumeration of plants hitherto known from Corea. Seoul, Corea: Government General of Chosen. 372 p. + 174 p. 23 cm. [Eng; Jap; Lat]*
• ***Summary:*** In the chapter on "Leguminosae" are entries (p. 215) for: (1) Glycine Soja, Bentham. Called *Daizu* or *Mame* in Japanese, and *Kong* in Korean. (2) Glycine ussuriensis, Regel et Maack, is called *Tsuru-mame* in Japanese, and *Tolkong* in Korean; it grows wild in Korea. The author was born in 1884.

227. Ri-Koheki. 1922. Chôsen shôyu miso oyobi tôfu no seihô ni tsuite [The processes for manufacturing shoyu, miso, and tofu in Korea]. *Nippon Jozo Kyokai Zasshi* (*J. of the Society of Brewing, Japan*) 17(11):45-46. [Jap]
Address: Chosen Sotokufu Iin Yakuzai-shi.

228. Mori, Tamezô. 1922. An enumeration of plants hitherto known from Corea. Seoul, Corea: Government of Chosen. xiv + 372 p. + 174 p. See p. 215. Index. 23 cm. 5 plates. [Eng; Jap; Kor; Chi]
• ***Summary:*** The section titled Leguminosae mentions two species of Glycine. Glycine Soja, Bentham, is called daizu or mame in Japanese, and Kong in Korean. It is cultivated.

Glycine ussuriensis, Regel et Maack, is called tsuru-mame in Japanese and Tolkong in Korean. It grows wild in Korea. The names of 4 places that it grows are listed in Chinese characters: Jizhoudao, Jinzhou, Shuiyuan, Jiangjie. The author was born in 1884.

229. Piper, Charles V.; Morse, William J. 1923. The soybean. New York, NY: McGraw-Hill Book Company, Inc. xv + 329 p. Feb. Illust. Index. 24 cm. Reprinted unrevised in 1943 by Peter Smith Publishers, New York. [563 ref]
• ***Summary:*** This classic is the first comprehensive book about the soybean written in English, and the most important

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book on soybeans and soyfoods written in its time. Contains an excellent review of the world literature on soybeans and soyfoods with a 22-page bibliography on soy that is larger than any published prior to that time (563 references), a good description of the present status of the soybean worldwide based on the authors' extensive contacts, and a great deal of original information. It quickly became a key source for people and organizations working with soybeans and soyfoods in all countries, and a major factor in the expansion of the soybean in the western world. Because of its scope and influence, Soyfoods Center considers the year of its publication to mark the end of the "Early Years" of the soybean worldwide. It remained in print until about 1986.

Facing the title page is a list of "McGraw-Hill Agricultural and Biological Publications. Dr. Charles V. Piper, Consulting Editor." The authors and titles of twelve books already published in this series are listed.

Contents: Preface. 1. Introduction: Name of the plant, origin, literature, use by the Chinese and Japanese, present importance, future prospects in the U.S., recognition of the possibilities. 2. The commercial status of the soybean: Manchuria and China, Japan, Europe, U.S., other countries, summary of imports and exports of soybeans and soybean oil. 3. Botanical history of the soybean: History prior to Linnaeus' "Species Plantarum" 1753, Linnaeus' misunderstandings of the soybean, Prain's elucidation, other and the correct botanical name.

4. Agricultural history of the soybean: Vernacular names of the soybean, China, Korea, and Japan, India and neighboring regions, Cochin China, Malayan region, early introduction into the United States, later U.S. introductions, the early introduced varieties (grown in the USA by 1898–Ito San, Mammoth, Buckshot, Guelph or Medium Green, Butterball, Kingston, Samarow, Eda, Ogemaw or Ogema), soybean in Europe, varieties grown in Europe and identification, Hawaiian Islands, Australia, Africa, Argentina (p. 50), Canada ("Soybeans are grown in very small quantities in Canada and then usually as a forage crop"), Philippines, Egypt, Cuba (p. 52), British Guiana, Mauritius (p. 53), present culture distribution. 5. Culture of the soybean: Climatic adaptations, soil preferences, water requirement, preparation of seed bed, time of planting, methods and rate of seeding, seeding for pasturage, depth of seeding, inoculation, fertilizer reactions, cultivation, soybeans in mixtures (with cowpeas, sorghums, Sudan grass, Johnson grass, millet, corn, or sunflowers and corn).

6. Harvesting and storage of soybeans: harvesting soybeans for hay, silage, for the seed, seed yields, proportion of straw to seed, storing seed, separation of cracked from whole soybean seed, viability of soybean seed, pedigreed, inspected, registered, and certified seed. 7. Composition of the soybean: Proportions of stems, leaves and pods, composition of plant and seed, nutritive and mineral constituents, forms of nitrogen in soybean nodules, factors affecting oil content of seed. 8. Utilization of the soybean: Diversity of uses (a chart, p. 129, shows 59 products that can be made from soybean seeds, and 6 more that can be made from soybean plants), soybeans for green manure, pasturage, soiling, ensilage, hay, straw.

9. Varieties: Japanese classification of varieties, classification of varieties in Manchuria (3 yellow, 2 green, 3 black), botanical classifications, vital characteristics, descriptions of important varieties (43 varieties and 7 synonyms), key for identification, breeding and improvement, genetic behavior, oil content.

10. Structure of soybean seeds. 11. Soybean oil: Methods of extraction [Manchurian, and solvent], American oil mills, methods of shipping and marketing, prices, utilization in soap manufacture, food, paint manufacture, miscellaneous. 12. Soybean cake or meal: Feeding value, composition, use for feeding for dairy cows, cattle, swine, sheep, poultry, digestibility, injurious effects, fertilizer.

13. Soybean products for human food: Food value of the soybean, digestibility of the soybean and its products, mature or dry soybeans, immature or green soybeans (a "nutritious green vegetable"), soybean flour, digestibility of soybean flour, soybean bran (p. 225-26), soybean sprouts, soybean coffee, soybean or vegetable milk [soymilk] (preparation, composition, residue from the manufacture of vegetable milk [okara], utilization of soybean milk, condensed vegetable milk, vegetable milk powder, fermented vegetable milk), vegetable casein, tofu or soybean curd (names and brief history, method of manufacture, coagulating agents, manufacturing yields, digestibility, utilization of bean curd and manufactured products, bean curd brains or *tofu nao*, dry bean curd or *tofu khan*, thousand folds {*chien chang tofu*}, fried bean curd {*tza tofu*}, Fragrant dry bean curd {*hsiang khan*}, frozen tofu {*kori tofu*}, Chinese preparation, various dishes), natto, hamananatto [hamanatto], yuba, miso, shoyu [soy sauce], confections. 14. Table dishes of soybeans and soybean products: mature or dry beans, flour, tofu, sprouts (86 recipes). 15. Enemies of the soybean: bacterial, mosaic, fungous [fungus], and nematode diseases, insects, rodents. This last chapter is a comprehensive review of the literature on soybean diseases and insects published before 1922.

The Preface begins: "The soybean, also known as soya or soja bean, has assumed great importance in recent years and offers far-reaching possibilities of the future, particularly in the United States. It is, therefore, desirable to bring together in a single volume the accumulated information concerning this crop...

"The aim has been to present the information so as to make it useful from both agricultural and commercial standpoints, not omitting, however, much that is mainly of historical or botanical interest..."

The introduction begins: "There is a wide and growing belief that the soybean is destined to become one of the leading farm crops in the United States."

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Note 1. C.V. Piper lived 1867-1926. Note 2. This is the earliest English-language document seen (July 2003) that uses the term "soybean bran" to refer to soy bran.

Note 3. This is the earliest document seen (July 2003) in which Piper or Morse describe natto, Hamananatto [Hamanatto], yuba, or miso.

Note 4. This book was published by March 1923 (See *Ohio Farmer,* 10 March 1923, p. 313).

Note: The word "Russia" appears on 3 pages of this book in connection with soybeans: p. 18 (in 1912, 1913, and 1914 Russia imported soybeans, soybean cake, and soybean oil), p. 54 (cultivated in "southern Russia {Podolia, Samarow}"), p. 227 ("In Japan and southern Russia soybean coffee is prepared and put up in small packages for the market").

Note 1. The terms "Soviet Union" or "USSR" do not appear in this book–even though the Soviet Union was established in Dec. 1922.

Note 2. Podolia is in today's Ukraine. Address: 1. Agrostologist; 2. Agronomist. Both: United States Dep. of Agriculture, Washington, DC.

230. Piper, Charles V.; Morse, William J. 1923. Photographs and illustrations (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p.

• ***Summary:*** Photos show: (Fig. 1) Typical soybean plant (p. 1). (2) Plant of wild soybean (p. 2). (3) A fleet of junks engaged in carrying soybeans to Newchwang, Manchuria, from different points in the interior, taking away bean oil and bean cake to other places * (p. 6). (4) Soybeans in sacks brought to a bean center by horses in winter in Manchuria (p. 8). (5) Chinese bean cart loaded with beans in wicker containers in Manchuria (p. 8).

(6) Type of cart and method of hauling soybeans with a horse in Manchuria (p. 10). (7) Manchurian farmers hauling the bean crop to market in winter on sleds (p. 10). (8) Plants of a soybean variety from India (p. 38). (9) Plants of the wild soybean from Soochow, China, grown at the Arlington Experimental Farm, 1908 (p. 38). (Fig. 15) Soybeans grown on the edges of a rice field in southern China * (p. 58).

(16) A man in a field of the Peking variety of soybean grown in rows and cultivated (p. 61). (17) A broadcast field of soybeans showing how weeds have overrun the field (p. 61). (18) The ordinary grain drill furnishes a most convenient method of seeding in rows or broadcast (p. 63). (19) Soybeans and corn grown in alternate rows for pasturage; a man in a hat stands between the rows (p. 65). (20) The roots of a soybean plant, showing abundant development of nodules (p. 66).

(21) A man standing in a plat of soybeans without inoculation (in the foreground) and an adjacent plat which had been inoculated, in the background (p. 67). (22) A man seated on a cultivator pulled by two horses doing the last cultivation on a field of soybeans (p. 79). (23) Soybeans and sorghums grown in mixture for forage purposes (p. 80). (24) A field of soybean and Sudan grass grown in mixture for hay (p. 81). (25) A field of soybeans and corn grown in the same row for ensilage (p. 82).

(26) Soybean hay on frames. Under favorable weather conditions, hay can be successfully cured in this manner (p. 86). (27) A field of mature soybeans ready to cut for seed (p. 90). (28) Harvesting soybeans for seed with a bunching attachment on the mower (p. 90). (29) Self-rake reaper used in cutting soybeans for seed (p. 91). (30) Soybeans cut for seed with binder and soybeans placed in shocks for curing (p. 92).

(31) The ordinary gasoline threshing outfit which may be used in threshing soybeans (p. 92). (32) A special bean harvester used in gathering the soybean seed from the standing mature plants and also cleaning it (p. 94). (33) A special bean harvester by which the plants are cut, thrashed, and cleaned (p. 94). (34) A special soybean harvester used to gather soybean seeds from the standing mature plants, and which can be adjusted to level or ridged cultivation. On one side is written "The Little Giant Bean Harvester," manufactured by Hardy & Newsom, La Grange, North Carolina (p. 95). (35) Method of storing soybean seed awaiting shipment in Manchuria. The beans in sacks are stacked under Chinese mats (p. 98).

(37) Pasturing a corn and soybean mixture with sheep (p. 133). (38) Thrashing soybeans from the field and baling the straw (p. 141). (39) The larger plant is the Guelph or Medium Green which is very pubescent, while the smaller plant is a nearly smooth variety from Japan (p. 149). (40) Pods of soybeans showing the range in size and shape (natural size; p. 151).

(41) Seeds of the most important varieties of soybeans now grown in the United States showing the wide range in size and shape of seed. The name of each of the 20 varieties is given. A side view and a ventral view of each pair of seeds is given (p. 152). (42) Seeds of a black and white variety (Widower) from Korea. The white is due to the splitting of the outer later of the testa. A side view of six varieties is shown (p. 155). (43) A field of the Biloxi soybean, which requires a long season to mature (p. 163). (44) A man standing in a field of the Virginia variety of soybeans (p. 170). (45) Seeds of a natural soybean hybrid showing peculiar types of coloration (p. 175). (46) Pods of soybeans, hairy and smooth (p. 176). (47) A sterile soybean plant obtained from a natural hybrid (p. 176). (49) Seeds of an artificial soybean hybrid, showing peculiar types of coloration (p. 181). (56) An old style Chinese oil bean press, Manchuria (p. 195). (57) Coolies at Newchwang, Manchuria, carrying loads of soybeans from the junks to big stacks, where they are kept until the factory needs them for oil manufacture * (p. 196). (58) "Seeds and pods of the Hahto variety of soybeans, the seeds being especially valuable as a green vegetable" (p. 222). (59) Baskets of sprouted, small

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yellow soybeans and sprouted mung beans * (p. 226). (60) Men making soymilk, working with machinery with which the soybeans are ground and the milk strained. Note the 2 grinding stones and the cloth strainers suspended from the ceiling over the tub. The cabinet with rack for bottles is noted in the background (p. 228). (61) Motor stone mill for grinding soybeans in preparing tofu with brass water tank (A), funnel reservoir (B), stones (C), and brass guard (D) (p. 229). (62) Delivery coolies holding baskets full of bottles showing the way soybean milk is delivered by the factory in Changsha, China (p. 231). (76) A courtyard filled with large earthenware containers with cone-shaped wicker tops for ripening soy sauce mash [in Ichang (I-ch'ang or Yichang), Hupe / Hupeh / Hubei province, China]; a small, strong basket is placed into each, with its rim just above the surface of the mash. The soy sauce collects or accumulates in each basket and is then dipped out, ready for consumption * (p. 251). (77) A man standing next to an iron cauldron in which soybeans are boiled for the manufacture of soy sauce (p. 252). (79) Fermenting room for yeast and soybeans in preparation of soy sauce (p. 253). (80) Rows of pots with cone-shaped wicker lids filled with soybean and wheat mixture for soy sauce * (p. 254). (81) A box press in which sacks of fermented soybeans are placed for pressing out the liquid forming soy sauce * (p. 254). (82) A man next to a kettle for boiling the soy sauce. After it is boiled, the sauce is ready to be placed in kegs at left side (p. 255). (83) Rows of soybean sauce in jars ready for shipment (p. 255). (84) Root of a soybean plant showing rootknot caused by the nematode (*Heterodera radicicola*) (p. 285).

Note: * means photo by Frank N. Meyer in China or Manchuria.

Illustrations (line drawings) show: (Fig. 48) Flower of the soybean enlarged. Front view. Side view. Parts of the corolla, standard, wing, one of the keel petals. Stamens. Pistil (p. 177). Figures 50-55, from Kondo (1913) are described at Kondo.

Maps show where the soybean is extensively and successfully grown in: (Fig. 10) The Orient (p. 51). (11) North and South America (p. 52). (12) Europe and Africa (p. 53). (13) A map of Manchuria shows the soybean districts and seed production of different localities (p. 56). (14) An outline map of the United States shows the areas with shading to which the soybean is especially adapted as to varieties and purposes (p. 57).

A diagram (Fig. 36, p. 129) shows the various ways in which the plants and seeds of soybeans are utilized. Level 2: The first two categories are seeds and plants.

Level 3: Under seeds: Food products, oil, and meal. Under plants: Hay, ensilage, soiling.

Level 4: Under food products: green beans and dry beans. Under oil: Glycerin, explosives, enamels, varnish, food products, waterproof goods, linoleum, paints, soap stock, celluloid, rubber substitute, printing inks, lighting [illumination], lubricating. Under meal: Human food, stock feed, fertilizer. Under forage: Hay, ensilage, soiling.

Level 5: Under green beans: Green vegetables, canned, salads. Under dried beans: Soy sauce, boiled beans [from whole dry soybeans], baked beans [whole], soups, coffee substitute, roasted beans, vegetable milk, breakfast foods. Under soap stock: Soft soaps, hard soaps. Under oil–food products: Butter substitute, lard substitutes, edible oils. salad oils. Under meal–human food: Breakfast foods, diabetic foods, flour, infant foods, macaroni, crackers, [soy] milk.

Level 6: Under dried beans–vegetable milk: Cheese, condensed milk, fresh milk, confections, casein. Under meal–human food–flour: Bread, cakes, muffins, biscuit.

Level 7: Under cheese: Fresh, dried, smoked, fermented.

231. Piper, Charles V.; Morse, William J. 1923. Soybean varieties: Size and weight of seeds. Color of seeds (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 152-55. [14 ref]

• ***Summary:*** A full-page black-and-white photo (fig. 41, p. 152) shows the "Seeds of the most important varieties of soybeans now grown in the United States showing wide range in size and shape of seed." The varieties are: Mammoth, Hollybrook, Haberlandt, Manchu, Medium Yellow, Mikado, Ito San, Chiquita, Lexington, Hahto, Tokio, Guelph, Biloxi, Early Brown, Virginia, Barchet, Black Eyebrow, Wilson-Five, Peking, Ebony.

"None is truly globose, but this shape is closely approximated by some varieties. Others are much compressed. The great majority, however, are elliptic in outline, the thickness less than the breadth.

"The size and weight of the seeds vary considerably, the lowest weight per hundred seeds being 4.3 grams and the highest 21.2 grams. Soybean seeds weigh about 60 lb. to the bushel and this weight is recognized as standard throughout the United States. In Manchuria the weight per bushel is usually 40 lb."

Table 69 (p. 154) show the "Number of seeds per bushel and weight in grams of 100 seeds of the most important varieties." Mammoth 132,480 / 21.2. Hollybrook 175,680 / 17.3. Haberlandt 141,120 / 20.4. Manchu 140,160 / 20.0. Ito San 171,840 / 15.7. Midwest 261,120 / 10.6. Chiquita 274,560 / 10.4. Tokio 142,080 / 19.3. Guelph 148,000 / 19.0. Biloxi 112,000 / -. Hahto 75,000 / -. Early Brown 170,000 / -. Virginia 249,600 / 11.6. Jet 340,000 / -. Barchet 644,160 / 4.3. Black Eyebrow 147,840 / 19.1. Tarheel 164,000 / -. Arlington 306,240 / 9.0. Peking 348,480 / 7.8. Wilson-Five 327,360 / 9.8. Ebony 345,000 / -. Lexington 215,000 / -.

"Color of seeds: Most varieties of soybeans have unicolored seeds in the following colors: Straw yellow, olive yellow, green, olive, brown, and black, the last really a dark violet. Straw-yellow seeds are in some varieties very pale, especially when old, and are sometimes erroneously called white, but no truly white seeds are known in soybeans...

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Bi-colored seed occurs in but few varieties... Some varieties have their seeds brindled brown and black, the two colors somewhat concentrically arranged... The hilum or seed scar may be of the same color as the seed coat... In a few varieties, as in Ito San, there is a minute brown spot on the micropyle which is diagnostic."

A quarter-page photo (fig. 42, p. 155) shows the "Seeds of a back and white variety (Widower) from Korea." The white is due to the splitting of the outer layer of the testa.

232. Piper, Charles V.; Morse, William J. 1923. Agricultural history of the soybean: China, Korea and Japan (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 36-37.

• ***Summary:*** "The soybean is a plant of very early cultivation in China. According to Li-Yu-Ying and Grandvoinnet (1911-1912) the soybean is described in the book of Materia Medica 'She-non' written over 5,000 years ago. Note 1. This is probably the *Shennong Bencao Jing* (abbreviated *Benjing*) [Classical Pharmacopoeia of Shennong, the Heavenly Husbandman], which appeared in about AD 100.

"The celebrated dictionary of Sui Sham describes the plant under the name of *'tchouan.'* Note 2. This is the earliest document seen (July 2007) that mentions the name "Sui Sham." We have been unable to find any dictionary compiled by a man who name sounds even vaguely like his.

In another ancient dictionary, the 'Kouang-ia' [sic, *Guangya,* by Zhang Yi, AD 230] dating from the time of the Christian era, the soybean is called *ta-teou* or grand pea and also *sou.* It seems very probable that the names soi, soy, soya and soja are all derived from the ancient Chinese name sou.

"In Manchuria the soybean is grown to a greater extent than in any other country, and its culture there is doubtless ancient. From Korea there have been sent to the United States Department of Agriculture many distinct varieties, the large number indicating long cultivation in that country. The culture of the soybean in Japan is likewise very old and many species peculiar to that country are in cultivation.

"No comprehensive account of the agricultural history of the soybean in any of these countries has yet been attempted, but doubtless much information is contained in ancient Chinese and Japanese literature.

"Several varieties different from any secured elsewhere have been introduced into the United States from Formosa, and the plant has probably been cultivated there for a considerable period."

Korea (p. 14): "The beans produced in Japan are believed to be superior in quality to those of Manchuria or Chosen (Korea) and are used exclusively in the manufacture of food products."

Korea (p. 154-55). Color of seeds. "Among recent introductions from Chosen (Korea) were several black and a few brown varieties with the outer layer of the testa (seed coat / hull) broken by numerous cracks so as to expose the inner white layer (Fig. 42). In the case of the black sorts this splitting has a net-like appearance, giving the beans a black and white color." Fig. 42 shows six soybeans. The caption: "Seeds of a black and white variety (Widower) from Korea. The white is due to the splitting of the outer layer of the testa."

233. Piper, Charles V.; Morse, William J. 1923. The commercial status of the soybean: Japan (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 13-16.

• ***Summary:*** In production and utilization, the soybean occupies a most important position among the various legumes grown for seed in Japan. It is extensively cultivated from Hokkaido province in the north, to Formosa in the south. The data relative to the production and commerce of the soybean and soybean products in Japan are more extensive than for China and Manchuria, and furnish rather valuable information concerning the importance of this crop.

"Acreage and Production: The soybean is grown by the Japanese farmers mainly for grain and not to any considerable extent as a green manure crop. The average annual production of seed is about 18,000,000 bu. The following table shows the acreage and production in Japan during the decade [sic] 1897 to 1919. The principal bean-producing provinces are Hokkaido, Ibaraki, Saitama, Iwate, Niigata, Nagasaki and Kumamoto, but there is no province where the annual production does not exceed 50,000 bu. The province of Hokkaido has the largest acreage and produces the highest quantity and best quality of beans.

Utilization: The soybean forms one of the most important articles of food in Japan. It is one of the principal ingredients of soy sauce, miso, tofu and natto. The beans are eaten boiled or baked or in powder form for soups. Sometimes they are picked green, boiled and served cold with soy sauce, and sometimes as a salad. A vegetable milk is also produced from the bean forming the basis for the manufacture of vegetable cheese. The milk is not only used in the fresh state, but a form of condensed milk is also manufactured from it. All these foodstuffs are used daily in the Japanese homes. For the poorer classes they are the principal source of protein and considered indispensable as articles of food in the diet. Owing to their large utilization as human food, the domestic soybeans are used only to a limited extent in the feeding of live stock. To supply the protein ration for animals deficient in that nutrient, the beans are sometimes boiled and fed mixed with straw, barley and bran. The beans, especially those imported from China and Manchuria, are used extensively in the production of oil and cake. The oil is used as an article of diet and for various technical uses, while the residue or bean cake is used extensively as a fertilizer and as a cattle feed.

"Cost of production and market prices: Accurate data as to cost of production are not available, but estimates made

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by Japanese agricultural experts, place it about $10.00 per acre, exclusive of taxes, or about 65 cents per bushel. The beans produced in Japan are considered to be superior in quality to those of Manchuria and Chosen (Korea) and are used exclusively in the manufacture of food products. Prior to 1914 the prevailing wholesale price of domestic beans in Japan was about $1.00 per bushel while for imported beans it was about 70 cents per bushel.

"Imports: Japan has always been a large consumer of soybeans from China and Manchuria, the greater part of the beans being used in the manufacture of oil and bean cake. In amount and value the importation of soybeans is second only to rice. The amounts and values of soybeans imported are shown in table VII for the years 1903 to 1907 inclusive, and 1911 to 1914 inclusive.

The bean cake manufactured in Japan forms only a small proportion of the total used by Japanese farmers. Large amounts of bean cake are annually imported as shown in the following table. Previous to 1903, bean cake was the largest in amount among imported fertilizers.

Exports: In addition to supplying domestic demands, Japan has exported beans, bean oil, miso (bean cheese) and soy sauce in large quantities to American and European countries as shown in the following tables. The exports of beans and bean oil have only become of importance since the development of the American and European trade. Prior to 1914, soybeans were not listed separately.

234. *USDA Bureau of Plant Industry, Inventory.* 1923. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from April 1 to May 31, 1920. Nos. 49797 to 50647. No. 63. 99 p. March.

• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ. (*Glycine hispida* Maxim.)

49828-49833. "From Yokohama, Japan. Beans presented by Robert Fulton & Co. Received April 2, 1920. Quoted notes by Mr. Fulton:

"49828. '*Kuro mame* (black soy bean).'

"49829. '*Kuro Teppo mame* (round, middle-late, black soy bean).'

"49830. '*Nakate mame* (middle-late, white soy bean), seed larger than *Wase mame.'*

"49831. '*Okute mame* (late white soy bean).'

"49832. '*Shiro daizu* (white soy bean).'

"49833. '*Wase mame* (summer bean), small seeded early white.'

"49834. From Aizu Wakamatsu, Japan. Beans presented by Rev. Christopher Noss. Received April 2, 1920. '*Ogon daizu* (golden soy bean).' (*Noss.*)

"The oil of the bean is used for frying, as a butter substitute, for lubricating, for water-proofing clothes, for medicine, and in the manufacture of soap, candles, guncotton, and artificial rubber. The residue after the oil has been extracted has been used for cattle feed, but is now mixed with wheat flour for food purposes. The entire bean is slightly roasted, pulverized [to make kinako], and mixed with flour to make light cakes and to give flavor to boiled rice; it is cheaper and more nutritious than flour. (Adapted from *Parry, Travel Sketches, Japan Advertiser, January 25, 1920.*)'

"49911/49921. From Techow, Shantung, China. Seeds presented by Miss Alice Reed through Prof. Henry Conrad, Grinnel College, Grinnel, Iowa. Received April 21, 1920. Quoted notes by Miss Reed.

"49918-49920.

"49918. 'Black bean.'

"49919. 'Yellow bean.'

"49920. 'Large green bean.'

"50382/50387. From Foochow, Fukien [Fujian], China. Seeds collected by C.R. Kellogg. Received May 27, 1920. Quoted notes by Mr. Kellogg.

"50385. 'Yellow bean from Hokchiang (Futsing).'

"50440-50441.

"50440. '*Deu tz* (bean). The only yellow soy bean known here and the one referred to when beans are spoken of unless some other variety is definitely mentioned. A field crop; clay preferred. Usually planted right after rice is reaped, making a rotation of rice in the spring and beans in the fall.'

"50441. '*U deu* (black bean). The only other type of soy bean grown here. Rather heavier yielder and more vine than the yellow, but not grown very much. A field crop preferring medium-heavy clay soil. Collected at the farm of Lee U. Ken.'

"50522-50524. From Mukden, China. Seeds presented by Albert W. Pontius, American consul general. Received June 7, 1920. Market beans requested for the Office of Forage-Crop Investigations.

"50522. '*Hei tou* (black).' 'A small flat shining black bean used when boiled, salted, and fermented as the main ingredient in a sauce; also fed, when boiled, to water buffaloes.' (*Frank N. Meyer.*) For previous introduction, see S.P.I. No. 45294.

"50523. '*Hsiao chin huang tou* (small golden yellow bean).'

"50524. '*Pai mei tou* (white-crested bean).' A late maturing bean, yellow with a 'white eyebrow.' For previous introductions, see S.P.I. No. 30745.

"50531/50539. From Keijo, Chosen (Korea). Seed presented by Miss Katherine Wambold. Received June 21, 1920.

"50535-50536.

"50535. '*Kong* Bean.' For previous introductions, see S.P.I. No. 42059.

"50536. '*Kong* bean; this is used for making sauce.'" Address: Washington, DC.

235. Slosson, Edwin E. 1923. Catching up with China.

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*Scientific Monthly* 17:283-85. Sept.
• ***Summary:*** The soy bean "was first introduced to America in 1804, but it was a hundred years before we could be induced to take it seriously... But in the last ten years it has rapidly come to the front as one of our major crops and is likely in the next ten years to go ahead of oats in acreage in some of our states... The latest bulletin of the Department of Agriculture lists fifty different uses for soy products, and doubtless Yankee ingenuity can and will add more when we get our minds to working on it.

"Even the Japanese have not exhausted their ingenuity in this field, long as they have been at it. A Japanese scientist named Sato has invented a new plastic which he has called, according to American precedent, 'Satolite.' It is made by precipitating the protein with sulphite, hardening it with formaldehyde, and molding it under heat and pressure into combs, buttons and whatever we make from hard rubber or celluloid or the casein of milk.

"The soy bean is rich in protein and fat, and lacking in starch; in that more like animal than like vegetable food. You can make a milk out of it by simply soaking the dried beans till soft, then crushing fine in a meat grinder, boiling in three times the volume of water for half an hour and straining through cloth. If you do not like the flavor you can add vanillin or something else. This vegetable milk sometimes agrees with children when cow's milk does not. It can also be used for cakes and custards.

"The soy milk may be made into curds and cheeses of various sorts which form a large part of the diet of orientals, but for which we have not yet acquired a taste. Soy meal has come into common use in America, not only as a cattle food, but also for bread and pastry mixed with three parts wheat flour.

"Soy sauce has long been familiar but quite unknown to us. We did not recognize it under its aristocratic English name and its added flavors. But when the high cost of living drove us to the chop sueys, we became acquainted with the cruet of brown salty sauce called 'shoyu,' and we found, as the Chinese had found thousands of years before, that a sprinkling of it would make tasty a large lot of rice and serve as substitute for meat, both in taste and nutriment. Soy sauce is of several sorts. If you want it strong take the Korean. If you want it sweet take the Japanese. It is made by fermentation and the flavor depends upon the way it is brewed and the length of time it is left to ripen. To suit the palate of a Korean connoisseur the jars must be exposed to the sunshine by day and covered by night for a period of thirty years. We Americans, when we get to making it, will undoubtedly speed up the process.

"So far the oil is the most in demand of the soy products. The beans contain from 18 to 20 percent. of a fine palatable oil, which we have imported at the rate of a hundred thousand tons in a year, but which we are now growing for ourselves. It can take the place of cottonseed oil in vegetable substitutes for lard and butter, and of linseed oil in paints. Formerly the oil went mostly to Germany and England, but the war made a shift in the currents of Pacific trade, and we learned to appreciate its value. But we have a lot to learn yet before we catch up with the orientals in the utilization of this multifarious bean."

236. **Product Name:** Soy sauce.
**Manufacturer's Name:** Chinese & Korean Soy Co. (C.K. Soy Co.).
**Manufacturer's Address:** 2406 Notley, Honolulu, Oahu, Hawaii. Phone: 89550.
**Date of Introduction:** 1923.
**New Product–Documentation:** Directory of Honolulu and the Territory of Hawaii. 1923. p. 224. Chinese & Korean Soy Co. (C.K. Soy Co.), W.K. Ahn, mngr, groceries, canned goods, general merchandise and soy. 346 N. Beretania. Tel 2541. Soy Factory, 2406 Notley, Tel. 89550. P.O. Box 1454.

237. Bottari, Fulvio. 1923. La soja nella storia, nell'agricoltura e nelle applicazioni alimentari ed industriali [The soybean in history, in agriculture, and in food and industrial applications]. Torino & Genova, Italy: S. Lattes & Co. 243 p. Preface by Prof. Oreste Mattriolo (R. Università di Torino). With 34 illust. 22 cm. [25 ref. Ita]
• ***Summary:*** This is the first major book in Italian about the soybean.

Contents: Preface. Reason for the work; its scope and limits. Part I: The origin and history of the soybean. Reason for this history, the origin of the soybean and its early dissemination, soya (including production statistics) in Oriental countries (China, Manchuria, Japan, Formosa, Korea, French Indochina), how the soybean was introduced to Europe, the cultivation of soya in France, Soya in England, Austria, Germany, Denmark, Holland, Russia, Sweden, Alsace-Lorraine (now in northeast France), Spain, Italy, America, Conclusion.

Part II: Cultivation of soya.

Part III: Soya in the feeding and nutrition of humans and animals. 1. The analysis and physiology of metabolism as an element in the study of nutrition. 2. Soybean forage in the feeding of animals. 3. Soybeans (*il grano di soja*) and soy products in the feeding of humans and animals: Commercial and nutritional value and digestibility of the soybean, how to prepare and cook whole soybeans, soy broth, thick soups, salads, and meat dishes, soy purée (*puré di soja*), soybean cakes (*torté di soja*), soybean sprouts (*germi di soja*), roasted soybeans (*grano di soja come frutta secca*), soy coffee (*caffé di soja*), soy chocolate (*cioccolata di soja*), soy confections (*confetture di soja*), special soy sweets and chocolates for diabetics and tuberculosis patients, the soybean as a feed for animals.

Note 1. This is the earliest Italian-language document seen (Nov. 2012) that mentions soy coffee, which it calls

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*caffé di soja.*

4. Flour, pasta, and bread in feeding. 5. Soymilk (*il latte di soja*) and its use in the feeding of animals and humans. 6. Tofu (*il formaggio di soja;* p. 209). 7. Soy oil and oil-cakes (*L'olio ed i panelli di soja;* p. 212). 8. Condiments and sauces: Natto, miso, soy sauce (*le salse,* called *Schogon* [sic] in Japan, *Tsinag-Yeou* [sic] or *Tao-yu* in China, *Ketjap* in Java, and *Tuong* in Annam). 9. Enzymes (I fermenti, incl. urease). 10. Conclusions.

Part IV: Industrial applications of soya. 1. Various industrial applications of soya and its derivatives. 2. Chemical composition of vegetable casein compared with animal casein. 3. The industrial applications of animal casein. 4. If it is possible, it is convenient, necessary and appropriate to replace vegetable casein for the animal casein in industrial applications. 5. Vegetable casein factories. 6. Process for extracting casein from soy. 7. How to manufacture galalith / galalite.

Part V: General conclusions.

The first test of the lactation of calves with soymilk was conducted in the winter of 1916-17 by the Bonafous Institute in Turin. The results were splendid, and have encouraged eminent pediatricians such as Dr. Casalini, Prof. Dr. Alberto Muggia (teacher of clinical pediatrics at the University of Turin), and Dr. Enrico Gasca (vice director general of infants at Turin) to extend their experiments (p. 6).

A table (p. 31) shows soybean and cotton hectarage and production in Korea from 1909 to 1917. Soybean hectarage increased from 277,776 ha to a record 487,134 ha. Soybean production grew from 1,991,126 quintals (1 quintal = 100 kg or 0.1 metric tons) to a record 3,816,498 quintals.

Page 35: "Prof. Rouest of Luxey (Landes) in France wrote us on 30 Nov. 1921. 'I have finished only the period of acclimatization of the soybean. It remains for me to propagate it a little everywhere. The experiments of 1921 were extended in all the Departments, being viewed from an industrial and commercial point of view. I must now study which variety adapts among those I am cultivating. Soy flour will not be able to be made until we have many thousands of hectares under cultivation, and then we will be able to think of other applications as well... Actually the firm Hendebert de Lion sells its flour, originating in China, at 10 French francs per kg, a prohibitive price.'"

Page 206: At the pediatric congress held in Milan in Sept. 1922, the question of lactation (feeding children) with vegetable milk was discussed in a favorable way, proposed by Prof. Muggia and sustained by the illustrious Prof. Berghius, Director of the Pediatric Clinic of the University of Padua, and by Prof. Francioni of Bologna. We can also add that experiments on lactation are proceeding in Italy at the pediatric clinics of Turin, Bologna, Padua, Genoa, and Florence, and also at the Infant's Dispensary in Turin.

Photos and tables are discussed in a separate record.

A diagram (p. 227) compares the chemical composition of animal casein and vegetable casein.

Note 2. Quite a bit of the historical and non-Italian information in this book comes from Léon Rouest's 1921 book *Le soja et son lait végétal: Applications agricoles et industrielles.*

Note 3. This is the earliest Italian-language document seen (Jan. 2012) that mentions natto, of which it says: "il *Natto* in Giappone che corrisponde al *Tao-Teche* della Cina."

Note 4. This is the earliest Italian-language document seen (Jan. 2013) that mentions soy sprouts, which it calls *germi di soja.*

Note 5. This is the earliest Italian-language document seen (Sept. 2016) that mentions soybean cake (a co-product of soybean oil), which it calls *panelli di soja.* Address: Dr. of Economic and Commercial Science, Turin [Torino], Italy.

238. Bottari, Fulvio. 1923. La soja nella storia, nell'agricoltura e nelle applicazioni alimentari ed industriali [The soybean in history, in agriculture, and in food and industrial applications (Photos and tables–Document part)]. Torino & Genova, Italy: S. Lattes & Co. 243 p. Preface by Prof. Oreste Mattriolo (R. Università di Torino). With 34 illust. 22 cm. [25 ref. Ita]

• ***Summary:*** Photos show: (0) An infant fed soymilk in Turin in 1921, together with a table showing its weight gain from 18 July 1921 until 14 Jan. 1922 (p. 7). (Figs. 1-3) Three different varieties of soybean plants (p. 70-71). (4) The leaves of 3 different varieties of soybean plants (p. 72). (5) Close-up of the stem and pods of a soybean plant (p. 73). (6) Beans and pods of soybeans (p. 74).

(7-8) Different stages of germinating soybean seeds (p. 75). (9) Close-up of soybean roots and nodules (p. 76).

(10-12) Fields of soybeans at the "Istituto Bonafous" (p. 106, 108, 113). (13-14) Field of soybeans grown with corn (p. 122, 123). (15-18) Cellular transverse section through a soybean (facing p. 152).

(20-21) Soy flour and wheat flour, each in a sack and loose (p. 177). (22) Pasta made from soy (p. 181). (23-28) Bread and baguettes / breadsticks made with various percentages of soy (*Pane di soja*) (p. 183-89).

(29-30) Soy bran and wheat bran, each in a sack and loose (p. 191). (31) Two bottles of soymilk (p. 194). (32) Two bottles of soy oil (p. 214).

Tables show: (1) Imports and exports of soybean seeds from 1910 to 1919 by various countries, Imports into Europe (Denmark, France, Great Britain and Ireland, Norway, the Low Countries {Netherlands, Belgium, Luxembourg}, Sweden), into Asia (Netherlands Indies {today's Indonesia}, Java & Madura, External Possessions, Japan, Formosa). Exports from Europe (France, Great Britain and Ireland, the Low Countries), from Asia (China, Japan, Formosa) (p. 3).

(2) Imports and exports of soybean oil from 1910 to 1919 by various countries, Imports into Europe (Denmark, Germany, Denmark, France, Great Britain and Ireland,

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the Low Countries {Netherlands, Belgium, Luxembourg}, Russia {both European and Asiatic} Sweden), into North America (Canada, United States), into Asia (Netherlands Indies {today's Indonesia}, Java & Madura, Japan, Formosa), into Africa (Egypt). Exports from Europe (Denmark, France, Great Britain and Ireland {re-export}, the Low Countries, Sweden), from North America (United states, re-export), from Asia (China, Japan) (p. 4).

(3) The weight gained by a baby fed soymilk at the dispensary of Lattanti at Torino. The trial ran from 18 July 1921 to 14 Jan. 1922. The baby's weight increased from 3,000 gm to 6,140 gm (p. 7).

(4) Production of soybeans in China in 1916 and 1917 by color. And production of soybean cakes and soy oil in China in 1916 and 1917 (p. 21).

(5) Exports of soybeans and soybean cakes from Manchuria yearly from 1905 to 1908 (data from Rouest) (p. 23).

(6) Area and production of oilseed plants (cotton, linseed, colza/canola, peanut, and soya) in Japan from 1877 to 1920. Soy is by far the greatest, and both the area and production of soybeans increase during this time (p. 26).

(7) Production of the principal vegetable oils (colza/canola, sesame, cotton, linseed, soya, peanut, coconut) in Japan from 1886 to 1918.

(8) Area and production of major oilseeds (cotton, soja) in Korea from 1909 to 1917 (p. 31). Soybean hectarage increased from 277,776 ha to a record 487,134 ha. Soybean production grew from 1,991,126 quintals (1 quintal = 100 kg or 0.1 metric tons) to a record 3,816,498 quintals.

(9) Imports of soybean oil to England from 1910 to 1919 (p. 38). (10) Imports of soybean oil to Denmark from 1910 to 1919 (p. 46). (11) Imports of oilseeds (copra, soya, peanut, sesame, linseed, colza / canola & mustard seed) to Denmark in 1917 (p. 46).

(12) Exports of soybean oil from Denmark from 1910 to 1919 (p. 47). (13) Imports of soybean oil to the Low Countries from 1911 to 1919 (p. 47). (14) Imports of soybean oil to Russia from 1909 to 1915 (p. 48). (15) Imports of soybean oil and cottonseed oil to Sweden from 1912 to 1919 (p. 48). (16) Imports of soybean oil to Alsace Lorraine from 1913 to 1919 (p. 49). (17) Area of oilseeds and production of oil in Italy from 1909-1920 (p. 50). The area was about constant and the production of oil increased. (18) Median annual production of oil in Italy from 1870-1874 to 1920 (p. 50). Production decreased. (19) Trial comparing the nutritional value of cow's milk and vegetal milk (soymilk). The name of each of the 8 calves is given (p. 56-57). (20) Area and production of soybeans in the United States from 1909, and 1917-1919.

(21) Imports of various vegetable oils (olive, palm, coconut, soya) to the United States from 1910 to 1919 (p. 63).

(22) Cultivation of soybeans in Spain as described by Coll. D. Santiago Felice Valderrama of Montilla. The five columns are: (a) Classification, from 0 to 10. (b) Provenance / Source (China). (c) Seed color. (d) Development (large, medium, small). (e) Maturity date (Late, semi-late, early, etc.) (p. 85).

(23) Fertilizer tests with Soja hispida, The five columns are: (a) Parcel number, 1-9. (b) Fertilizers used and dosage. (c) Stems, kg per 50 square meters. (d) Production of pods, kg per 50 square meters. (e) Grain, kg per 50 square meters (p. 95).

(24) Chemical composition of soybeans grown in Vienna, yellow from Mongolia, Yellow from China, reddish brown from China. Composition is given for both the original seed and for its progeny (p. 98).

(25) Weight of soybean stems, pods, and seeds of soybeans grown by Prof. Manvilli of the Bonafous Institute (p. 98).

(26-28) Effect of planting distance and pattern on the weight of soybean stems, pods, and seeds (p. 102, 105).

(29) Effect of place of origin and variety on the time to germination, time of flowering and formation of the pods. The soybeans came from Tunisia, China, Ceylon, New South Wales, Podolia [in today's Ukraine], and Lithuania, France, Northwestern Italy (*Piemonte*, [Piedmont]), United States, Indochina [Cambodia, Laos, Vietnam, Burma, Siam, Peninsular Malaysia, Singapore], and India (p. 109).

(30-31) The effect of applying electrical voltage to soybean plants on the yield of stems, pods, and seed (p. 110-111).

(32) Ito San Soybean production per ha in Connecticut from 1877 to 1918 (p. 120).

(33) The yield of protein and oil from common beans, peas and soybeans (p. 121).

(34) The yield of various minerals from the stem, leaves, pods, seeds and entire plant (p. 121).

(35) Chemical analysis of the soybean plant, on both an "as is" and a dry basis, in the stem, foliage, pods, and entire plant (p. 141).

(36) Composition of the soybean–various parts from various places. entire plant, forage after the plant blooms and sets pods, hay from Japan, hay from Massachusetts, straw from Massachusetts (p. 142).

(37) Nutritive elements in hay from different types of plants, both green and dry, for crude substance and digestible portion (p. 143).

(38) Distribution of the various nutritive components in the various parts of the soybean seed. The parts are entire seed, cotyledons, embryo, seedcoat (*scorza*) (p. 145).

(39) Complex analysis of the seed of the soybean (in parts per 100) (p. 146).

(40) Analysis of the seed of various colors of soybean by various researchers, incl. Dr. Emil Pott, Meissl & Böcker, & Pellet.

(41) Nutritional composition, both crude substance and

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digestible portion, of various protein sources: beef, common beans, lentils, peas, broad/fava beans, soybeans (p. 149).

(42) Protein content of various basic protein sources, incl. meat, peas, broad beans and soya (p. 155). (43) Bar graph. The soybean as a source of nutrients, compared with other legumes, wheat flour, soy flour, wheat pasta, soy pasta, 75% wheat + 25% soy pasta, wheat bread, soy bread, 75% wheat + 25% soy bread, cow's milk, soymilk, mother's milk (p. 159).

(44) Chemical composition of soybean hay according to Oscar Kellner 1885, p. 82 (p. 162).

(45)

(45) Chemical composition of soybean hay according to Emil Pott 1907 (Vol. 2, p. 3) (p. 163).

(46) Composition of soybean straw, according to Emil Pott (p. 165).

(47) Chemical composition of soybean pods according to Emil Pott (p. 165).

(48) Nutritional composition of soy coffee from Tyrol and Dalmatia (p. 171).

(49) Nutritional composition of soy jams (*confetture di soja*).

(50) Nutritional composition of soy flour compared with the flour of various cereals (p. 176).

(51) Nutritional composition of various types of soy pasta: 100% soy, 25% soy, pasta from Naples (p. 182).

(52) Nutritional composition of soy bread, four analyses, compared with two analyses of wheat bread (p. 185).

(53) Nutritional composition of soymilk made from whole soybeans or soy flour (p. 195).

(54-55) Nutritional composition of soymilk, 7 analyses, compared with mother's milk, cow's milk and goat's milk (p. 200-201).

(56) Nutritional composition of okara (the residue from making soymilk), various analyses (p. 207).

(57-58) Nutritional composition of soybean oil vs. cottonseed oil, and according to five different analysts (p. 213).

(59) Nutritional composition of soybean cake according to five different analysts (p. 215).

(60) A diagram compares the chemical composition of animal casein and vegetable casein (p. 227).

(61) A table compares the chemical composition of animal casein and vegetable casein (p. 228). Address: Dr. of Economic and Commercial Science, Turin [Torino], Italy.

239. Capone, Giorgio; Grinenco, Ivan; Costa, Mario. eds. 1923. Oleaginous products and vegetable oils: Production and trade. Rome, Italy: International Institute of Agriculture, Bureau of Statistics. 545 p. See p. XX-XXI, 140-41, 144-47, 442-43, 480-81. No index. 24 cm. [Eng]

• ***Summary:*** In Sept. 1921 the IIA published a monograph on this subject in French. By popular demand, this English edition was published 2 years later. Contents: Introduction (p. VII-XXXII): General scope, general survey of the 9 principal crops (including soya beans) plus others, final points of consideration. Part I (p. 1-402) is an analysis by region, and within each region by country, countries of vegetable oil production and trade. Regions are Europe, North and Central America, South America, Asia, Africa, and Oceania.

Major countries: Denmark (p. 20-23; oil production 1916-1921, oil imports 1910-1922). France (p. 26-34). Germany (p. 35-40). Great Britain and Ireland (p. 41-43). Netherlands (p. 65-68). Norway (p. 69-70). Russia–European and Asiatic (p. 84-93). Sweden (p. 100-03). Canada (p. 111-15). United States (p. 131-47). Argentina (p. 179-85; no soy). Brazil (p. 187-90; no soy). Ceylon (p. 218-21; no soy). China (p. 222-26). Dutch East Indies (Java & Madura, Other islands; p. 229-33). Formosa (p. 238-39; gives soybean production and acreage from 1900 to 1921). Japan (p. 259-64; gives Japanese soybean production and acreage from 1877 to 1921, and production of soya oil from 1909 to 1920. Japan's leading oil produced domestically from 1895 was rapeseed oil). Korea (Chosen, p. 265-67). Kwantung Leased Territory (p. 268). Hawaii (p. 388; Hawaii produced 17 long tons of soybeans on 20 acres in 1909, and 10 tons on 15 acres in 1919).

Part II (p. 403-506) is recapitulatory tables for both soya beans and soya bean oil: Area and production by crop (1909-1922), Trade by crop (1909-1921). Cottonseed (p. 410-11). Linseed (p. 414-15). Soya beans (p. 442-43, 480-81).

Pages XX-XXI state: "In the absence of data from China, the chief grower of soya beans, it is impossible to make even the roughest estimate of the world's yield of this product. Among the few countries of any moment as producers of soya beans, we may mention: Japan, where this crop increased rapidly between 1877 and 1887 and then became nearly stationary at about 500,000 long tons [2,240 lb per long ton] per annum, although in the last few years some further increase has been noticeable; Korea, with a continuous increase in area and yield, from 1910 onwards, (the crop of 1920 was about 600,000 long tons); and United States, where from 1909 to 1921, the area under soya beans increased from about 1,600 to 186,000 acres with a production of about 70 thousand long tons. It may be observed that the increase of this crop during the last twenty years is supplemented by attempts already made and in progress for its introduction into countries with a favourable climate, especially into Africa."

"Exports are exclusively from China and Korea. The Chinese exports have increased very greatly during the last thirty years. Before 1890 they were insignificant, in 1901 they had reached a total of more than 100 thousand tons, and during the decade from 1909 to 1918 they averaged about 600 thousand tons and reached their maximum in 1919 with about 1 million, declining in the two following years to 600 thousand long tons.

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"With regard to Korea although we have not a complete series of data for the period 1909-1918, the ever-increasing importance of its exports of soya beans may be emphasized; during the last few years these have been double the average of the years 1909-1911, and in 1921 they already equalled one third of the Chinese exports."

"The chief importers, in Europe are Great Britain, Denmark, and Holland, and, in Asia, Japan, and the Dutch East Indies. To these must also be added Russia-in-Asia as the Chinese Customs register large exports destined for the Russian Pacific ports."

"England, which at one time constituted the greatest market for the soya bean, has continually reduced its imports: these were 420 thousand long tons in 1910, 76 thousand in 1913, and about 60 thousand in the two years 1921-1922... In the Asiatic market, represented in this case by Japan and the Dutch East Indies, imports have continuously increased especially in the last few years of the period under consideration.

"The trade figures of *soya oil* (see tables on pages 480 and 481) indicate that China is the principal exporter, having quadrupled its shipment during the period from 1914 to 1919, attaining in the latter year a total of over 140 thousand long tons."

Other countries unrelated to soy (some no longer in existence): Europe: Esthonia [Estonia], Luxemburg [Luxembourg], Serb-Croat-Slovene State. North and Central America: British Honduras [named Belize after about 1975]. South America: Curaçao [Curacao; no soy], Falkland Islands, British Guiana, French Guiana. Asia: Aden [became part of independent Yemen in 1967], Andaman and Nicobar Islands, Bahrein Islands [Bahrain], Borneo (British Protectorates), Dutch East Indies, Federated Malay States, Formosa, French Settlements in India, Indo-China, Persia, Portuguese India [annexed in 1962 by India; became Union territory of Goa, Daman, and Diu], Protected Malay States, Russia, Japanese Saghalin (Karafuto), Siam [later Thailand], Straits Settlements [later Singapore], Timor and Cambing, Wei-Hai-Wei [Weihai, Wei-hai, or Weihaiwei; seaport in northeast Shandong province, northeast China]. Oceania: Australia, Fiji Islands, French Settlements in Oceania, Gilbert and Ellice Islands, Hawaii, Island of Guam, New Caledonia, New Hebrides, Papua, Samoan Islands (American Samoa), Solomon Islands, Territory of New Guinea (*Later German New Guinea*), Tonga, Western Samoa (*Formerly German Samoa*).

Note 1. This document gives a clear definition of the geographical region named "Oceania."

Note 2. A "quintal" is probably 100 kg. Address: 1. Doctor of Economics; 2. Doctor of Agronomics. Both: IIA, Rome, Italy.

240. Capone, Giorgio; Grinenco, Ivan. 1923. Korea (Chosen) (Document part). In: G. Capone & I. Grinenco, eds. 1923. Oleaginous Products and Vegetable Oils: Production and Trade. Rome, Italy: International Institute of Agriculture, Bureau of Statistics. 545 p. See p. 265-67. [Eng]

• ***Summary:*** Area and production: Table 1 (p. 265) shows Japanese statistics for area and production of oil-yielding crops in Korea (Chosen) from 1909 to 1922. Soya was the leader by far in both categories throughout this period. Soya area increased from 686,409 acres in 1909 to 1,858,971 acres in 1919. The crop with the next largest area was cotton followed by hemp (which had 40,407 acres in 1909, increasing to 69,731 acres in 1921), then sesamum.

Soybean production grew from 195,967 long tons in 1909 (Note: 1 long ton = 2,240 lb) to 612,459 tons in 1920. The crop with the second largest tonnage was cottonseed (44,807 tons in 1920), followed by sesamum (4,000 tons in 1920). *Perilla ocymoides* is cultivated in almost all the provinces of Korea, where it is used for the manufacture of oil. In 1920 about 35,000 acres were devoted to this crop. About half of the seed produced is exported to Japan.

Imports of oleaginous products and vegetable oils: Small amounts of sesamum seed (2,772 tons in 1922) and groundnuts (1,063 tons in 1922) are imported. Smaller amounts of vegetable oils are imported. Imports in 1922 were: Soya bean oil 500 tons, rapeseed oil 391 tons, and linseed oil 155 tons.

Exports of oleaginous products: The main product exported by far is soya beans. In 1909 some 90,108 tons of soya beans were exported. Exports of this crop apparently ceased from 1912 to 1917 (during World War I), then rose from 122,471 tons in 1918 to a peak of 225,417 tons in 1921. The second largest export was cottonseed (2,602 tons in 1922), followed by very small amounts of sesamum. Address: 1. Doctor of Economics; 2. Doctor of Agronomics. Both: IIA, Rome, Italy.

241. Kellogg, John Harvey. 1923. The natural diet of man. Battle Creek, Michigan: The Modern Medicine Publishing Co. 386 p. Illust. Index. 20 cm. [50+* ref]

• ***Summary:*** This classic of vegetarian literature contends that a vegetarian diet is the natural diet of man. Contents: 1. Man not naturally a flesh-eater: Modern civilized life unnatural and unbiologic, animal dietaries, lessons from the monkey, porcine wisdom in diet, animals classified by diet, the ancient family of primates, all mammals originally vegetable feeders, when germ diseases were unknown, kinship of higher apes and men, flesh-eating never a universal human custom.

2. Twenty popular delusions about flesh foods: D-1. That meat is superior as a blood-making food, and, hence, is needed in anemia. D-2. That meat is essential as a flesh-building food. D-3. That a flesh diet is essential to support severe or prolonged activity; that is, promotes endurance. D-4. That flesh-eating is necessary to produce physical courage. D-5. That vegetarian races are inferior physically

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and mentally to races using a mixed diet. D-6. That flesh foods are more refined and more easily digested and, hence, more nutritious than are foods of vegetable origin. D-7. That man is naturally omnivorous. D-8. That flesh foods are stimulating and thus supply an element needed especially by brain workers. D-9. That beef tea is a useful nutrient. D-10. That a meat diet is required to prevent or cure gastric acidity. D-11. That a meat diet is desirable in tuberculosis. D-12. That a meat diet is necessary in diabetes. D-13. That a flesh diet is essential in the treatment of obesity. D-14. That meat is required in beri-beri. D-15. That meat is essential as a "building-up" or restorative food. D-16. That meat is needed by growing children. D-17. That meats are needed as a stimulus to appetite. D-18. That the beef industry is a necessary part of our national economic system. D-19. That a meat diet is necessary to insure reproductive activity. The law of diminishing returns versus flesh-eating. D-20. That meat is a harmless luxury.

3. Scientific objections to the use of meat: Human liver not adapted to meat diet; important differences between meat and milk; meat deficient in vitamins and food lime; Eskimos eagerly seek vegetable food; ill effects of meat diet on Arctic explorers; meat saturated with tissue poisons; meat readily putrefies, natural foods do not; the poisons of meat; meat extracts; why viscera are especially objectionable; bacteriology condemns meat as food; vast numbers of bacteria in meat; putrefactive products of meat; why physicians forbid meat in cases of kidney disease and high blood pressure; how flesh-eating causes constipation ("partly because the flesh diet is lacking in the roughage or indigestible material required to stimulate the intestine to action").

4. Diseases due to flesh eating: Tuberculosis in animals, cancer from meat eating, cancer rare and appendicitis unknown among flesh abstainers, meat-eating causes disorders of nutrition, acidosis from a flesh diet, a meat diet and scurvy, meat eating and arteriosclerosis, pernicious effects of a meat diet experimentally proven, recognized meat contraindications, the peregrinations of a deadly parasite, typhoid germs in meat products, flesh poisoning, no protection for meat-eaters, oyster poisoning, converting sewage into food.

5. Experimental evidence against flesh eating: McCollum's experiments, Dr. S. Weir Mitchell endorses the meatless regimen, an eminent scientist on meat diet, Fauvel's observations, greater endurance of flesh-abstainers, the death rate reduced by meatless diet, flesh-eating does not develop intelligence, meat-eating and race degeneracy, meat-eating a city habit, non-meat diet best even for carnivorous animals, the Scotchman's dog, the effects of a meat diet on rats, the effects of a flesh diet on rabbits, flesh-eating animals short lived. 6. The ethical argument.

7. Historical facts and authoritative opinions: Biblical teaching about flesh eating, apostles who were flesh abstainers, the Essenes were flesh-abstainers, the diet of the ancient Greeks, King Cyrus a flesh-abstainer, Julius Caesar's army ration, diet of Peruvian soldiers, diet of athletes of ancient Greece, ancient philosophers were flesh-abstainers, Plutarch's essay on flesh-eating, fleshless diet of a Roman emperor, meatless diet endorsed by Gautier, views of Seneca, diet of the ancient Sumerians [today's Iraq], eminent modern flesh abstainers, vegetarian monks, Thoreau on the fleshless diet, a Chinese statesman's experience, the views of two great naturalists, the poet Shelley a food reformer, a child's natural repugnance to meat, Liebig on the advantages of a non-flesh diet, Sylvester Graham's diet reform movement.

8. Interesting facts concerning the dietary habits of various peoples. 9. The marvelous adaptation of the natural diet to human needs. 10. How to discard meats comfortably and safely.

11. Is the disuse of meat advisable from a practical standpoint? The U.S. Department of Agriculture shows the use of less meat to be safe and economic, the importance of planting nut trees, avoidance of meat is necessary to change the intestinal flora, vegetable substitutes for meat, the recent low protein movement in the United States, the half century experience of the Battle Creek Sanitarium with a fleshless diet.

12. Newspaper and magazine misinformation: An "eat-more-meat" campaign, Professor Fisher of Yale University [Connecticut] refuses to support the "eat-more-meat" campaign of the [Chicago, meat] packers, pernicious piffle.

Soy is mentioned in many places. The section titled "Flesh-eating never a universal custom" states (p. 33-34): "According to Mori, the Japanese peasant of the interior is almost an exclusive vegetarian. He eats fish once or twice a month and meat once or twice a year... The soy bean is held in high esteem and used largely in the form of *miso*, a purée prepared from the bean and fermented; also *to-fu*, a sort of cheese; and *cho-yu* [shoyu, soy sauce], which is prepared by mixing the pulverized beans with wheat flour, salt, and water and fermenting from one and a half to five years. The Chinese peasant lives on essentially the same diet, as do also the Siamese, the Koreans, and most other Oriental peoples. Three-fourths of the world's population eat so little meat that it cannot be regarded as anything more than an incidental factor in their bill of fare."

Page 45: Complete "proteins are found in milk and eggs as well as in most nuts, peanuts, and the soy bean..."

Page 73: "The protein of milk, of the soy bean, and of nuts is known to be superior to meat as a source of body nitrogen." Address: M.D., LL.D., F.A.C.S. [Fellow of the American College of Surgeons], Superintendent of the Battle Creek Sanitarium, Battle Creek, Michigan.

242. Kempski, Karl E. 1923. Die Sojabohne: Geschichte, Kultur und Verwendung unter besonderer Beruecksichtigung der Verhaeltnisse in Niederlaendisch-Indien [The soybean:

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History, culture and use, with special attention to the situation in the Netherlands-Indies]. Berlin: Paul Parey. 88 p. Illust. Index. 22 cm. [101 ref. Ger]

• ***Summary:*** Contents: Introduction. Some remarks on the soybean's early history (p. 8). Overproduction of soybeans in Manchuria after the Russo-Japanese War–English oil mills make their first trials (p. 9). Soybean production in Manchuria (p. 10-11). Soybean production in Korea (p. 11-12). Soybean production in Japan (p. 13-15). Soybean production in America–Soybean meal and soybean milk are introduced (p. 16-22). Soybean production has also expanded in Africa, British India, and the Philippines (p. 22-23). The introduction of soybean cultivation to Europe (p. 23-25). The many uses of the soybean in Europe (p. 25-26). The many uses of soy oil (p. 26-27). Old and new methods of obtaining soy oil (p. 27-31). Soybean production and use of soybeans in the Netherlands-Indies (*Niederländisch-Indien*) (p. 31-61). A table gives the production of soybeans on Java in bouws (1 bouw = 1.7537 acres = 7096.49 square meters). In 1921 the production was 226,186 bouws. Of this: West Java 12,980 bouws. Central Java 162,124 bouws. East Java 61,082 bouws. Thus, Central Java produced about 71.7% of Java's soybeans.

Appendix: Descriptions of how the most important soybean products are manufactured: In Java (tao-hoe [tofu]), tempeh, ketjap [soy sauce], tao-tjiong [or tao-jiung, a term, and perhaps a product, between *doujiang* and *tao-tjo,* Indonesian-style miso] (p. 62-65), in China and Japan (soy sauce, miso, tofu, frozen tofu, natto, soymilk) (p. 65-68). Supplements: I: Soybeans in Manchuria (p. 69-75). II; Hansamuehle [Hansa Muehle] in Hamburg, Germany (p. 75). III: *The Soybean* by Piper and Morse (p. 75).

Note the extensive, early bibliography. Unfortunately, it contains many errors.

This book is largely a review of the literature, but with some original information, especially on Indonesia and Germany. In 1923 Java imported 150,000 to 200,000 tons of soybeans and had a population of 35 million. The area of soybeans planted in Java (including Madura) increased from 157,600 ha in 1918 to 164,700 ha in 1922 (p. 32). In 1921, 67.3% of Java's soybean acreage was in Central Java, 20.7% was in East Java, and only 5.7% was in West Java. (p. 35). Large quantities of soybeans are imported to the Netherlands-Indies from Manchuria: 35,105 metric tons (tonnes) in 1920, rising to 95,742 tonnes in 1922. From these and local soybeans are made tempeh [spelled like this!], tofu (*tahoe; Bohnenkäse*), soy sauce (*Ketjap, Sojasauce*), etc. In Java, mostly black soybeans are grown. To make tofu yellow, it is cooked in an extract of the *Curcuma* root / rhizome. Sometimes it is also sun-dried or fried/roasted (*gebraten*). Tempeh is inoculated with a piece of tempeh from a previous fermentation, and often fried in coconut oil. Detailed descriptions are given of the production of soy sauce (*ketjap;* which is made from black soybeans) and Indonesian miso (*taucho; tao-tjiong*). The author (p. 64) states that ketjap and tao-tjiung are both inoculated using *Hibiscus tiliaceus* (hibiscus) leaves, called *waroe* in Java. Today Germany, like America, produces fresh and dried soymilk, fresh and dried soya cream, meat analogs, and soy sauce (p. 25).

This book contains 17 interesting, old photos. Descriptions of those reproduced from other periodicals are omitted. (1) A soybean field on the farm Kikai Nojo near Sempo-Station, Korea, owned and run by Mr. Moegling (p. 12). (2) A combine used for harvesting regular beans in California in 1918 (p. 19). (3) Many hydraulic presses in a modern American oil factory (p. 29). (4) The equipment used in steaming the soybeans before they are crushed in an American "steam mill" type oil mill (p. 31). (5) The interior of a British oil mill (p. 33). (6) The electrical generators in a modern oil mill (p. 34). (7) Soybeans being harvested manually at Madioen [Madiun, in East Java], Java (p. 48). (8) Harvested soybeans being dried on racks in a field in Java, and carried away by one worker (p. 48). (9) Workers dividing up the harvest in Java (p. 50). (10) Threshing soybeans with bamboo flails in the courtyard of a small farmer in Java (p. 51). (11) Selling soybeans in a small market in Central Java (p. 51).

Tables show: (1) Imports of soybeans to Germany from 1910 (43,500 tonnes) to 1912 (more than 125,200 tonnes) (p. 24). (2) Soybean acreage in Java (including Madoera) from 1918 (157,600 ha) to 1922 (164,700 ha) (p. 32). (3) A breakdown of soybean area in Java in 1921 (of 226,186 bouws) into West Java (12,980 bouws), Central Java (152,154 bouws), and East Java (61,082 bouws) (p. 35). Note: 1 bouw = 1.754 acres (Johnstone 1975). (4) Imports of Manchurian soybeans to Java (including Madoera) and other parts of the Dutch East Indies (mainly Sumatra) from 1920 to 1922 (p. 36). (5) Yields (average or range) of soybeans in various countries: Germany, Italy, British Indies, Manchuria (incl. China and Korea), Japan, America (up to 2,700 kg/ha), Java (p. 52). (6) Comparison of the nutritional composition of soybeans, peas, and regular beans (Phaseolus varieties) (p. 53). (7) Comparison of the nutritional composition of soya cheese (*Sojakäse,* tofu), beef, and lean pork (p. 53). (8) The prices of white and of black soybeans in Java during January and December 1922 and the same two months of 1923 (in Gulden) (p. 56). (9) Comparison of yields, price, costs, and profit for peanuts (*Katjang tanah*) and soybeans in Java (p. 57-58). (10) Nutritional composition of canned frozen tofu (based on E. Senft) (p. 68). (11) Exports of soybeans from five Manchurian ports (Dairen, Antung, Newchwang, Suifenho [Suifenhe], and Sansing) in 1919, 1920, and 1921 (p. 70). (12) Exports and value of soybeans from all of China to four countries (Netherlands, Russia, Japan, Dutch East Indies) in 1919, 1920, and 1921 (p. 72). (13) Exports of soybean oil from five Manchurian ports (Dairen, Antung, Newchwang, Suifenho [Suifenhe], and Harbin) in 1919, 1920, and 1921 (p. 72). (14) Exports and value of soybean

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oil from all of China to five countries (England, Netherlands, Belgium, Japan, USA) in 1919, 1920, and 1921 (p. 72). (15) Exports of soybean meal from four Manchurian ports (Dairen, Antung, Newchwang, Suifenho [Suifenhe]) in 1919, 1920, and 1921 (p. 73). (16) Exports and value of soybean meal from all of China to three countries (Japan, Russia, USA) in 1919, 1920, and 1921 (p. 73). (17) Names of the five major railway lines in Manchuria (South Manchuria Railway, Chinese Eastern Railway, Peking Mukden Line, Kirin-Changchun Line, Saupingkai-Taonan Line) (p. 74). (18) Amounts (in tons) of soybeans, soybean cake, and soy oil (*Sojaöl*) shipped over the South Manchuria Railway, and the Chinese Eastern Railway in one year (p. 74). (19) Railway transport and production amounts of the mills (in tons) in Dairen and Newchwang of soybeans, soybean cake, and soy oil (*Sojaöl*) during the year 1921 (p. 74). Address: Agricultural Expert in Poerbasari te Pengalengan, Java.

243. Vanbuskirk, J.D. 1924. The composition of typical Korean diets. *Japan Medical World* (*Nippon no Ikai*) 4:127-31. June. [Eng]*

244. *Ministerio de Agricultura de la Nacion* (*Buenos Aires, Argentina*), *Circular.* 1924. La soja: Conferencia con ilustraciones [The soybean: Illustrated lecture with 50 lantern slides]. No. 307. 16 p. Aug. 16. Reissued in Feb. 1932. [Spa]
• ***Summary:*** This is a Spanish translation of USDA Syllabus No. 35–Illustrated lecture on soy beans by W.J. Morse and H.B. Hendrick (1919). The slides and their captions are identical. The opening sentence, a mistranslation, reads: "The soy bean originated in the southeast of Africa [the original says "Asia"], and has been cultivated in China, Korea, and Japan since ancient times." Address: Seccion Propaganda e Informes, Buenos Aires, Argentina.

245. *Foreign Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1924. Soy beans and millet in Chosen [Korea]. 9(22):569. Nov. 26.
• ***Summary:*** "Soy beans and millet in Chosen are expected to proved poor crops this year owing to a prolonged drought, according to R. S. Miller, the United States Consul of that district. The soy bean crop for 1924 is estimated at 18,147,000 bushels compared with 23,760,000 in 1923, or a decrease of 23.6%."

246. Muramatsu, Syunsuke [Shunsuke]. 1924. On the composition of the soy bean. *Bulletin of the Imperial College of Agriculture and Forestry, Morioka* No. 7. 52 p. Nov. [15 ref. Eng]
• ***Summary:*** Contents: I. Chemical studies on the soy bean proteins (p. 1-23; 15 ref).

II. On the starch of soy bean (p. 25-30; 0 ref). Illustrations show (after p. 26): (1) Section of a green seed stained with iodine solution. (2) Section of a ripened seed stained with iodine solution. (3) Section of an imperfectly ripened seed stained with iodine solution. (4) Ditto. (5) Spermoderm of a green seed stained with iodine solution, showing that its palisade cells contain starch granules. (6) Spermoderm of a ripened seed stained with iodine solution. ps = Palisade cell. ed = Endosperm. (7) Section of a cotyledon of a green seed stained with iodine solution, showing the starch granules in it. (8). Ditto, a ripened seed. (9) Section of a cotyledon of a green seed showing the mode of aggregation of starch granules in the cell. (10). Starch granules X 1000 magnification.

III. On the natural soap occurring in soy bean (p. 31-41; 0 ref). Illustration (p. 38): Crystals of hispidic acid X 450 magnification.

IV. On the preparation of tofu (p. 43-52; 0 ref). Contents of part IV, "On the preparation of tofu." Introduction." Introduction. Raw materials: Soy bean, nigari (the composition of each is given). The method of preparation of tofu. An improvement for the preparation of tofu (using calcium chloride as a coagulant to increase the calcium content and quality). Conclusion.

It is said the method for preparing tofu was developed in China during the Han dynasty, and was brought to Japan during the rule of Toyotomi Hideyoshi (1585) from Korea. The author analyzed the composition of 7 varieties of soybeans used to make tofu. They contained on average 12.29% moisture, 43.18% crude protein, and 18.72% crude fat. The smaller beans contained more protein and gave higher yields of tofu. Address: Morioka Koto Norin Gakko, Nogei Kagaku Jikken-shitsu, Morioka, Japan.

247. Dorsett, P.H.; Dorsett, Jim H. 1924-1927. Agricultural explorations–Japan, Korea, Manchuria and Northeastern China, 1924-26.
• ***Summary:*** This set of microfilms, located in the National Archives, is part of a larger collection titled "Expedition Reports of the Office of Foreign Seed and Plant Introduction of the [U.S.] Department of Agriculture 1900-1938." The records reproduced in the microfilm publication are from *Records of the Bureau of Plant Industry, Soils and Agricultural Engineering, Record Group 54*–also known as Microfilm M840.

The set is occasionally cited incorrectly as "Plant hunting in northeastern China." However, so far as we know, no book or PhD thesis, other than the report in the National Archives Record Group 54, has ever been published. Note: We highly recommend this important USDA expedition to East Asia as the subject of a PhD thesis or book. Many new soybean varieties were introduced by this expedition.

Dorsett kept a daily log of his activities during the years 1924 to 1927; the logs are in the custody of the National Archives and microfilm copies may be found on Microfilm M840.

An index to Microfilm M840, found in the National

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Archives & Records Administration (US) (NARA) microfilm catalog is available in PDF format.

The microfilms concerning the 1924-26 Dorsett expedition are found in RG-54 on Rolls 11-15, Volumes 40-54, and Roll 20, Volume 73.

Another part of this expedition is: "Clips from Motion Pictures Made by P. Howard Dorsett and Jim Dorsett, compiled 1925-1926.

"ARC Identifier 516517 / Local Identifier 54-FSD.

"Series from Record Group 54: Records of the Bureau of Plant Industry, Soils, and Agricultural Engineering, 1853–1977.

"Scope and Content: These surveys, conducted over several years by P. Howard Dorsett and W.J. Morse, respectively, resulted in the collection of some 3,000 new varieties of soybeans from China, Manchuria, Korea, and Sakhalin Island, U.S.S.R. The images in this series are a reference file, apparently produced by the Motion Picture Laboratory of the Department of Agriculture, from motion pictures produced during the surveys of P. Howard Dorsett. His son, Jim, accompanied his father on these surveys and shot the motion picture footage. After the 1926 survey, Jim Dorsett joined the staff of the National Geographic Society as a photographer; he died in 1927. The series consists of 1 to 4–frame opening segments from each film, with accompanying caption for the subject contents of each film. Covering the years 1925 and 1926, the films documented the Dorsetts' journeys to Manchuria, China, Ceylon, Java, and Sumatra. In addition to footage of different varieties of soybeans found during the surveys, these film clips also show examples of indigenous flowers, plants, and trees, including wild peony (500), sorghum (313), Dutchman's Pipe (331), the King Coconut (405), and the Cannon Ball Tree (480).

"The camera used 35mm film wound onto special cartridges, and produced 18 x 24mm images. Duplicate positives, negatives, and contact prints have been made from these film clips. The cellulose nitrate and cellulose acetate film (probably made in the 1950's as a copy) are unstable and should not be used. The whereabouts of the motion pictures, from which these clips were taken, are unknown."

248. Chôsen Shokusan Ginko Chôsa-ka. 1924. Chôsen no daizu [Korea's soybeans]. Keijo [Seoul], Korea: Chôsen Shokusan Ginko Chôsa-ka. 80 + [2] p. Illust. 23 cm. Series: Chosen Shohinshi. [Jap]*

• ***Summary:*** About the soybean industry in Korea.

249. Early Korean / Korean: New Canadian soybean variety. 1924.

• ***Summary:*** Sources: Shutt, Frank T. 1931. "Soybeans: Influence of heredity and environment on the protein and oil contents of soybeans, as grown at Harrow and Ottawa, crops of 1928-29." *Canadian Department of Agriculture, Division of Chemistry, Report of the Dominion Chemist.* p. 54-57. For the year ending March 31, 1930. See p. 55. Two tables list the varieties grown at Harrow in 1928 and 1299. One of these is "E. Korean" [Early Korean]. In 1928: 100 beans weighed 25.21 gm. Moisture: 5.91%. Protein: 39.69%. Oil: 18.30%. On a water-free basis–Protein: 42.19%. Oil: 19.45%.

Elliott, H.G. 1946. "The soybean. Its possibilities in W.A." [Western Australia]. *J. of Agriculture, Western Australia* 23(4):285-93. Dec. See p. 293. Canadian soybean varieties presently under trial in Australia include "Early Korean."

Cohn, Henry I. 1948. "The Rickard Koreans." *Soybean Digest.* Aug. 13, 28. Dimmock, F. 1948. "Korean soybeans." *Soybean Digest.* Oct. p. 7. This letter to the editor gives a detailed history of the "Early Korean" variety in Canada. It arrived, so labeled, at Harrow in 1924.

Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 2. "Early Korean" [No source given].

USDA Agricultural Marketing Service. 1957. "Soybean variety names." Washington, DC. 31 p. Nov. Supplement 1 to Service and Regulatory Announcements No. 156 "Rules and Regulations Under the Federal Seed Act." See p. 13. "Korean.–Selected from an introduction from China by the Dominion Agricultural Experiment Station, Harrow, Ontario. Pubescence, brown; flowers, white; shattering, little; seeds, yellow with black hilum, about 2,000 to the pound; cotyledons, yellow; oil, 20.5 percent; protein, 42.5 percent, iodine number, 130. Maturity, group II." Page 25 states that Early Korean is a synonym for Korean.

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Korean is in the USDA Germplasm Collection. Maturity group: II. Year named or released: by 1928. Developer or sponsor: Department of Agriculture, ES (Experiment Station), Harrow, Ontario, Canada. Literature: 16. Source and other information: 'Early Korean' from China, to the Harrow ES (Experiment Station), Ontario, Canada, by 1923 [probably from North Korea]. Prior designation: Early Korean. Address: USA.

250. Minami Manshû Tetsudô K.K. Kôgyô-bu. Nômu-ka. [South Manchuria Railway Co., Industrial Div. Bureau of Agriculture]. 1924. Daizu no kakô [Soybean processing]. Dairen, Manchuria: SMRC. 777 p. 30 cm. (Sangyo Shiryo 21). [250 ref. Jap]

• ***Summary:*** Name of company with diacritics is: Minami Manshû Tetsudô K.K. Kôgyô-bu. Nômu-ka. This important, major work was written by Yoshitane Satô. Contents: Photos (on unnumbered pages at the front of the book) show 16

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scenes of soybean transportation, storage, and processing in Manchuria, as follows: (1) Mule drivers whipping mules trying to pull carts loaded with large sacks of soybeans over muddy roads. (2) Cylindrical osier storage bins for soybeans. (3) Row upon row of sacks of soybeans piled high in storage near docks. (4) Soy sauce being made in a courtyard; each earthenware jar is covered with a woven conical lid. (5) The inside of a huge and modern soy sauce plant. (6) Wooden kegs and glass bottles of Yamasa shoyu. (7) Soy sprouts (*daizu moyashi*) growing in round woven baskets. (8-11) Soy oil being pressed using vertical screw presses [as an alternative to hydraulic presses]–four views. (12) Boilers used in a soybean mill. (13) A wooden barrel of soybean oil being sealed. (14) Soy oil packaged in many small containers, each surrounded by a wicker basket. (15) Round soybean cakes stacked high on railway flatcars. (16) The inside of a modern soy oil factory.

Note 1. This is the earliest Japanese-language document seen (Jan. 2013) that uses the term *daizu moyashi* to refer to soy sprouts.

Contents: 1. Current status of soybean production and consumption: A. Production: Overview (p. 2), Japan (p. 4), Korea (p. 12), Manchuria (p. 16), China (except 3 eastern provinces, but including Eastern Inner Mongolia, p. 31), USA (p. 34), British colonies (p. 37), European countries (p. 40). B. Consumption: Japan (p. 41), Korea (p. 52), Manchuria (p. 57), China (p. 59), Dutch East Indies (Indonesia, p. 60), USA (p. 61), European countries (p. 63).

2. Characteristics of soybeans: A. From a physical sciences viewpoint (p. 67): Structure (overview, cotyledons, hypocotyl, seed coat), contents of each system (p. 70), appearance (p. 73; color, gloss, shape, size, hilum (*fusuma*) color, young plumule leaf color, ratio of seed to seed coat). B. From chemical viewpoint (p. 82): General composition, structure of each component (p. 109; protein, oil, carbohydrate, ash/minerals, vitamins). C. Appearance and relationship between oil and protein content (p. 126): Oil and protein color related to color, glossiness, shape, size, hilum color, young plumule leaf color. D. Evaluating soybean quality (p. 140): Overview, key points (sizes, shapes, colors, glossiness, hilum color, young plumule leaf color, ratio of seed coat to seed, dryness of seed, volume, weight, smell, mixing of different varieties, ratio of imperfect seeds, amount of other types of seeds), collection of materials for testing, testing and evaluating commercial soybeans.

3. Soybean usage and processing (p. 175). A. One view of main usage of soybeans. B. Nutritional value of soybeans as food (p. 183): Nutritional value of soy protein. C. Processed soyfoods (p. 208): Soy sprouts (p. 208), natto (*itohiki nattô*, p. 212, Hamanatto, p. 224), types of tofu (regular tofu [*nama-dôfu*, p. 226], *kori-dofu* or *koya-dofu*, p. 240, aburaage, p. 245, tofu curds [*tofu nô*, p. 247], hard tofu [*tofu-kan*, p. 247], fragrant hard tofu [*kô-kan*, p. 248], *senchô tofu*, p. 249, fermented tofu [*nyûfu or funyû*, p. 249]), *tofu-p'i* or yuba (p. 256), soymilk and artificial cow's milk, p. 259, soybean flour raw, or roasted (kinako, p. 263), shoyu (p. 266; overview of miso and shoyu, Japanese traditional regular shoyu, p. 267, Japanese traditional special shoyu and tamari, p. 269, Chinese soy sauce, p. 272, recent shoyu research and development, p. 274), miso (p. 280; Japanese traditional regular miso, Japanese traditional special and processed miso, p. 282, Chinese miso, recent miso research and development, p, 285). D. Soybeans as feed or fodder (p. 287; green soybeans as feed, p. 290): Fresh forage, dried forage or hay. E. Soybeans as manure or fertilizer (*hiryô*, p. 297; in the Kaijô area of Manchuria, have been roasted and steamed, and mixed with compost, and used for green manure (*ryokuhi*) or soybean cake (*daizu kasu*). This method has also been used in the northeastern provinces (*Tohoku Chiho*) of Japan in rice fields). F. Soybeans as oilseeds (p. 302). G. Use of soybean protein in industrial products (p. 304).

4. The soy oil extraction industry (p. 305): A. Methods of removing the oil (origins, traditional methods, hydraulic pressing, extraction method, p. 340). B. Advantages and disadvantages of each method (p. 348). C. The soy oil industry in Manchuria (p. 357): History of development, important places for soy oil on the Manchurian Railway, economic condition of the Manchurian oil industry (p. 420), oil extraction in Japan (history, p. 437, commercial factories, p. 442, development of these factories, p. 451).

5. Soybean meal or cake and its composition (p. 464). A. The varieties of soybean meal or cake and the composition of each. B. Evaluation of quality (p. 473). C. Soybean meal or cake as a fodder (p. 478): Feeding value and digestibility, incorrectness of the theory that there are bad effects from feeding soybean meal or cake (p. 479). D. Soybean meal or cake as a fertilizer (p. 490). E. Soybean meal or cake as food (p. 504): Use as a raw material for shoyu production (p. 506), use to make soy flour (p. 509). F. Soybean meal or cake as a source of protein in industrial products.

6. Soy oil and its processing (p. 526). A. Characteristics of soy oil: Composition, physical characteristics (p. 535), chemical characteristics, testing and evaluating soy oil (p. 564), the quality of commercial soy oil products (p. 577). B. Refining soy oil (p. 587). C. The use and processing of soy oil (p. 631): Overview, refined soy oil as a food, substitute for salad oil, or for deep-frying oil, as an illuminant, as a cutting oil, lard substitute, margarine, in paints, soap, hardened oil, for waterproofing, substitute for petroleum oil, glycerin, fatty acids, stearine.

7. Exports and imports of soybeans, soybean meal or cake, and soy oil (p. 708). A. Manchuria. B. Manchurian exports. C. China. D. Japan. E. Korea. Appendix: Bibliography of soybeans (Japanese-, German, and English-language works; p. 748). List of photos.

Note 2. This is the earliest Japanese-language document seen (Oct. 2011) that mentions fermented tofu, which it calls *nyûfu* or *funyû*.

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Note 3. This is the earliest Japanese-language document seen (Feb. 2012) that uses the term *itohiki nattô* to refer to natto. Address: Dairen, Manchuria.

251. *Crops and Markets* (*USDA*). 1925. Foreign crops and markets: Production of oil materials. 3(15):240. April 11.
• ***Summary:*** "Manchuria is by far the most important soybean producing region for which an estimate is available. An unofficial estimate for that part of China places the 1924 crop about equal to or slightly greater than the 1923 harvest of 2,500,000 tons. The Chosen [Korean] crop, according to a commercial estimate, is much smaller this year than last, while the United States crop is slightly larger. No recent estimates are available for Japan."

Large producers of olives for oil include Spain, Italy and Greece.

"The hempseed, rapeseed and sesamum crops were probably slightly smaller in 1924 than in 1923... In both rapeseed and sesamum the crop of British India is the dominating factor." Address: Washington, DC.

252. Kaku, T. 1925. [Analysis of miso of Korea]. *Chosen Ikai* 55:317-; 56:495-. [Jap]*

253. Adachi, Kinnosuke. 1925. Manchuria: a survey (Continued–Document part IV). New York, NY: R.M. McBride & Co. xvii + 401 p. Plus 62 plates on unnumbered leaves. Illust. Maps (many, 1 folded, p. 10). 24 cm.
• ***Summary:*** Continued: Chapter 13, "Trade and trade tendencies" states (p. 258-59): "There are also eight articles on the list of her exports which put all the rest in the shade. They are in their order of importance:

"Bean cake 58,072,138 Haikwan taels
"Soya beans 36,164,538 Hk. taels
"Kaoliang 23,664,024 Hk. taels
"Bean oil 14,367,410 Hk. taels
"Coal and coke 13,462,752 Hk. taels
"Raw silk, wild (tussah) 11,242,321 Hk. taels
"Millet 6,591,058 Hk. taels
"Timber and bamboo 5,462,017 Hk. taels

"All of these belong to the raw-material class except bean oil; and the Manchurian bean oil is not at all refined in the sense America or Europe understands the term. In short, the character of Manchurian trade is essentially of colonial type. The list of her exports paints her as a great agricultural state, as we have already seen; and the story of her export trade is largely the epic of her humble bean. No prophet or historian can correctly read the meaning of this simple statement, however, unless he can vision clearly to what extent [soya] beans enter into the food articles in the Far East in general and in Nippon and Chosen [Korea] in particular. This is the aspect which we have already treated at length in other chapters. From all of which it is not difficult to see why it is that Nippon places so much emphasis on the possibilities of Manchuria–on the economic development of that country. American and British writers who cannot see Manchuria except from a political angle miss the point entirely as far as the real meaning of Nippon's activities in the Eastern Three Provinces is concerned."

Full-page photos show: (1) "Beans and bean-cakes in the open storage ground at the Wharf compound at Dairen" (facing p. 258). (2) "Soya bean crowding into Kaiyuan from surrounding districts for shipment" (facing p. 270).

Also in Chapter 13. "Trade and trade tendencies" is a section titled "Soya beans and the Manchurian trade" (p. 270-72): "The prizes and honors the soya bean has won in the profitable arena of commerce are countless and old–achieved long before the opening of the Port of Newchwang to foreign commerce. Like champions in any other field, it rarely took a backward step on its way to triumph. For the period of thirty years from 1872 to 1901, when the port of Yingkou, known to all the outside world as Newchwang, was the only outlet for Manchurian goods, the annual average shipments of soya beans out of Manchuria amounted to 2,592,869 piculs (1 picul is 133.3 pounds) valued at 10,222,471 Hk. taels. In the same thirty years the average annual export of bean cake amounted to 6,096,920 piculs worth 2,061,117 Hk. taels, and that of bean oil to 54,147 piculs of the value of 255,221 Hk. taels. From that time on the progress has been marked: in the ten-year period from 1913 to 1922, when Dairen and Antung and other points of outlet in Manchuria were opened and operating, the average annual exportation of soya beans amounted to 7,370,505 piculs valued at 21,050,937 Hk. taels; the average annual figures for the bean cake for the same period were 18,672,447 piculs valued at 38,053,762 Hk. taels; and for the bean oil 1,688,163 piculs valued at 14,477,610.

"One gets a hint of the giant step the soya bean has taken as the leader of international trade commodities in Manchuria by looking at the following two figures and noting the distance between them: The total value of bean, bean-cake, and bean-oil exports for 1907 through the Big Three of Manchurian ports amounted to 17,015,365 Hk. taels. In 1922 they were valued at 115,438,224. After the first trial shipment of 100 tons to England in November, 1908, which proved an instantaneous success, the first regular shipment of 5,200 tons was landed in Hull in March, 1909. That was the beginning. In the season of 1909-1910 no less than 400,000 tons were shipped to England. Fifty steamers were chartered for the sole purpose of carrying beans from Dairen and Vladivostok to Europe. In the month of December, 1909, alone, 300,000 tons of new beans worth two million pounds sterling were contracted.

"These figures are colorless, however, to any one who knows intimately to what extent the soya bean has leavened the life and activities of trade in Manchuria. More than a thousand mule- and donkey-power *yufang* [traditional Manchurian bean-oil mills] all over South and Central

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Manchuria would be without a job, as would be hundreds of banks which finance them, if tomorrow the bean were to disappear from the face of the country. More than 26,000,000 yen of capital funds in 337 larger modern oil mills would be instantly idle. In 1922 more than 252,620,000 catties of bean oil and more than fifty million pieces of bean cake came from the oil mills. Without them the market places would have been as lonely as lower Broadway at midnight.

"Coal of course gave, in 1922 and in other years, the great South Manchuria Railway its heaviest freight tonnage; but the second ranking commodity in terms of railway tonnage was soya bean. Out of the 12,043,790 tons, the total tonnage of principal commodities carried over the South Manchuria line, the bean and bean oil accounted for more than 2,077,000 tons. Kaoliang, the biggest freight tonnage producer among Manchurian grains, could not provide half of the bean tonnage; it was less than 912,200 tons. All other grains combined could give the railway no more than 688,975 tons. When one comes to the export tonnage out of Dairen, respect for the humble bean increases mightily: out of the total of 4,081,431 tons exported, bean, bean cake, and oil made up pretty nearly half–to be exact, 1,927,803 tons.

"And the most eloquent part of the story of the soya bean is that not half–not one hundredth–has ever yet been told." Address: Author.

254. Adachi, Kinnosuke. 1925. Manchuria: a survey. Map of Dairen (Dalny) with legend (Continued–Document part IV). New York, NY: R.M. McBride & Co. xvii + 401 p. Plus 62 plates on unnumbered leaves. Illust. Maps (many, 1 folded, p. 10). 24 cm.

• ***Summary:*** This detailed map of Dairen (2-page spread after p. 268) in about 1922 has a legend in the upper left corner which gives a reference number for each of 46 importance places on the map.

Numbers 1-11 run vertically down both sides of the map. Letters A-N run horizontally along the top and bottom of the map. The Reference Numbers are as follows.

"1. Army Transport Dept. (Branch) K5
"2. New S.M.R. Wharf Office K5
"3. Staple Produce Exchange J6
"4. Dairen Trust Co. J6
"5. Chien-shun tung Yufang & Yu cheng Yufang J6
"6. Mitsui Bussan Kaisha Co. Branch & Nippon Yusen Kwaisha (Branch) J6
"7. Butterfield & Swire J6
"8. Dairen Oil Industrial Co. H6
"9. Roman Catholic Church H6
"10. Independent Church (Japanese) H6
"11. Standard Oil Co. H5
"12. Yamaguchi Forwarding Co. G5
"13. General Post Office G6
"14. Gendarmerie [Police] Station F6
"15. To-a Tobacco Co & Mitsukoshi General Store (Branch) F6
"16. S.M.R. Electric Office F6
"17. Liao-tung Hanaya Hotel F6
"18. Iwaki Hotel F7
"19. Dairen Saving bank F7
"20. Christian Missions Presbyterian Church (Japanese) F7
"21. Daisen Water Work Office & Bank of Chosen [Korea] (Branch) G7
"22. General Post & Telegraph Office G7
"23. Shôryû Bank G6
"24. Telephone Exchange Office G6
"25. Dairen Hotel G6
"26. Yokohama Specie Bank G7
"27. Chamber of Commerce G7
"28. Business Men's Club & Lyôto Shinpô G6
"29. Kabuki-za (Japanese Theatre) G6
"30. Nisshin Oil Mills Co. Office H6
"31. Young Men's Christian Association G6
"32. Bank of Chinese G7
"33. Cornabe, Eckford & Co. R6
"34. Tompson Harram Co. H6
"35. S.M.R.'s Library & Japan Tourist Bureau H7
"36. Manshu Nichi-Nichi Shimbun H7
"37. Army Accountant Office H7
"38. Dairen Municipality G7
"39. Yamato Hotel G7
"40. British Consulate G7
"41. Civil Administration Office G7
"42. Salvation Army F7
"43. Engei-kwan (Movie-show) F7
"44. American Consulate F8
"45. Kindergarten G8
"46. Myôshô-ji & Joan-ji (Temple) G8" Address: Author.

255. Kephart, L.W. 1926. Charles Vancouver Piper. 7 p. Unpublished manuscript.

• ***Summary:*** "Charles Vancouver Piper, ex-president and recently elected Fellow of the American Society of Agronomy, and for twenty-three years Agrostologist in Charge of the Office of Forage Crop Investigations of the United States Department of Agriculture, died at Washington, D.C., February 11, 1926. He was in his 59th year. He had been in poor health for nearly two years and had been forced to curtail the extraordinarily active interests in which he was engaged, but he had been attending his office regularly until a few days before his death.

"In the passing of Prof. Piper, the science of agronomy loses one of its most distinguished exponents and staunchest friends. In a day when the study of field crops consisted mostly of simple plot tests and its proponents were looked upon merely as glorified farm hands, he insisted on the maintenance of the highest scientific standards in agronomic

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research and, by the example of his own individual contributions, did much to convince the classical sciences that agronomy was worthy of a place among them. In that conception he never faltered and his many writings, while clear, lucid and practical, are accepted as the authoritative treatises on these subjects throughout the world.

"Professor Piper belonged to that fast disappearing class of truly versatile naturalists who are competent in all branches of biology. He was primarily a taxonomic botanist and, in that difficult field, had gained distinction long before the science of agronomy, as such, was conceived. He was almost equally proficient in entomology, while in the hundred or more technical papers from his pen are found treatises on pathology, histology, soil chemistry, historical geology and plant and animal physiology. In addition, he was a master of etymology and of languages and understood the derivation and use of words as perhaps no other man in the agricultural professions. Exactness and precision of phraseology were his hobby and he coined many words or called attention to the incorrect use of words in both technical and popular speech.

"Perhaps the reason for his broad interest in the natural sciences can be found in the background of his boyhood days. He was born in Vancouver, British Columbia and his early years were spent amid the teeming life of the northwest Pacific Coast. Probably there was an inborn spirit of the naturalist, or it may have been merely the urge of his rugged physique that took him out into the woods and fields and early gave him an interest in the living world about him. At all events, while still in his teens, he began the systematic study of the fauna and flora of his native region. To such good effect did he apply himself that before he was eighteen he had graduated as Bachelor of Science from Washington State College [sic, Univ. of Washington]. Before he was twenty-six he had acquired his Master's degree and had been appointed Professor and Head of the department of Zoology and Biology of the same institution. To the upbuilding of that department he devoted the next ten years of his life, setting an example of interest and enthusiasm that inspired those about him to a degree not common in those branches of study. Somewhere he found time during the summers to go East and study at Harvard, where he obtained an M.S. in 1900. Years later the doctorate was conferred upon him by the Kansas Agricultural College. Most of his vacations at Pullman, however, were spent exploring the little known mountains, forests and plains of Washington, in the course of which he built up an extensive collection of plants, which culminated in 1915 in the publication of the *Flora of the Northwest Coast,* the first and foremost manual of the plants of that region.

"In 1903, Prof. Piper came to the Department of Agriculture to take charge of the agrostology or grass investigations of the old Office of Farm Management. Two years later Forage Crop Investigations became a separate office and Prof. Piper was placed in charge. Immediately his attention turned to the possibility of applying his botanical knowledge to the solution of forage difficulties. The most promising avenue of approach appeared to be the introduction and testing of forage plants from other parts of the world. Arrangements were therefore made with the Office of Foreign Seed and Plant Introduction for explorers to be sent to the remote corners of the earth in search of unknown plants and a systematic combing of the earth began, which has continued to the present time. This search was by no means a blind hit-and-miss peregrination. Each journey was definitely for the purpose of uncovering some type or species of plant whose existence seemed probable because of the botanical relation to other plants, but whose like had never actually been seen. Such a program on the part of a botanist can be compared only to the efforts of the chemist, who, having at hand the composition and behavior of the known substances, constructs a Periodic Table of the elements, predicting that the gaps in the table will be filled at some time in the future by the discovery of other elements corresponding exactly in chemical composition to the hypothetical figures in the table. Or it may be likened to the effort of the astronomer, who, carefully arranging the known celestial bodies in orderly fashion, predicts that at some precise moment, perhaps years in the future, two bodies will come into juxtaposition. Botanical exploration, based on such a premise, had not, so far as known, heretofore been made, and it required courage of the convictions of a rare order to risk the funds and reputation of the government in such pursuits.

"That these endeavors were richly rewarded is well known. Probably the most spectacular success was Sudan grass. This plant, now so important a part of the agriculture of the great plains, would today be utterly unknown in America had not Prof. Piper, by pure deductive reasoning, decided that in a certain part of Africa there was almost certain to be found the missing link between Johnson grass, a perennial, and its evolutionary forms, the annual sorghums. Seed of the sorghums was accordingly assembled from all northern Africa, and in a small packet received from the director of agriculture at Khartum [Khartoum], in the Sudan, and labeled simply *Sorghum Halepense,* was contained the precious seeds so earnestly sought. After careful trials, the plant was released to the public and, since 1915, the crop has been estimated to be worth $10,000,000 a year to the people of the United States.

"Next in importance to Sudan grass and apparently destined to exceed it in value are the improved varieties of soybeans which have made possible the culture of this crop north of the Mason and Dixon Line. So gradually and systematically have the seeds of these new varieties been diffused through the northern states that their origin is sometimes obscured. But it is a fact that soybeans would still be an unprofitable curiosity outside of the cotton belt had not

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Prof. Piper brought together and segregated and cross-bred at various places the hundreds of varieties found in Mongolia, Korea and the Far East" (Continued). Address: [Asst. Agronomist, Office of Forage-Crop Investigations, Bureau of Plant Industry [USDA, Washington, DC].

256. Wolf, Frederick A.; Lehman, S.G. 1926. Diseases of soy beans which occur both in North Carolina and the Orient. *J. of Agricultural Research* 33(4):391-96. Aug. 15. [19 ref]
• ***Summary:*** "Introduction: A number of the more important diseases of soy bean, *Soja max* (L.) Piper have been investigated in the last 10 years at the North Carolina Experiment Station" (nine papers are cited).

"The most significant result of this work, which has arisen both from the laboratory studies and the field survey, has been the establishment of the fact that certain of these diseases are seed-borne. This fact accounts for the distribution of the diseases throughout the States in which soy beans are grown, serves as a basis for control, and suggests that some of the diseases probably were introduced into the United States with the seed. It is the primary purpose of this report to present such evidence as bears on the last phase of this problem and to give a brief account of the diseases which are common to the Orient and to North Carolina.

"As is well known, the soy bean is native to eastern Asia and is a crop of great importance in Japan, Manchuria, Chosen (Korea), and Mongolia. It has been a major crop of the Orient since ancient times, but was of no importance as a farm crop in the United States until about 1880.

"In the last 10 years there has been a progressive increase in soy-bean acreage in this country, especially in North Carolina and in several States of the Corn Belt. To-day soy beans are a major crop in the United States.

"Apparently the fact that soy beans have only recently become of commercial importance in this country is responsible for the lack of knowledge of soy-bean diseases as found in the United States. A survey of available literature on soy-bean diseases in eastern [Asia] shows that a similar condition exists there, and that such information as has been recorded on soy-bean diseases in Asia has been contributed largely by Miura (13), Hemmi (6, 7, 8), Takimoto (16), and Nakata. The present writers' knowledge of soy-bean diseases in the Orient is limited by the fact that a considerable part of the work done there has been published in Japanese. Collections of diseased plants and unpublished manuscripts and additional notes sent by Miura, Hemmi, and Nakata have been of invaluable service to the present writers in their work."

The following diseases occur in both North Carolina and eastern Asia: Wilt (*Fusarium tracheiphilum*). Mildew (*Peronospora manshurica*). Brown-spot disease (*Septoria glycines*). Pod-and-stem blight (*Diaporthe sojae*) [=*D. phaseolorum* var. *sojae*]. Cercospora leaf spot (*Cercospora diazu*) [=*C. sojina*, Frog-eye leaf spot]. Anthracnose (*Colletotrichum glycines*) [=*C. dematium f. truncata*], and *Glomerella glycines.* Bacterial blight.

*Xanthomonas phaseoli* var. *sojense* and *Sclerotium rolfsii* are found in North Carolina but not in Asia. *Sclerotinia libertiana* (=*Whetzelinia sclerotiotum*), *Hypochnus centrifugus, Uromyces sojae* (=*Phakopsora pachyrhizi*), and *Phyllosticta sojaecola* occur in eastern Asia but not in North Carolina. Address: 1. Plant Pathologist, Office of Fruit Diseases, Bureau of Plant Industry, USDA; 2. Plant Pathologist, North Carolina Agric. Exp. Station.

257. South Manchuria Railway Co. 1926. Soya beans in Manchuria. Dairen: SMRC Agricultural Office. 40 p. Nov. 26 cm. [Eng]
• ***Summary:*** Contents: 1. How Manchurian beans are produced: Soybean production in the world (Japan, Chosen {Korea}, Manchuria, China proper, United States), bean cultivation in Manchuria (how production has been increased, Manchuria suited for bean production {meteorological peculiarities, Manchurian soil and bean cultivation, local adaptability}). 2. World-wide demand for Manchurian beans: Supply and demand in Manchuria, bean demand in destination countries (demands in Japan, in China proper, in Java {Dutch East Indies}, in European countries).

3. Uses of beans: Introduction (gives uses as food, cattle feed, and fertilizer, and uses for the oil), general uses of beans (beans, bean oil, bean cake, food), value of beans as food (from general constituents, food value of beans from new dietetic point of view, conclusion), uses of bean oil (properties of bean oil, miscellaneous uses of bean oil {direct uses (native), refined bean oil for table use, substitute for lard, substitute for butter, paint solvent, soap, glycerine and fatty acid, candles, water proof, substitute for petroleum, substitute for India Rubber, etc.}), uses of bean cake (as fertilizer, bean cake as cattle feed, bean powder [probably defatted soybean flour] made from bean cake & its uses, "soy" made from bean residuum, "Aji-no-moto" made from bean residuum, water-paint made {Solite, invented by Mr. T. Suzuki and manufactured and sold by the Dairen Solite & Co. until several years ago}, protein products made from bean residuum {such as paper sizing, celluloid substitutes, and Satolite [soybean plastic]}). 4. Bean milling in Manchuria: History of development, oil milling processes (expressing process, by process of operation, by kinds of expressing devices, by chemical / benzine extraction at Honen Bean Mill, Dairen), advantages & disadvantages of different processes (wedge, screw, & hydraulic systems compared; round cake, plate cake, & extraction system compared {advantages & disadvantages of extraction system, advantages & disadvantages of bean plate, advantages & disadvantages of hydraulic pressure system}), bean mills in Manchuria.

5. Accumulation & distribution of beans, bean cake

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& oil: Produce movements in South Manchuria, produce movements in North Manchuria. 6. Business in Manchurian produce: Business on the Exchange (Japanese Exchanges, Chinese Exchanges), business outside the Exchanges (spot deals in beans {river beans, market beans, osier bin beans, train beans}, by forward contract {by future contract, business in the green field, by speculation}, business in bean cake & oil).

7. Export staple produce: Staple produce in Manchurian trade, exports of staple produce in South & North Manchuria compared, position of custom houses in Manchuria concerning export of staple produce.

In Chapter 4, "Bean milling in Manchuria," section 1 titled "History of development" states: The [soya] Bean milling industry was established in China a few hundred years ago. In Manchuria, hemp oil mills used to be practically all that existed up until about 60 years ago [i.e., until about 1866]. Around Tiehling and Changchun, which were important [soya] bean markets, the process for expressing oil from hempseed was applied to Beans with excellent results; this was the origin of the bean milling industry in Manchuria. As the demand for bean oil kept rising, hempseed oil found its uses gradually reduced, and in time the term "oil mill" came to refer to a bean oil factory. At that time, the object of the mills lay chiefly in producing Bean Oil; Bean Cake was regarded as a by-product, good only for cattle feed. Most of the demand was local and the milling process was primitive and on a small scale, often conducted by hand or by means of a donkey.

Phase II: The Sino-Japanese War (1894-1895) marked the start of Bean Cake exports to Japan. As its fertilizing value came to be recognized, demand for to Japan expanded rapidly. Starting at this time, Bean Cake came to be seen as the main product and Bean Oil as the by-product.

Phase III: In recent years, with the worldwide shortage of oils and fats, Manchurian Bean Oil has come to be exported worldwide; exports to the West have begun and increased dramatically. Demand reached its zenith during the Great War [World War I].

Photos show: Seed-bean field (Agricultural Experiment Station, Kungchuling). Soya beans in pods. Sowing of seed beans. Bean plant in harvesting season. Weeding in bean field. Beans being threshed in farm-yard. Beans harvested & carted away. Beans stored in Osier Bins in the yard of the local merchant. Bean carts wending their way the Market in the Interior. Old screw patterned presses in Manchuria. Hills of bags of beans in Changchun Station Yard. Train loads of bean cake to be shunted to quay of shipment. Hydraulic pressure system in Manchuria.

The section titled "'Aji-no-moto' made from bean residuum" (p. 17) states: "In the amino acid that constitutes [soy] bean protein is contained much glutamic acid that serves as the chief source of 'ajinomoto,' a very popular flavor at Japanese table. Thus, by decomposing the constituents of bean residuum [defatted soybean meal], the manufacture of glutamic acid soda will be easily accomplished." Note: This is the earliest document seen (Jan. 2014) concerning "aji-no-moto" / "ajinomoto" (mono-sodium-glutamate) made from soybeans.

258. Takagi, M. 1926. On the frequency of the spontaneous hybridization in soybean. *Annals of the Agricultural Experiment Station of the Governor General of Chosen* 4:323-24. Abstract in Japanese Journal of Botany 3:68 for 1927. *

259. International Institute of Agriculture. Bureau of Statistics. 1926. Production et commerce des produits oleagineux de huiles vegetales [Oleaginous products and vegetable oils–Production and trade]. Rome, Italy: Institut International d'Agriculture. Service de la Statistique Generale. 192 p. Index 24 cm. [30+ ref. Fre; Eng]
• ***Summary:*** The Introduction begins: "This volume is a continuation of a the monograph on oleaginous products (*produits oléagineux*) and vegetable oils, published in 1921 in French, then in 1923, with numerous amplifications and modifications, in English.

Soya is discussed in detail in English on pages 70-73. Tables show: (1) World production of soybeans in 1909-13, 1921, 1922, 1923, and 1924 in the following countries (in thousands of quintals): China (incl. Manchuria), Korea, Japan, United States, Java & Madura, and Kwangtung (French: Koung-Toung; today's Guangdong province in southern China). In 1923, China was by far the leading country (22,680), followed by Korea (6,466), Japan (4,378), USA (2,434), and Java and Madura (973). (2) Exports of soybeans worldwide (during the same 5 years as (1) above). (3) Exports of soy oil worldwide (during the same 5 years as (1) above). Note: This same basic information is given in French on pages 24-27.

Pages 60-63 give a worldwide overview in English. Tables show: (4) World production of primary oleaginous products (during the same 5 years as (1) above). The eight products are: Groundnuts, rapeseed, linseed, hempseed, cottonseed, sesamum, soya and copra. For sesamum, soya, and copra, values are given only for the year 1924. (5) World production of primary oleaginous products (expressed in terms of oil, in thousands of quintals). (6) World exports of primary oleaginous products (in thousands of quintals). (7) Excess of imports (+) or of exports (-) of primary oleaginous products terms of oil (in thousands of quintals). For the eight products for the years 1909-1913 and 1924 for: Europe, North and Central America, South America, Asia, Africa, Oceania. (8) World exports of vegetable oils (in thousands of quintals during the same 5 years as (1) above).

There are also detailed sections in English on groundnuts (p. 64-68), and sesamum (p. 68-71). Address: Rome, Italy.

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260. Stevenson, John Albert. 1926. Foreign plant diseases: A manual of economic plant diseases which are new to or not widely distributed in the United States. Washington, DC: USDA, Office of the Secretary. viii + 198 p. See p. 171-72. 23 cm. [ soy ref]

• ***Summary:*** Pages 171-72, under "Soja," list 19 diseases attacking *Soja* spp. which are new to or not widely distributed in the U.S.: "*Aecidium glycines* P. Henn. Leaf rust on *S. max* in Tanganyika and Uganda." Note: This is the earliest document seen (March 2021) concerning soybeans in Uganda, or the cultivation of soybeans in Uganda.

"*Ascochyta* sp. On *S. max* in Japan.

"*Bacterium* sp. A leaf-spotting disease of *S. max*, said to be due to a bacterium distinct from other species on this host, is reported from Japan.

"*Cercospora daizii* Miura. Leaf spot on *S. max* in Manchuria.

"*Cercospora glycines* Cke. Definite dark-brown leaf spots on *Glycine clandestina* in Australia.

"*Colletotrichum glycines* Hori. Anthracnose on stems and pods of *S. max* in Japan and Chosen.

"*Fusarium* sp. Causes ring spot disease of *S. max* in Manchuria.

"*Hypochnus centrifugus* Tul. Causes cankers on stems, blighting infected plants of *S. max* in Manchuria.

"*Hypochnus cucumeris* Frank. See Cucumis.

"*Mosaic.* Mosaic disease of *S. max* reported from Japan is probably the same as the mosaic and crinkling reported from the United States.

"*Mycosphaerella phaseotarum* Siem. See Phaseolus.

"*Peronospora manshurica* (Naoum) Syd. (*P. trifoliorum* De B. var. *manshurica* Naoum.) Downy mildew on leaves of *S. max* in Siberia, India, Formosa, and Manchuria, causing premature leaf fall.

"*Phyllosticta sojaecola* Massal. (*Phaeosphaerulina sojaecola* Miura.) Subcircular, dull-brown leaf spots on *S. max* in Japan, Russia, Manchuria, and Italy.

"*Pseudomonas glycines* Nak. Circular yellow leaf spots, becoming brown to dark-brown with yellow margins on *S. max* in Japan. The spots may be as numerous as 70 to 80 per square centimeter, causing death of infected leaves.

"*Septoria glycines* T. Hem. Brown leaf spots on *S. max* in Japan and Manchuria.

"*Septoria sojina* v. Thuem. Irregular yellowish leaf spots on *S. max* in Italy, Japan, and Austria.

"*Trotteria venturioides* Sacc. Black mildew on leaves of *S. max* in the Philippines.

"*Uredo vignae* Bres. See Vigna.

"*Uromyces sojae* (P. Henn.) Syd. Brown rust pustules on leaves of *S. max* in Japan, Java, China, India, Formosa, Manchuria, and the Philippines." Address: Chief Pathological Inspector, Federal Horticultural Board.

261. Takenobu, Y. 1926. Japan Year Book. Tokyo: Japan Year Book Office. 626 + 162 p. See p. 447, 449, 514. 22nd annual issue.

• ***Summary:*** The total area of Japan proper is 147,652 square miles (382,861 square kilometers). Japan's population (as of Oct. 1925) was 59,736,704. A large area of Japan is very mountainous, and it is estimated that the cultivated area is about 6 million hectares. According to Prof. Shimizu of Keio University the population density per square kilometer of cultivated area in Japan is much larger than various European countries. Japan 969. Belgium 394. Italy 305. Netherlands 273. England 226. Germany 195. Switzerland 168. France 108. Spain 90.

In chapter 29, Agriculture, the section titled "Beans, potatoes and sweet potatoes" (p. 449) begins with a table showing the production (in koku; 1 koku = 180 liters) of these crops from 1921 to 1923, inclusive. Soybean production decreased from:

4.261 million *koku* in 1921
3.628 million *koku* in 1922
3.434 million *koku* in 1923.

The text continues: "Among subsidiary farm crops there is perhaps nothing that plays so important a part in the Japanese kitchen as soy beans..."

In the section on "Breweries" (p. 512+) the subsection titled "Soy" [meaning shoyu or soy sauce] (p. 514) states: "For soy the prefecture of Chiba, which is contiguous to Tokyo municipality, heads all other places on the list as to output. Parched wheat mixed with salt and beans is a principal ingredient. The process is still far from scientific, requiring about 12 months before the liquid is ready for sale. It is also costly, as it does not much admit labor-saving appliances. To obviate these disadvantages have been tried several patented processes, but most of them have failed. In 1917 the leading soy manufactures of Chiba-ken combined and formed the Noda Soy Co., capital ¥7,000,000 p.u. with capacity of about 250,000 'koku' i.e. about 60 per cent. of the total output of the Prefecture."

A table (p. 514) shows production of sake, beer, and soy from 1919 to 1922 (year ending in March). Production of soy (in 1,000 koku) grew from 2,940 in 1919 to 3,268 in 1922. Address: Prof. at the Waseda Univ. and late of the "Japan Times".

262. United States Tariff Commission. 1926. Certain vegetable oils. I. Costs of production. II. Economic study of the trade in and the prices and interchangeability of oils and fats. Washington, DC: U.S. Government Printing Office. 174 p. See Part I, p. 55-71, 77; Part II, p. 114-17, 138-40, 159-61. Tables. Diagrams. 31 cm. [6 ref]

• ***Summary:*** This document gives the best picture of the soy oil industry and market in the U.S. and worldwide up to this time. Part 1. Costs of production, Section 4, titled "Soya-bean oil" (p. 55) has the following contents:

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Rates of duty. Uses. Raw material and its sources: Foreign production, domestic production. Joint products. Domestic production and consumption: History, production statistics, geographic distribution of mills, domestic consumption. Imports. Principal competing country (Manchuria). Exports of domestic and foreign oil. Foreign production and consumption: Production (China [Manchuria], Japan, Europe), consumption. Costs of production: United States (proportion of the industry covered, cost data by companies, shipping charges), China (Manchuria; Introduction, verification of cost data, Dairen, shipping charges from Dairen to the U.S., Harbin, Newchwang, Antung), Japan, Great Britain, comparison of these cost data.

The Act of 1921, an emergency tariff that went into effect on 28 May 1921, placed the first tariff on soya-bean oil, at the rate of 20 cents per gallon (2.67 cents per pound). The Act of 1922 (which went into effect on 22 Sept. 1922) reduced this slightly to 18.75 cents per gallon (2.5 cents per pound). "For a number of years prior to 1921 soya-bean oil was used in the United States chiefly in the manufacture of soaps, and to a lesser extent in paint, varnish, and lard compounds... Since 1921 the domestic consumption of soya-bean oil has been chiefly in the manufacture of paints and varnishes and in foundry core oils. In lesser quantities it finds use in the manufacture of linoleum and of printing inks" (p. 55)

"Foreign production.–Chinese official statistics estimate that the area under soya beans in the whole of China in recent years has been 12 million acres (*Chinese Economic Monthly*, June 1924). Generally accepted show that China produces about 80 per cent of the world's production of [soya] beans, or from 3 to 4 short tons annually, of which Manchuria produces from 2 to 3 million tons. Japan and Chosen [Korea] grow the beans in about equal quantities, each producing approximately 600,000 tons per year or about 15 per cent of China's production. Some soya beans are grown in Central European countries, but there, as in the United States, they are used mainly for forage. Japan, Chosen, and the interior of China consume practically all of the beans they produce, but Manchuria, which is less densely populated, exports in the raw state or as manufactured products about 60 percent of its production. It is from Manchuria that the other nations of the world obtain their supply for crushing.

"Domestic production [USA].–The domestic soya bean crop is grown primarily for forage. The chief States harvesting soya beans in 1923 and 1924 were North Carolina, with 2,675,000 and 2,560,000 bushels, Illinois, with 1,722,000 and 1,548,000 bushels, and Indiana, with 790,000 and 650,000 bushels, respectively. Sixteen other States, of which Ohio and Missouri were the most important, produced soya beans in much smaller quantities... The total harvest in the United States was 8,944,000 bushels (268,320 short tons) in 1923 and 9,567,000 bushels (287,010 short tons) in 1924. Only about 20 per cent of the acreage planted is harvested, and of the quantity harvested less than 2 per cent is crushed for oil. This is because the seed necessary for the next crop of beans requires nearly all the beans that are harvested" (p. 55).

Note: This is the earliest document seen (Jan. 2005) that gives total soybean production or area statistics worldwide. However the information lacks detail, except for the USA.

Table 82 (p. 56) shows that the amount of soya beans crushed in the U.S. increased from 2,978 tons in 1922 (1.70% of the total soya beans harvested), to 3,724 tons in 1924 (1.3% of the total). Imported soya beans were first crushed in about 1910 on the Pacific Coast.

Table 83 (p. 57) shows that production of crude soya-bean oil in the U.S. rose from 751,108 lb in 1922, to to 1,404,035 lb in 1923, to 950,437 lb in 1924, to 1,406,112 lb in 1925. "Domestic production has at all times been small compared with imports. In 1923 the domestic output was 4 per cent of imports; in 1924 and 1925 about 8.5 per cent."

The soy oil tariff of 1921 led to a rapid increase in soybean crushing in the U.S. "The commission's investigators interviewed the managers of eight domestic oil mills–all that had produced soya-bean oil since 1921. Four of these mills were located in Illinois, three in Indiana, and one in North Carolina. Of these, two had used the benzine extraction process and after extracting a few tons of beans had closed down because of mechanical difficulties, high cost of operation, and high cost of beans. Nearly all the other mills used Anderson expellers, although a few of them used hydraulic presses."

Table 86 (p. 58) shows imports of soya-bean oil into the U.S. by countries, 1918-1925. In 1918, the peak year for imports (335,984,143 lb), 68.7% came from the Kwantung Leased Territory (principally from Dairen on the southern tip of the Liaotung Peninsula in South Manchuria), 27.2% came from Japan, and 4.0% came from other parts of China. In Japan 19 mills are known to be crushing soya beans. Their production of soya-bean oil in 1922 was 44,714,000 pounds.

Table 88 shows imports of soya beans into Germany, United Kingdom, Denmark, and Holland 1919-1925. In 1925 Germany was by far the largest importer (370,585 short tons), followed by the UK (181,420), Denmark (121,389), and Holland (39,301).

Part I, Section 5, titled "Interest on capital invested in crushing vegetable oils," has a passage on soya-bean oil which gives that information for 1924.

Part 2. Economic Study of the Trade in and Prices and Interchangeability of Oils and Fats, includes references to the domestic production of soybean oil, net imports of oils, including soybean oil, into the United States 1910-1924; and 1916-1924; international supply and consumption of soybeans and soybean oil; price changes of soybean oil and beans; statistics of these price changes. The Interchangeability of Oils and Fats in Consuming Industries has scattered references to soybean oil, and a special section

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on soybean oil giving data received from questionnaires on the interchangeability of oils and fats.

This is the earliest document stating that soy oil, itself, is used in printing inks. Address: Washington, DC.

263. Horvath, A.A. 1927. The soybean as human food. *Chinese Economic Journal* 1(4):415-25. April. [34 footnotes. Eng]

• ***Summary:*** Contents: Soybean curd (tofu) for food: Preparation and types ("The Chinese classical name for *tofu* is *li chi*, probably meaning 'the morning prayer'"), historical, present state (of tofu in China), chemical composition, digestibility, utilization (incl. frozen tofu and fried tofu).

Fermented soybean products for food. Soy sauce: Kibiki and sobiki tamari, composition of various soy sauces. Natto. Miso. Conclusion. Bibliography.

Tofu–Historical (p. 416): "The manufacture of soybean curd (*tofu*) was started in China in 164 B.C., during the reign of the Emperor Han Wen, by a man named Liu An, the duke of Hwai Nan. Liu An was a great friend of the Buddhist monks, and it seems quite probable that he made this bean curd to provide a change or delicacy to break the monotony of the monastic ration (Adolph). *Tofu* was introduced into Japan from Korea for the first time during the Toyotomi government, and Buddhist priests and some other people used it for their daily food among others before it was generally used in Japan.

Tofu–Utilization (p. 418-19): "Both the composition and the digestibility of *tofu*, therefore, prove it to be a very nutritious food material. In the Orient *tofu* forms a very popular and almost indispensable dietary article for the Buddhist priests, as well as the strict adherents to Buddhism, who eat no animal food [i.e., are vegans]. A common saying in some parts of China terms 'bean milk the poor man's milk, and bean curd the poor man's meat.' *Tofu* is also called 'the meat without the bones.'

Note: This is the earliest English-language document seen (Aug. 2016) that contains the phrase "the meat without the bones" (or a similar phrase containing the words "meat" and "bones"); the phrase is used to refer to tofu, not to soybeans.

In Indo-China the daily consumption of *tofu* by an adult is about 3/4 of a pound. *Tofu* in its various forms is also used very extensively by all classes of Japanese. In the interior of the country where fish cannot be easily obtained, it is a most important source of protein.

"In the Orient *tofu* is eaten in a fresh condition simply with a little *shoyu*, though it is also frequently cooked in soup. Fried *tofu* is also a very popular article of food. Rape-seed oil, sesame oil or soybean oil are generally used in frying.

"*Tofu* may also be prepared for preservation and transportation. For this purpose fresh *tofu* is cut into smaller pieces and exposed to severe cold weather, to remove the water by freezing, and is then dried in an oven. As thus prepared it can be preserved for several years. When the *tofu* is frozen the water collects in fine needles of ice distributed throughout the mass. When the ice melts and the water runs out, it leaves the *tofu* porous and it may be easily dried. If it is not frozen, it is difficult to dry and the resulting material is dense and horn-like. The *tofu* also cooks very well if cooked in diluted soy sauce and smoked in the same manner as meat. The resulting product forms in the Orient the basis for the manufacture of various 'artificial meat' preparations.*" Footnote: * "In Germany, the Soyama factory prepared during the Great War [World War I] a meat supplement from soybeans. It was cheaper than beef, contained less carbohydrates and had a nutritive value of about 1500 Calories in 1 kilo."

"In Peking, at the Kai Cheng Bean Products Company, various preparations manufactured from tofu may be purchased, such as different kinds of soybean meat, soybean sausages, etc. The company has established a restaurant in Peking (at 86 Morrison Street, the name is written in Chinese characters) where one can get a Chinese dinner of numerous dishes prepared mostly from soybean products (chicken meat, pork, ham and beef, manufactured from *tofu*).

Also discusses: "Dr. Yamei Kin, a Chinese dietitian, has become particularly well-known as an exponent of bean curd on her visits to the United States" (p. 419).

A note at the end of this April issue states: "A reprint of Dr. Horvath's paper in booklet form may be obtained from the Bureau of Economic Information. Price $1, Peking Currency.–Ed." Thus, these six articles were reprinted in 1927 as part of an 86-page monograph titled "The Soybean as Human Food" (Peking, China). Address: M.D., Peking Union Medical College, China.

264. Morse, W.J. 1927. Soy beans: Culture and varieties. *Farmers' Bulletin* (*USDA*) No. 1520. 34 p. April. Revised 1939 and 1949. Supersedes Morse 1918b. The Soy Bean. USDA Farmers' Bulletin No. 973. [36 ref]

• ***Summary:*** Contents: History of the soy bean. Climatic adaptations. Soil preferences. Varieties: Descriptions of varieties (59 varieties and 44 synonyms). Varieties recommended for different areas. Preparation of seed bed. Fertilizers. Inoculation. Time of seeding. Methods of seeding. Rate of seeding. Depth of seeding. Cultivation. Soy beans in rotations. Soy beans in mixtures: Soy beans and corn, cowpeas, Sudan grass, millet. Insect enemies of soy beans: Grasshoppers, blister beetles, Mexican bean beetle, other beetle enemies, leaf hoppers, army worms and other caterpillars, the green clover worm, chinch bugs. Diseases of the soy bean: Bacterial blight, bacterial pustule, mosaic, fusarium blight or wilt disease, stem rot, pod and stem blight, sunburn, downy mildew, anthracnose, root knot (caused by a tiny eelworm or nematode, *Heterodera radicicola*). Other enemies of soy beans (rabbits, woodchucks).

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The soy bean is "also called the soja bean, the soya bean, and in North Carolina the stock pea." "Previous to 1908 the trade in soy beans was largely confined to oriental countries, particularly China, Manchuria, and Japan. Since that time the value of the soy bean and its products has gradually been realized in other countries, and during the last decade they have attained considerable importance in the world's commerce. At the present time the soy bean is cultivated principally in China, Manchuria, Japan, Chosen (Korea), and the United States, but it is also of more or less importance in northern India, Indo China, and the Malayan Islands. Soy beans are grown also in Italy, France, southern Russia, Hungary, Hawaii, Egypt, South Africa, and in a few countries of South America, but the acreage in these countries is very limited.

"The soy bean was introduced into the United States as early as 1804 and for several decades was regarded more as a botanical curiosity than as a plant of economic importance. Since 1890 nearly all of the State Agricultural Experiments have experimented with soy beans and many bulletins have been published dealing wholly or partly with the crop."

"The soy bean has been used mainly for forage purposes in the United States, but as a forage crop alone it would not likely become one of the major field crops. The acreage in soy beans has increased very rapidly during the last decade. Previous to 1917 considerably less than 500,000 acres were grown. In 1924 there were more than 2,500,000 acres, of which 1,000,000 were grown for hay, 932,000 for pasture and silage, and 613,000 for the production of seed. More than 10,000,000 bushels of soy-bean seed and about 1,360,000 tons of soybean hay were produced in 1924."

The 103 soy bean varieties and synonyms described on pages 5-11 are as follows (in alphabetical order): A.K., Aksarben, Arlington, Austin, Banner–same as Midwest, Barchet, Biloxi, Black Beauty–same as Ebony, Black Eyebrow, Black Sable–same as Peking, Bopp–same as Chernie, Brown–same as Mammoth Brown, Chernie, Chestnut, Chiquita, Columbia (from China), Columbian–same as Columbia, Dixie, Dunfield, Early Brown, Early Green–same as Medium Green, Early Virginia Brown–same as Virginia, Early Wilson–same as Wilson, Early Wisconsin Black–same as Wisconsin Black, Early Yellow–same as Ito San, Easycook (from Shantung province, China in 1894), Ebony, Elton, Essex–same as Peking, Extra Early Black Eyebrow–same as Black Eyebrow, Extra Select Sable–same as Peking, Giant Brown–same as Mammoth Brown, Goshen Prolific, Green–same as Medium Green, Guelph–same as Medium Green, Habaro, Haberlandt, Hahto ("Introduced under S.P.I. No. 40118 from Wakamatsu, Japan, in 1915. It is commonly known in Japan as 'dove killer,' and is said to be used boiled in the green stage... Especially valuable as a green vegetable bean when three-fourths to full grown"), Hamilton, Herman, Hollybrook, Hongkong, Hoosier, Illini, Ilsoy, Indiana Hollybrook–same as Midwest, Ito San, Jet, Laredo, Large Brown–same as Mammoth Brown, Large Yellow–same as Mammoth Yellow, Late Yellow–same as Mammoth Yellow, Lexington, Mammoth–same as Mammoth Yellow, Mammoth Black–same as Tarheel Black, Mammoth Brown, Mammoth Yellow, Manchu, Manchuria–same as Pinpu, Mandarin, Medium Early Green–same as Medium Green, Medium Early Yellow–same as Ito San, Medium Green, Medium Yellow–same as Midwest, Merko, Midwest, Mikado, Minsoy, Mongol–same as Midwest, Morse, Ogemaw, Ohio 9035–same as Hamilton, Old Dominion, Otootan, Peking, Perley's Mongol–same as Midwest, Pinpu, Red Sable–same as Peking, Roosevelt–same as Midwest, Roosevelt Medium Early Yellow–same as Midwest, Royal–same as Wilson Five, Sable–same as Peking, Shanghai–same as Tarheel Black, Sooty, Southern–same as Mammoth Yellow, Southern Prolific, Soysota, Tarheel–same as Tarheel Black, Tarheel Black, Tarheel Brown–same as Mammoth Brown, Tokyo, Virginia, Virginia Early Brown–same as Virginia, Wea, White Eyebrow, Wilson, Wilson-Five, Wisconsin Black, Wisconsin Early Black–same as Wisconsin Black, Wisconsin Pedigreed Black–same as Wisconsin Black, Yoko–same as Yokoten, Yokoten, Yellow–same as Mammoth Yellow.

Note 1. This is the earliest document seen (Nov. 2020) that mentions the soybean varieties Black Sable, Early Virginia Brown, Extra Early Black Eyebrow, Giant Brown, Large Brown, Tarheel Brown, Virginia Early Brown, or Wisconsin Pedigreed Black.

Note 2. This is the earliest document seen (Nov. 2020) which states that Black Sable is the same as Peking, or that Brown, Giant Brown, Large Brown, and Tarheel Brown are the same as Mammoth Brown, or that Early Green is the same as Medium Green, or that Early Virginia Brown and Virginia Early Brown are the same as Virginia, or that Early Wisconsin Black and Wisconsin Early Black and Wisconsin Pedigreed Black are the same as Wisconsin Black, or that Extra Early Black Eyebrow is the same as Black Eyebrow, or that Mammoth Black is the same as Tarheel Black, or that Yellow is the same as Mammoth Yellow.

Photos show (unless otherwise stated): (1) A typical soy-bean plant growing alone. (2) "Outline map of the United States showing by numerals the areas to which the soy bean is especially adapted. The varieties suited to the various areas for different purposes are discussed on page 11. Outside the unnumbered areas the soy bean either can not be grown profitably or it is in the experimental stage." A vertical line shows that the soybean grows east of the 99th meridian. The area east of this line is divided into 5 zones by 4 lines parallel to the latitudes. Soybeans can also be grown in small parts of Arizona, New Mexico, and California, where extremely hot weather prevails during the period when the seed is forming. (3) Roots of a soy-bean plant showing abundant development of nodules.

(4) Soy beans and corn planted in alternate rows; two

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men and waist-deep among the plants. (5) "The ordinary grain drill may be used for sowing either in rows or in close drills." It is pulled by horses and a man, seated on top, is looking backward. (6) Seeds of the 22 more important varieties of soy beans now grown in the United States showing the wide range in the size of the seed. Soybeans range from 1,250 seeds to the pound for the Hahto (large) to 9,950 seeds to the pound for Barchet.

(7) "The rotary hoe is an excellent implement for either solid or row plantings." This one is pulled by two horses; a man is seated on top. (8) "Soy beans seeded in the same row with corn. They are more generally grown with corn than with any other crop." A man is standing in front of the tall plants. (9) "A field of soy beans and Sudan grass grown in mixture for hay." (10) Roots of a soy-bean plant showing galls caused by the nematode *Heterodera radicicola.* Address: Agronomist, Office of Forage Crops, Bureau of Plant Industry, USDA, Washington, DC.

265. Shirakura, N. 1927. Heian-nando ni okeru daizu hinshu no chôsa [Survey of soybean varieties in Heian-nando, Korea]. Heijo, Korea: Heian Nando Shubyojo, Special Report No. 3. 50 p. May. [Jap]
• ***Summary:*** Note: As of 2011, Heijo is named Pyongyang, the capital of North Korea. Address: Heijo, Korea.

266. Morse, W.J. 1927. The present outlook of the soybean industry in the United States. *Proceedings of the American Soybean Association* 1:167-71. Eighth annual field meeting. Held 9-12 Aug. in North Carolina.
• ***Summary:*** "In 1907, the soybean was considered but a minor crop in America, less than 50,000 acres being devoted to its culture. North Carolina had the largest acreage at that time, and produced at least 90 per cent of the seed, possibly more."

Note: This is the earliest document seen (May 2008) that gives statistics for soybean production in the USA before 1909. It is also the earliest document seen (May 2008) that mentions the number "50,000 acres" in connection with the year 1907–statistics that were repeated by many subsequent publications. Yet we have been unable to find Morse's source for these earliest baseline statistics. He may have somehow derived the figures from those in: U.S. Department of Commerce, Bureau of the Census. 1913. Thirteenth census of the United States taken in the year 1910. Volume V. Agriculture, 1909 and 1910.

"Not more than six varieties were being grown [in America]. The most important of these were the Mammoth Yellow, Ito San, Ogemaw, and Medium Green, varieties limited as to soil and climatic conditions, and also as to purpose. At this time, it seemed unlikely, to all except a few soybean enthusiasts or 'soybean cranks' as they were then called, that the soybean would ever amount to much more than a minor or emergency crop. Several experiment stations had conducted tests with the crop as pasture, hay and silage, and with the seed as a concentrated feed... One soybean enthusiast, the late Dr. C.V. Piper, then Chief of the Office of Forage Crops, United States Department of Agriculture, had a remarkably clear vision of the great potential value of the soybean as a major crop in American agriculture. After studying the soybean in the Orient, it seemed to Dr. Piper that more and better varieties were essential to meet the widely diverse conditions found in the United States... Through the Office of Foreign Plants, therefore, numerous introductions were made from the soybean regions of China, Manchuria, Korea, and Japan. Additional introductions and numerous tests indicated the wisdom of Dr. Piper's conclusions. The introductions were found to be adapted to wider ranges of soil and climatic conditions. The new and varied uses of the crop stimulated new and greater interest in possibilities, and the soybean's march of progress was on.

"Moving forward slowly through the years with new varieties, increased acreage, wider interest, greater utilization of crop and by-products, its safety and dependability under adverse conditions, more efficient methods of planting, cultivating and harvesting, its availability as a relief crop (as in the recent Mississippi flood area in the South and in the corn-borer infested territory in the North), *the lowly soybean of 1907 has risen to the rank of a major crop in 1927.*

"In 1926, the acreage of soybeans for all purposes was estimated at more than 3,000,000 acres and the seed production at about 148,000,000 bushels. At present (1927), all states east of the Mississippi River are growing soybeans and with yearly increasing acreages. Moreover, the states bordering the west bank of the Mississippi are greatly increasing their soybean acreage. For 1927, the average increase of soybean acreage over that of 1926, is estimated at about 20 percent.

"Let us consider the forage outlook in the United States. The soybean undoubtedly will be utilized primarily for forage purposes, and by forage purposes is meant as hay, pasture, ensilage, and soilage. In 1924 (we have no later statistics), more than 1,500,000 tons of soybean hay were produced, nearly doubling the production of 1922. No figures are available as to acreage devoted to pasturage and ensilage; but, you of the states producing soybeans know that a very considerable part of the soybean acreage of your state was devoted in 1924 to these two purposes. For instance, Illinois, with a total soybean acreage in 1924 of 747,000 acres, had only 90,000 acres for seed production. North Carolina had a total acreage in 1924 of 255,000 acres of which 120,000 were for seed. For forage purposes, soybeans are increasing in favor on the farms of the North, South, East and West. Without a doubt, as hay, pasturage, and ensilage, soybeans will be used more and more in the farming systems of America.

"Seed production has become a very important and profitable industry in many sections. During the past few

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years, the growers in certain sections have been confronted in the fall with the surplus-seed problem. Before the passing of the next planting season, however, first-class seed for planting has been at a premium, and during the past two years (1926 and 1927), there has been an acute shortage in some sections of seed of desirable varieties. Commercial possibilities today offer a potential outlet for a supply above seeding requirements, many times the size of the present surplus. Several oil mills are now crushing domestic-grown soybeans for oil and oil meal in the Southern and Western States, and many others are being equipped for this purpose. Complaint is often made that oil mills pay too little for seed, making seed production for this purpose unprofitable. We must take into account, however, that the soybean is a legume. We must consider the fertilizing value, the feeding value of the straw, and not expect too much in comparison with other standard crops. Let us be fair with this oil-mill industry, and forget the high prices for seed which have prevailed with the introduction of new varieties and the large increase in acreage. To me, the production of soybean seed for oil and oil meal appears to be one of the bright spots in the future of the soybean which will firmly establish it as a major crop.

"Increasing imports of soybeans, soybean oil, and soybean cake from China and Japan, in spite of a tariff on the beans and oil, indicate a ready market for these products in the United States. Soybean oil is a strong competitor of other vegetable oils and is used extensively in the manufacture of butter and lard substitutes, paints, enamels, waterproof goods, rubber substitutes, linoleum, and edible oils; and constantly new uses are being found for this valuable oil. Soybean oil meal is a valuable concentrate for all kinds of livestock. Oil meal is also valuable as a flour, and is extensively used in the manufacture of glue, of buttons, etc. The following table shows the increasing demands for soybean products through imports for the past five years.

This table, "Soybeans, soybean oil, and soybean cake imported into the United States, 1922-1926 inclusive," shows that imports of soybean oil ranged from 9.1 million lb in 1924 to a high of 41.7 million lb in 1923. Soybean cake ranged from 4.2 million lb in 1922 to a high 47.1 million lb in 1924. Imports of soybeans ranged from 3.5 million lb in 1922 to a high 4.2 million lb in 1924.

"Soybean seed is employed for various other purposes and its uses, no doubt, will further increase. There are established in the United States several factories for the manufacture of soy sauce, which in previous years was imported in large quantities from China and Japan. There are, also, a large number of food factories using soybean seed in the manufacture of special foods. And we must not overlook the value of soybean seed as a highly valuable stock feed, relished by all kinds of farm stock. Practical experience and extensive tests by experiment stations have indicated the value of soybean seed as a home-grown concentrate.

"No doubt, most of you will recall that soybean bulletins of a few years ago told you that the ordinary farm equipment was all that was necessary to produce a crop of soybeans. Today, however, after extensive experiments, we have more efficient and economical methods of planting, cultivating, harvesting and marketing the crop. In the matter of machinery, we have soybean seed drills, soybean cultivators, and soybean harvesters. Just a word concerning harvesters, of which we have several types adapted to various conditions. There is the beater type for rows and for broadcast beans, and these have gradually brought about the combine harvester, now used successfully in the Western States.

"Further brightening the path of the soybean is the extensive work of experiment stations. Nearly all state experiment stations (and the United States Department of Agriculture) are engaged in various tests with regard to variety testing, breeding work, feeding experiments, inoculating, fertilizing, methods of culture and harvesting, and in greater utilization of the soybean and its products. From this review of experimental and other work during a score of years, I think you will quite agree that the outlook is decidedly bright for the soybean, and that, through the efforts of the American Soybean Association, we must keep this work going, and place the soybean where it belongs–in the 'King' row with King Corn and King Cotton." Address: USDA, Washington, DC.

267. Takimoto, S. 1927. Daizu no saikin-sei hanten-byô [Bacterial spotting disease of soybean]. *Byochu-gai Zasshi* (*J. of Plant Protection, Tokyo*) 14:559-66. Oct. [13 ref. Jap]
• ***Summary:*** The disease occurred in Japan and Korea. Its causal organism is named *Bacterium sojae* var. *japonicum* n.var. (=Pseudomonas glycinea), and morphology and cultural characters are described in detail. Address: Kyushu Teikoku Daigaku, Nôgaku-bu, Shokubutsu Byori-gaku Kyoshitsu.

268. Yu-niti-ei. 1927. [Enzymes of natto-pilz]. *Chosen Ikai* 75:284-. [Jap]*

269. Dixie: New U.S. domestic soybean variety. 1927.
• ***Summary:*** Sources: Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. See p. 6. "Dixie–Introduced under S.P.I. No. 37330 from Pingyang, Chosen, in 1914. Plants stout, erect, bushy, maturing in about 135 days; pubescence gray; flowers purple, 50 to 60 days to flower; pods 2 to 3 seeded; seeds straw yellow with yellow hilum, about 1,825 to the pound; germ yellow; oil 19.3 per cent."

Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (USDA). p. 1154-89. For the year 1937. See p. 1187. Selection by Arlington Experiment Farm, 1914.

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Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 10-11. Dixie is in the USDA Germplasm Collection. Maturity group: V. Year named or released: 1927. Developer or sponsor: USDA. Literature: 06. Source and other information: From Pyongyang [P'yongyang], North Korea, in 1914. Prior designation: PI 37330. Address: USA.

270. Morse, W.J. 1927. Soy-bean varieties newly developed for U.S. farms. *Yearbook of Agriculture* (*USDA*) p. 676-79. For the year 1926.

• ***Summary:*** "The acreage of soy beans in the United States increased from about 500,000 acres in 1917 to over 2,500,000 acres in 1924. This enormous increase in the use made of soy beans in this country has been largely due to the development of better-adapted varieties. The number of real or supposed varieties has increased very rapidly in the United States during the past few years, resulting in much confusion concerning varietal names and characters. In many instances disapointment and loss have been caused to the grower by the lack of reliable information, and the soy bean brought into disfavor in some localities. At the present time about 60 varieties of soy beans are handled by growers and seedsmen in the United States. Varietal names greatly exceed the number of true varieties, for different varieties are often sold under the same name and different names are often applied to the same variety. It is therefore essential not only to know the name of a desired kind, but also its varietal characteristics in order to prevent substitution in purchasing seed. Varieties of soy beans are differentiated largely by the color and size of seed, though they also differ in time of maturity, habit of growth, disposition to shatter their seed, disease resistance, oil and protein content, and in yield of forage and seed. They vary also in their adaptation to climate and soil. Some varieties are especially suitable for fertile land, others for less productive land; some for early planting, others for late planting; some for a seed crop, others for forage; some for planting with corn, others for planting with Sudan grass and sorghum. One may find a few varieties or even a single variety adapted to the climate of a certain section which will fill all the local requirements of the crop. No single factor has greater influence upon the success of the crop than the selection of the right variety to meet the needs and the conditions of the section where it is to be grown.

"Only Eight Varieties Grown in 1898: Previous to the numerous introductions made by the United States Department of Agriculture, beginning in 1898, there were not more than 8 varieties of soy beans grown in the United States, namely, Mammoth Yellow, Ito San, Butterball, Guelph or Medium Green, Eda, Ogemaw, Buckshot, and Kingston. All of these varieties were rather limited in adaptation, and at present the Ito San and Mammoth Yellow are the only ones grown to any appreciable extent. In 1907, 23 varieties of soy beans were being grown, and of these 15 were introductions made by the department prior to 1905. Vigorous efforts were inaugurated about 1907 to obtain additional varieties through consuls, agricultural explorers, foreign seedsmen, and extensive correspondence with missionaries and others until in 1909 the department had in its trials about 200 distinct varieties; by 1913, 400 varieties; by 1919, 600 varieties, and by 1925, about 1,200 varieties.

"The records of introduction indicate that every Chinese village has its own distinct varieties. There is no seed trade in China, consequently local varieties are never widely disseminated. Undoubtedly numerous varieties are yet obtainable from the agriculturally unexplored villages of China, Manchuria, Korea, Japan, and India.

"When new introductions are received they are thoroughly tested at Arlington Experiment Farm the first year, and if mixed, single plant selections are made for the second year's test. After three years' work with these selected strains, those giving the best results in comparison with standard varieties are disseminated among the State experiment stations, where they are grown again under careful observation and test conditions. Finally seed is distributed among farmer cooperators who assist the department in its practical field investigations. Varieties that appear promising in these field trials ultimately are assigned suitable varietal names and made available for general use and distribution in the localities to which they are adapted.

"One thousand varieties introduced: During the past 20 years more than 1,000 varieties have been introduced into the United States from China, Japan, Manchuria, India, Korea, Siberia, and the East Indies. Several of these have become established in American agriculture, either as direct introductions or as selections from introductions. Others, introduced in the past year have proven so valuable in trials that they are deemed important acquisitions and doubtless will become widely grown. It is universally appreciated and acknowledged by all soy-bean authorities that the annual introductions of soy beans into the United States have been of fundamental importance in the rapid rise of the crop in public favor.

"The soy bean lends itself readily to improvement. Considerable breeding work is being carried on by the department, several State experiment stations, and a few soy-bean growers. Although the Orient abounds with varieties, it is evident that they are the result of natural crossing and selection, as very little breeding work has been done. Introductions, for the most part, are admixtures, containing two or more varieties. The progeny of individual plants has shown decided differences in yield of forage and seed, in tendency to shatter, in maturity, and in oil and protein content. Many new varieties have been introduced into the seed trade of the United States as a result of selection work. Some of these varieties originated from natural hybridization and a few are almost certainly mutations or sports. The most important of such varieties are Chestnut, Dixie, Goshen

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Prolific, Hamilton, Herman, Illini, Ilsoy, Lexington, Mikado, Minsoy, Peking, Sooty, Soysota, Virginia, Wilson-Five, and Wisconsin Black. Introductions without selection have given us the following important varieties: Biloxi, Black Eyebrow, Chiquita, Columbia, Haberlandt, Hahto, Hoosier, Laredo, Manchu, Mandarin, Morse, Old Dominion, Otootan, Southern Prolific, Tarheel Black, Tokio, Wea, and Yokoten.

"Work justified by results: The results that have been obtained by this wholesale search have justified the work and expense many times over. When the department work began, the soy bean was a very minor crop, and of importance only in limited areas, owing primarily to the lack of suitable varieties. To-day, its culture, due to a wide range of excellent varieties, is widespread and lends substance to the belief that the soy bean will become one of our major crops.

"Table 24 shows the total value of soy-bean seed and hay produced in 1924 by varieties introduced and developed by the department. These data, which do not include the value of the soy beans pastured or fed as silage, indicate that over half (52 per cent) of the total soy-bean hay and seed produced in the United States was obtained from these new varieties. The wide use that is being made of these varieties shows most conclusively the effect this introduction and breeding work has exerted on the development of the soy-bean industry in the United States."

Photos show: (1) Field trials of varieties of soy beans at Clemson College, South Carolina. (2) Two men standing in a "field of Otootan soy beans, one of the newer introductions by the United States Department of Agriculture."

Table 24 has six columns: 1. Variety (18 varieties). 2. Year introduced. 3. Estimated value as seed. 4. Estimated value as hay. 5. Estimated value, total. 6. Percent of value of all soybean hay and seed. Those with the highest percent of value are: Midwest 11.4%. Manchu 6.8%. Virginia 6.7%. Wilson 6.2%.

The 18 varieties, listed alphabetically, are: Biloxi, Black Eyebrow, Ebony, Hamilton, Haberlandt, Laredo, Lexington, Manchu, Midwest, Minsoy, Mandarin, Morse, Peking, Tarheel Black, Tokio, Virginia, Wisconsin Black, Wilson. Address: USDA, Washington, DC.

271. Dorsett, P.H.; Morse, W.J. 1928. Agricultural explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon (Log–unpublished). Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished typescript log. Illust. Partially indexed. 28 cm.

• ***Summary:*** Also called the "Log of the Dorsett Morse Expedition to East Asia" and (by the National Archives) "Dorsett-Morse Expedition to the Far East, 1929-31," this is one of the most important documents ever produced on soybeans and soyfoods. Covering the period from late 1928 until 1932, it consists of 17 volumes of typewritten unpublished manuscript plus handwritten notebooks.

The two explorers, who were gone on the expedition for a little more than two years, initially planned to be gone for about three years. They took 3,369 photos of which 95% appear in the report; the original prints are pasted on the pages, each with a number and a caption. The first negative number is #43196 (p. 238) and the last is #46514. The last numbered page of the report is #8818, but most of the index pages are not numbered and some special reports at the end of the main report each start with page 1.

The first quarter of the pages (to about page 2,500) are indexed, using 4 separate indexes. The only original and 2 microfilm copies were at the American Soybean Assoc. (St. Louis, Missouri), however as of Feb. 2014 they are on permanent loan to Rare and Special Collections at the National Agricultural Library (Beltsville, Maryland)–which also has 7 photograph albums that accompany the 7 log books. A list of the missing pages has been compiled. One photocopy of a microfilm copy is at the Soyinfo Center (Lafayette, California). One microfilm copy is at the National Archives in Washington, DC, in Records of the Bureau of Plant Industry, Soils, and Agricultural Engineering, Record Group 54. See: "National Archives Microfilm Publication No. M840. Expedition Reports of the Office of Foreign Seed and Plant Introduction of the Department of Agriculture, 1900–1938." Rolls 16-20, volumes 56-73. These microfilm rolls may also be available for viewing or duplication at one of the various regional branches of the National Archives (e.g. San Bruno, California).

A brief itinerary of the trip is as follows: 1929 Feb. 18–The party of 5 people leaves Washington, DC, for Los Angeles by train. It consists of Morse, his wife Edna, their daughter Margaret (age 7), Dorsett, and his daughter-in-law Ruth (Bobbie; the widow of Dorsett's son, she served as Dorsett's secretary and general helper).

March 1–They sail from San Francisco to Yokohama on the S.S. *President Grant* of the Dollar Steamship Lines.

March 29–Arrive in Yokohama, proceed directly to Tokyo, establish headquarters with rooms at the Imperial Hotel, and hire an interpreter, Mr. Suyetake, who works with them for the next 2 years.

May 21–The Morses go to Hokkaido, the Dorsetts to Kyoto, by sleeper train. Morse returns to Tokyo.

Aug. 17–The entire party arrives in Hokkaido and establishes headquarters in Sapporo to study soybeans.

Oct. 8–Leave Hokkaido for the Northeast Provinces, then arrive in Tokyo on Oct. 15.

1929 Oct. 23–Arrive in Keijo (Seoul), Korea, then take many side trips. Note: 1929 Oct. 29–Great Depression begins in USA with stock market crash.

Dec. 8–Return to Japan via Kyushu, then to Tokyo to study soyfoods. They buy and photograph many!

1930 April 1–Travel by steamer to Dairen, Manchuria, where they set up headquarters. Dorsett very sick from

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April 11 to June 11; taken to a Japanese hospital in Dairen, with Japanese doctors and nurses, he almost dies of double pneumonia. Morse does the work of both men and does not inform USDA of Dorsett's critical condition.

June 24–Morse takes a quick trip to northern Korea, via Mukden and Antung (Tan-Tung), to look for Zoysia grass.

July 1–Returns to Manchuria via Mukden.

July 21. Dorsetts leave for Peking by train; Morses and Mr. Suyetake stay in Dairen.

Aug. 21–Morse party travels to northern Korea, staying in Heijo (Pyongyang / P'yongyang); takes a 4-day side trip to Seoul.

Sept. 28–Morse returns to Dairen, Manchuria.

Oct. 19–Morse party leaves Dairen, arriving in Peking the next day.

Nov. 9–Morse party returns to Dairen.

Nov. 30–Morse arrives in Harbin, north Manchuria, then passing through Mukden, returns to Dairen.

Dec. 18–Morses leave Dairen for Japan, passing through Kobe on Dec. 21 and arrive in Tokyo on Dec. 23.

1931 Jan. 12–Travel to Kyoto, Himeiji, and Tatsuno Shoyu.

Jan. 16–Visit Okazaki and Hatcho miso. Jan. 17–Return to Tokyo.

Feb. 17–Morse party leaves Tokyo by boat for the USA, arriving in San Francisco on March 4.

March 15–Dorsett party leaves Peking for Tientsin, Shanghai, and Hankow.

March 27–Dorsetts sail from Shanghai to San Francisco.

Note 1. The title of this report is puzzling since the expedition never went to Taiwan, Singapore, Java, Sumatra, or Ceylon. It was proposed several times that they visit these places, but the plans did not work out.

Note 2. This is the earliest log (unpublished) seen (Oct. 2016) that mentions soy.

Note 3. The best biography of P.H. Dorsett seen to date was written by Theodore Hymowitz and published in 1984 in "Dorsett-Morse Soybean Collection Trip to East Asia: 50 Year Retrospective" (*Economic Botany*, 1984, 38(4):378-88). He wrote: "Palemon Howard Dorsett, veteran plant explorer and senior member of the team, had collected plants previously in Brazil, northeast China, Sri Lanka (Ceylon), and Indonesia. After the plant exploration trip with Morse, he collected plants in the Caribbean area and on the north coast of South America. His interests included photography, carpentry, gardening and tinkering with equipment.

"Howard Dorsett was born in Carlinville, Illinois, on April 21, 1862 and thus was 67 yr old at the time of the journey to east Asia. He married Mary V. Payne on September 12, 1892 and received a B.S. degree from the University of Missouri in 1894. The Dorsetts had 3 children, 2 daughters and a son. Dorsett's wife and 2 daughters died in the early 1900s. His son, Jim, accompanied him on a plant exploration trip to Asia in 1924 to 1927. Personal tragedy struck Howard Dorsett again when his son died of tuberculosis on October 8, 1927. His daughter-in-law, Ruth B. Dorsett, accompanied him on the Dorsett-Morse exploration trip.

"Dorsett joined the USDA in 1891 and was employed by the Section of Plant Pathology. He was involved with the early experiments on the use of Bordeaux mixture for the treatment of leaf diseases of nursery stock. From 1904-1907, he was in charge of the Chico, California, plant introduction garden. Altogether, Dorsett developed 6 plant introduction gardens for the USDA. From 1909 until he retired in 1932, Dorsett was either in the field as a plant explorer or working as an administrator dealing with plant introductions. In 1936, he was awarded the Meyer Medal in recognition of distinguished service in the field of plant introduction. According to David Fairchild, Howard Dorsett was involved with the first propagation in the United States of the tung oil tree, date palms, Japanese flowering cherry trees, oriental bamboos, east Indian mangos, Chinese cabbage, and many other plants. He collected about 1,000 soybean accessions from northeast China and also introduced guinea grass from Brazil. On April 1, 1943, Howard Dorsett died in a nursing home in Washington, DC (Cattell and Cattell, 1938a; Marquis, 1928; Fairchild, 1936, 1938; *Washington Post*, 1943; Who Was Who in America, 1968)."

Two detailed biographies of Morse have been written by Wm. Shurtleff: (1) In *Soyfoods* magazine (Summer 1981, p. 56-60). (2) "William J. Morse–History of his work with soybeans and soyfoods (1884-1959)." Sept. 2011. 482 p. 866 references. 126 photos. A digital book published by Soyinfo Center on Google Books. Address: Agricultural Explorers, USDA, Washington, DC.

272. Dorsett, P.H.; Morse, W.J. 1928. Foreign agricultural explorations: Introduction (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5. No author, date or place are given. "It is primarily through plant introduction in the form of new species or those related to the ones already established [new varieties] in the United States, and their fullest utilization which, not only promise most for the further extension, development and success of agriculture, but also tend to make the United States more nearly self supporting.

"The world is a 'Gold Mine' of plant wealth accessible, alike to all nations, however the development of country's interest in this vast and practically inexhaustible storehouse of potential agricultural possibilities is not dependent upon the united efforts of the nations but is directly in proportion to the efforts exerted by each country independently in its

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search for plant nuggets [?] adaptable to its needs.

"The United States has perhaps accomplished more in this important field of agricultural research than any of our sister countries, and yet she has but yet touched the fringe of its possibilities, both as to plant introduction and adaptation.

"It has been stated on good authority that more than 90% of the cultivated plants now being grown in the United States, are directly or indirectly the result of plant introduction. Under these conditions it is self evident that Foreign Plant Introduction is one of the most important lines of research investigations now being pushed by the United States Department of Agriculture."

Page 8. "Through plant introduction, selection and breeding, soybean culture in the United States is being rapidly extended throughout both the cotton belt of the South and the corn belt of the North. The acreage devoted to the growing of this plant alien in the United States has increased from 500,000 acres in 1917 to approximately 4,000,000 acres for the year 1928. The Virginia, Manchu and Laredo soybean selections made from introductions made by the late Mr. Frank N. Meyer, Agricultural Explorer of the Office of Foreign Plant Introduction, in 1906, 1911 and 1914 respectively, returned in the aggregate in money value, to their adopted country in 1924, for hay and grain alone upwards of $7,700,000.00" [$7.7 million].

Note: The soybean was probably the most import and best known of the many plants introduced to the United States.

Pages 9-10. "While the work as a whole is general agricultural explorations and every thing possible will be done to accomplish results in this connection, there are two principal objectives which it is hoped the expedition can accomplish. They are First to round up, in so far as possible, the work of observation, investigation and seed collection of desirable varieties, strains, etc. of the Soyabeans in the Orient, and also to secure data and photographs not alone of field operations but also of practices and methods of the utilization of the soybean for food and all other byproducts, especially those industrial. Second, to study the persimmon industry of the Orient..."

Pages 11-12.

"Ninety-five percent or more of the agricultural crops of America today are either directly or indirectly the result of plant introductions. The United States heads the nations of the world in its activities in agricultural exploration and plant introduction, As a result of this work this nation's diversification of important and valuable crop production and agricultural research investigations are not surpassed by any other country of the world.

"The work of agricultural exploration in northeastern China during the period from August 1924 to December 1926 [by P.H. Dorsett] resulted in the introduction of valuable types of soybeans, mung beans, wheat, rice, barley, chestnuts, pears, jujubes, persimmons, and other deciduous fruits, vegetables, forest trees, and ornamental shrubs and vines. All were adapted for trial in the temperate regions of the United States and many of them suitable for trial in the semi-arid Great Plain region of America, where the need for such material is so very great.

"The observations made, data, and still and motion pictures secured, concerning the Chinese practices of growing, harvesting, handling, and storing soybeans in a country which leads the world in its production has materially stimulated the interest in N.E. China, Japan, Korea & Formosa of farmers and research investigators, who have put America's acreage of this extremely valuable plant immigrant ahead of all other countries and next to Manchuria."

Note: The next paragraph (p. 12) is similar to the one above it, discussing the importance of agricultural exploration in 1924-1926 on the Chinese persimmon, and has helped to make the persimmon an important crop in California.

"Regions to be covered [by this expedition]: Japan, Chosen (Korea), Taiwan (Formosa), and Northeastern China..."

Page 13. "Objectives: It is proposed to conduct extensive agricultural investigations in the previously mentioned regions, primarily on the following crops:

"1. Soybeans: No one factor has contributed more to the increase of the soybean in America than the development of new varieties through introductions from the Orient. The soybean is a crop of local adaptation, as shown by the numerous varieties in Asiatic countries and the results of extensive tests in the United States. Although grown primarily for forage in the United States, many sections are looking forward to the production of soybeans as a cash crop for oil and oil meal, and for human food and industrial uses. It is quite generally predicted that the soybean will become one of our major crops, particularly in the South of the boll weevil sections and in the Corn Belt states through the menace of the corn borer. To attain this importance in American agriculture high yielding varieties for different uses and adapted to a wide range of soil and climatic conditions are essential. Also, extensive investigations are necessary as to the best methods of planting, culture, storage, marketing, and the extensive utilization of the seed for human food and industrial purposes as practiced in these Oriental countries where the soybean has been the most important food crop for many centuries."

Pages 14-15. 2. Mung bean: 3. Kudzu: 4. Persimmon. 5. Forage, green manure, and cereal crops; fruits, vegetables, trees, and other crops and plants of potential value to American agriculture.

Personnel: The Office of Foreign Plant Introduction plans to send on the proposed Agricultural Explorations to Japan, Chosen, Northeastern China and Formosa in 1929, Mr. W.J. Morse, Agronomist in the Office of Forage Crop

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Investigations–in charge of Soybean, Mung Bean, Kudzu and other Oriental leguminous crops, and Mr. P.H. Dorsett, Horticulturist in the Office of Foreign Plant Introduction. leader of the Agricultural Exploration work in N.E. China in 1924 to 1927.

Pages 26-28: "Regions to be explored: The countries included in the proposed exploration are Manchuria, Northeastern China, Chosen (Korea) and Japan including Formosa. On completion of the work in the above countries, provided conditions are favorable, a short time will be spent in the Dutch East Indies, especially Java and Sumatra [Note: This never happened].

Next come descriptions (location, latitude and longitude, etc.) of each of the countries they intend to visit: Manchuria: Chosen (Korea): Japan: Formosa (Taiwan): Dutch East Indies:"

Pages 28-29: "Prospective crops: Soybeans: The rapid expansion of soybean culture has been one of the outstanding developments in the recent history of American agriculture. From an area of less than 50,000 acres in 1907 it has expanded in 1927 to approximately 11,500,000 acres, with a production of over 8,000,000 bushels of seed valued at nearly $14,000,000. The value for hay, forage, silage and pasture is estimated to be equal to a similar amount. The present industry is based primarily on the more than 1,500 varieties of soybeans already introduced by the Department [USDA]. The present area in which soybeans are now being grown is indicated on the inclosed map. Over ½ of the area of the United States is involved. While the soybean is primarily grown for hay and forage its use for oil is also increasing and oil mills are being erected (see map 2). In Manchuria and Japan the soybean oil meal ranks first in importance as a soybean product, being especially valuable for animal feed and fertilizer. Soybean oil, now imported, is being used in lard and butter substitutes, paints and varnishes, glue, linoleum, rubber substitutes and also is refined as an edible oil.

"Varieties for expanding present area: The area in which soybeans are grown in this country can be greatly expanded provided drought resistant types can be found for the southwest and early maturing types for the northern and northwestern regions. The prevalence of the soybean throughout the widely varying districts of Manchuria and Japan gives ample promise of supplying these types.

"Soybeans are being extensively cultivated throughout Java for food and green manure. It is a highly important article in the products of the country. It is believed that types can be found here that will be successful in the milder, moist-summered southern states.

"In the present area where soybeans are grown, swine feeders demand [?] varieties of low oil content while the demand for oil mills is for varieties of high oil content. The range in both directions can be extended it is believed by introduction of new varieties.

"Leaf, stem, and root diseases are gradually increasing in some of our older soybean production regions. In the event these diseases [become] prevalent, a special study and selection of resistant strains is highly desirably." Address: Agricultural Explorers, USDA, Washington, DC.

273. Ryerson, Knowles A. 1928. Re: Memorandum for W.A. Taylor (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Dec. 19. Unpublished log.
• ***Summary:*** Pages 61-64. This letter, dated Dec. 19, begins: "Dear Dr. Taylor:

"In accordance with tentative plans discussed at various times during the past month, I wish at this time to ask formal approval for the proposed expedition of Mr. Dorsett and Mr. Morse to Manchuria, China, Chosen, Japan and also the Dutch East Indies."

"Of the plant material to be sought, new soybean varieties are the most important. The extension of the area where they can be grown in this country, both in the northwest and southeast, depends upon securing drought resistant strains."

According to reports of workers in Japanese Experiment Stations and to Consular reports, there are at least 500 varieties of soybean in Japan. Not more than 50 of these have been introduced into this country. Breeding work has been under way at the Japanese Experiment Stations for the past decade. Few of the new types developed have been obtained. On the North of the Island of Hokkaido, 250,000 acres of early maturing varieties are grown. Experience of a cooperator in Canada indicated that these varieties are better suited to the northern conditions than any of the varieties grown in the United States.

"Manchurian varieties vary from 90 to 130 days in the time required for maturity. In China, exclusive of Manchuria, the time to maturity ranges from 125 to 175 days. Many introductions have been made from Northern Manchuria but better varieties with a longer maturing period are needed in the southern part of the corn belt and the northern part of the northern part of the cotton belt. Japanese Experiment Stations in Korea have carried on extensive breeding work. At least 300 varieties are known in that country, many of which appear promising for the southern corn belt and adjacent cotton belt. Late maturing varieties are also grown extensively in the Island for Formosa."

Page 62. "According to various Dutch reports, soybeans are extensively grown in Sumatra and Java, principally for green manure purposes. There are many varieties of the late, yellow-seeded type which are of low oil content and are grown for forage, pasture, and soil improvement."

Page 63. "Personnel: It is proposed to head the

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expedition by Mr. P.H. Dorsett, Office of Foreign Plant Introduction, who led the expedition to Northeastern China and Manchuria in 1924 to 1927. He would be accompanied by Mr. W.J. Morse, a Bureau specialist in soybean and other Oriental legumes. In addition it is desired to send Mr. C.C. Thomas, of the Office of Foreign Plant Introduction who as specialized in the study of Oriental persimmon varieties, culture and storage problems, to spend six months, either in the fall of 1929 or 1930, to cooperate with Dorsett in the study of Korean varieties and the root stock problem in both Japanese and Chinese persimmon districts."

"Mr. Morse has planned to have Mrs. Morse accompany him and Mr. Dorsett has tentatively planned for his daughter-in-law also to go on the trip. This is a matter, however, which I wish to talk over with you.

"If approved, it is hoped to have the expedition sail from San Francisco, March 1, 1929, to be gone for two to three years."

"Expenses: The salaries of the men will be carried by the Offices concerned. Field expenses for the remainder of the fiscal year, 1928 and 1929, are estimated at $4,025 for the two men. Of this sum, the Office of Forage Crops will contribute $1,000 and the Office of Foreign Plant Introduction the balance."

"Concurred in (Signed) A.J. Pieters, Acting in Charge of Forage Crops." Address: Senior Horticulturist in Charge [Div. of Foreign Plant Introduction, USDA].

274. International Institute of Agriculture. 1928. International yearbook of agricultural statistics, 1927-28. Rome, Italy. See p. 370-77. Index. 23 cm.
• ***Summary:*** Statistics for soya (imports and exports) are on pages 370-71. In Europe, soya statistics are given for Germany, Denmark, France, Great Britain and northern Ireland, Italy, Norway, Netherlands, and Sweden. In Asia, for China, Korea, Formosa [Taiwan], Dutch East Indies, and Japan. For peanuts on pages 372-75, and for sesame on pages 376-77.

Note: This earliest issue of this book is 1909-21, but soybeans are not mentioned (under any name) anywhere in this book. Address: Italy.

275. New, Ilhan. 1928. When I was a boy in Korea. Boston, Massachusetts: Lothrop, Lee & Shepard. 190 p. Frontispiece (2 portraits). Illust. 19 cm. Series: Children of other lands books. *
• ***Summary:*** New was born in 1894, the first born son of New Kee Yun, a silk manufacturer and a successful business man. A patriot and a leader among the converts to Christianity, New lived part of his life in Manchurian villages. With 35 black and white photos.

276. Diaz, Juan B. 1929. Re: Soybeans in Cuba. Potential for soymilk. Letter to Director of the Station, Santiago de las Vegas, Cuba, Jan. 17. 1 p. [Spa]*
• ***Summary:*** "With respect to this bean (*judea* = soybean), a short time ago I read in the *Havana Post* an article which said that these soybeans contain a large quantity of a substance from which it is possible to make a very good and rich milk. In Korea there are said to be many dairies (*lecherias*) that are devoted exclusively to selling soymilk (*leche de soya beans*) and this milk is very rich and nutritious.

This letter is located in file #565 in the archives, INIFAT, Santiago de las Vegas, Cuba. Another letter in the same file, dated 5 Feb. 1929, describes the use of soybeans for green manure (*abono verde*) in tobacco cultivation. Address: J.B. Diaz & Co. (tobacco store), Habana, Cuba.

277. Dorsett, P.H. 1929. Re: Letter notifying Mr. Matsumoto of forthcoming trip to East Asia (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Jan. 25. Unpublished log.
• ***Summary:*** Page 113. This letter dated 25 Jan. 1929 is to Mr. H. Matsumoto, Central Laboratory, South Manchuria Railway Co., Dairen, Manchuria.

"Dear Mr. Matsumoto. I greatly appreciate the receipt of your kind favor of December 1928, and was delighted to learn of your safe arrival back in Dairen after your visit to the United States..."

"Mr. Morse and I plan on sailing from San Francisco on March 1 for Yokohama, Japan. After a year spent there and in Chosen (Korea), we expect to get over into Manchuria and will probably, at least for a time, make our headquarters at Mukden, and later get down to Dairen. We are looking forward with pleasure to meeting you then.

"If in the meantime, you, for any reason, desire to get in touch with us, address your communications in care of the American Embassy, Tokyo, Japan. We plan, while in Japan, to receive our mail through that source.

"With kindest personal regards, I remain very truly yours,..." PHD/p. Address: Agricultural Explorer, USDA, Washington, DC.

278. Jardine, William M. 1929. Re: Letter of introduction for William Morse, Agricultural Explorer, Bureau of Plant Industry, USDA–to be used on trip to East Asia. Letter to whom it may concern, Jan. 26. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Be it known that Mr. William J. Morse, Agricultural Explorer, in the Bureau of Plant Industry, of the United States Department of Agriculture, whose signature appears on the margin hereof, will, in the immediate future, visit Japan, Ceylon, Formosa, Manchuria, China, Chosen, the

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Dutch East Indies, and other foreign countries, in connection with the work of this Department.

"He is hereby introduced and cordially commended to all persons with whom he may come in contact, whose good offices on his behalf are earnestly requested."

Morse's signature does indeed appear in the margin, and document is signed and sealed by Mr. Jardine.

Note: William M. Jardine of Kansas was secretary of agriculture (1925-29) under President Calvin Coolidge. William Marion Jardine (seventh president of Kansas State University) served as U.S. Secretary of Agriculture (1925-1929) under President Calvin Coolidge.

This digital image was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004). Address: Secretary of Agriculture.

279. U.S. Department of Agriculture, Office of Information, Press Service. 1929. Plant explorers of the United States Department of Agriculture start for the Orient. Release immediately (News release) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Feb. 18. Unpublished log.

• ***Summary:*** Page 223. P.H. Dorsett veteran agricultural explorer of the United States Department of Agriculture, and W.J. Morse, soybean specialist of the department, left Washington [DC] February 18 on a two year expedition to the Orient. They will sail from San Francisco March 1, going direct to Tokyo, Japan.

"The soybean culture of Japan, Chosen [Korea], Manchuria and Java will be one of the main features of the exploration program. New varieties will be sought for expanding the present acreage of the United States, methods of handling and preparation of a wide variety of by-products will be investigated.

"The varieties of the Oriental persimmon of Chosen will be sought."

280. Dorsett, P.H.; Morse, W.J. 1929. Re: Letter notifying Mr. Peter Liu in China of trip to East Asia including China (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. March 12. Unpublished log.

• ***Summary:*** Pages 343-45. Neither the address, title or affiliation of Mr. Liu are given. However, Peter Liu was Mr. Dorsett's Chinese interpreter on his 1924-25 trip in China.

"Dear Liu: Well here we are on the way back to the Orient. We left Washington [DC] February 18th, and came by way of Los Angeles, California to San Francisco, California and left there March 1st. We are now about half way between Honolulu and Yokohama, Japan where we are scheduled to arrive on the morning of the 18th. As soon as practicable after landing we will go to Tokyo and arrange for making headquarters there at least until we can get acquainted officially and learn what part of the country we should first get to work in.

"Our present plans contemplate a stay of a full year in Japan and Chosen (Korea) and in the spring or early summer of 1930 we will get into Northeastern China and make headquarters there in Mukden, at least for a while. Later in the season we will likely move headquarters to Dairen and remain there until fall and then hope to get over to Peking and be there during the winter of 1930-31. From there we will likely work south to Nanking, Shanghai, Han Kow (Hankow; pinyin Hankou, as of March 2014 part of Wuhan), Hong Kong and then to Taiwan (Formosa) where we may spend the winter of 1931-32. From there we will likely go to Singapore, Penang, Java, Sumatra, and Ceylon then back to America by England.

"We are wondering if you and the other two boys, Yey and Gow, would like to be with us while we are in China at least until we are ready to start South from Peking. Please let us know.

Page 345. "I copy the following from a letter from Mr. Julian Arnold under date of January 16, 1929, which I consider a high compliment and feel sure that you will appreciate.

"'I wish to commend the expeditious and thorough manner in which Mr. Liu handles this whole matter. His work and attitude were most commendable.'

"We are wish that you could speak Japanese for if you could we would have arranged to have had you meet us in Yokohama and helped us with our work in Japan and Korea.

"All of the party joins me in kindest regards. Very truly yours, Dorsett and Morse." Address: Agricultural Explorers, USDA, Washington, DC.

281. Dorsett, P.H.; Morse, W.J. 1929. Soy sauce (shoyu) in Japan, China, and Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 655 (16 April 1929). "A representative of a Shoyu Sauce Company called on us and wished to give us a demonstration of a new process of soy sauce manufacture. This company had developed a chemical compound which when added to the regular soy sauce doubles the amount and makes an excellent soy sauce." However, in exchange, the company wanted the Americans' endorsement to use in

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advertising. He was politely refused.

Page 847 (May 2). Visited the soy sauce and rice wine experiment station [*Jozo Shikensho*] at Nishigahara. Met Prof. Dr. K. Kurono, who was said to be in charge. His young assistant took them through the soy sauce factory and rice winery. "We were able to get considerable data about the making of soy sauce as all the various steps involved were in operation and we were able to obtain seed of the soybeans and wheat used especially in making soy sauce.

Page 1222 (May 27). Dr. Ito made arrangements for Morse to visit a large soy sauce factory on the outskirts of Sapporo, Hokkaido. The Tomoe Shoyu Factory consisted of several large buildings covering several acres. Morse was shown through the entire plant. The wheat and soybeans are grown in Hokkaido, but each consists of a mixture of varieties; samples were sent to the USA. This factory uses the most modern machinery and methods. "In one of the large vat rooms more than 120 vats were counted in which the wheat and bean mash [moromi] is cured for about 18 months. The mash from which the soy sauce was pressed out is sold as cattle and hog feeds around Sapporo. The manager was interested in the possibility of selling soy sauce in the United States." A photo shows the outside of the factory's headquarters in Sapporo.

Note 1. This is the earliest English-language document seen (July 2011) that contains the term "bean mash" or the term "wheat and bean mash." The latter almost certainly refers to *moromi.*

Page 3341 (24 Dec. 1929). "Today [in Tokyo] Morse and Suyetake went to call upon soy sauce and natto manufacturers for the purpose of getting acquainted and also if possible to arrange for getting still and motion pictures of their places, equipment, and operations."

Page 3499 (9 Jan. 1930). They got six good photos of steps in the making of soy sauce at the Noda Shoyu Co. It is probably "the first time that such a picture has been made." "Detailed notes and descriptions of these soybean products will be found in the special report on soybean and soybean products which is a part of this report."

Page 4341 (March 11, 1930). A photo (neg. #45026) shows numbered specimens of various ingredients (in bottles) used in the manufacture of soy sauce, including soybeans, wheat, soy mash [moromi], malt from curing tub, soy sauce, soy sauce oil, and a small wooden cask. Purchased in Tokyo.

Page 4356. Photo (neg. #45033) of "a small quantity of mash left after the sauce has been pressed out. It is known locally as 'shoyu kasu.' It is used for feeding hogs and cattle and also for a fertilizer."

Page 4357 (March 17, 1930). "About 11 a.m. we went to the Yamasa Shoyu Factory at 576 Nakano-machi, Tokyo, Japan. There we met Mr. S. Yamaguchi, the manager, who allowed us to make pictures in the factory culture room and storage and curing sheds."

Pages 4358-4366. Photos (negatives #45034-42) of Yamasa Shoyu Sauce Factory in Tokyo. 1. Hydraulic press with thin bags for pressing out the sauce. 2. Factory interior, incl. cookers, pump, large casks. 3. Interior of wheat roasting and preparation room, with roaster, pile of small [koji] trays, huge wooden rafters. 4. Interior of "Shoyu sauce bacterial [sic, koji mold] culture room," with lines of small boxes [koji trays] on both sides. 5. Large iron double-boilers in which soy sauce is cooked [pasteurized?]. 6. Storing and aging room containing 4 rows of 16 casks each, taken at level of rim of casks. Each cask is about 8 feet across and 8-10 feet deep. The company has 8 such rooms and all are kept at full capacity. 7. Storage and curing shed (same room), taken from ground level. 8. Pile of "roasted wheat mixed with bacterial germs for shoyu sauce." Note 2. Actually, this contains soybeans and koji mold spores, about to be put into trays to make koji. Morse failed to understand these two basic facts. 9. Small wooden casks "ready for filling with shoyu sauce."

Page 5649-5650 (28 Aug. 1930). Heijo, Chosen [Pyongyang, North Korea]. Morse visited the branch office of the Grain Inspection Office of the Neian Nando Prefecture to learn about soybeans. Last season (1 Nov. 1928 to 1 Nov. 1929) some 263,090 bags of soybeans (of 2 bushels each) were inspected and shipped out from various points in the prefecture. "The Noda Soy Sauce Co. obtains most of its soybeans from here. The beans are shipped entirely to the Main Island [Honshu, Japan] for miso, soy sauce, and natto. Note 3. Chosen has been a Japanese colony since 1910.

Pages 6339, 6340, 6341, 6342 (3 Nov. 1930). In Peiping [Beijing], China. After tiffin they visited the Lan Hsin Chai "soy sauce, soy jam [chiang / jiang], and pickle" factory of Mr. Wang in the outer city to the southwest–not far from Hsuan Wumen Street. It is about 300 years old and many of the large earthen glazed jars are the same age as the establishment.

Note: This is the 2nd earliest English-language document seen (Nov. 2011) that uses the word "jam" to refer to *chiang / jiang.*

Pages 6341, 6342. 6343, 6344, 6345 (negatives #46157-61) show photos of this factory. 1. Side view "of one of a number of old Chinese lever soy sauce presses." 2-3. Other views of a soy sauce press, with jar in foreground. 4-5. Many large earthen jars, some covered with reed grass matting, in outdoors compound / courtyard.

Page 6802 (16 Dec. 1930). At Dairen, Manchuria, Morse met Dr. Kato at the Central Laboratory of the South Manchuria Railway Co. Concerning Japan, Dr. Kato said Ajimoto [a type of HVP] was made from wheat proteins, not soybean proteins. However, in and around Kyoto a product named Soyamint was very similar to Ajimoto but was made from soybeans.

Pages 7008-09 (21 Jan. 1931). In Tokyo, Morse visited the Institute of Physical and Chemical Research, where he met Dr. U. Suzuki, Prof. of Biological Chemistry at Tokyo

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Univ. "With reference to Soyamint, Dr. Suzuki advised that it is a soy sauce substitute–one half chemical and one-half fermentation" [i.e., a mixture of equal parts HVP and fermented shoyu].

Pages 7035-36 (24 Jan. 1931). In Tokyo, Morse "learned that soy sauce is prepared in nearly 12,000 establishments throughout the Japanese Empire and in addition it is made in private homes, especially farm homes. When 5 koku [1 koku = 47.6 gallons or 180 liters] (liquid measure) of soy sauce are made, a permit must be obtained from local authorities. Various sections in Japan are noted for brands of soy sauce such as Noda, Chiba Prefecture, for its "Kikkoman' and 'Higeta' soy sauces. In the Kwansei [Kansai, Osaka-Kyoto] district the 'Marukin' soy sauce is made while in the Tatsuno district [in western Japan's Hyogo Prefecture] the light colored [*usukuchi*] soy is made. The various brands are made in slightly different ways regarded as trade secrets by the various companies. Many experiments by chemical laboratories are being conducted to make artificial soy sauce and also to shorten the period of fermentation.

"Considerable quantities of Japanese soy sauce are exported, China being the chief market. Recently America and Europe have made increasing demands. In shipping to some countries, especially America, condensed soy sauce is exported, then water added and bottled."

Pages 7066-67 (30 Jan. 1931). In Tokyo, Morse has been trying for some time to locate the company that makes Soyamint. Finally, Mr. Suyetake found that it was made by the Japan Fertilizer Co. Morse visited the main office and met one of the directors, Mr. Koshiro Horie, who said that "his company supplies 65% of the commercial fertilizers used in Japan. One of the principal by-products of the manufacture of fertilizers is used with soybean oil meal in producing an artificial soy sauce. The process of manufacture is more or less secret so that it is not possible to visit the factory. As yet 'Soyament' is not on the market in large quantities as it is of only recent manufacture. It is said that soy sauce can be made in slightly over one month with this process, allowing one month for curing. It has quite a different flavor from that of soy sauce and it may take some time to establish it on the market. It can be produced much more cheaply than the ordinary soy and being cheaper may help it to take more quickly with the poorer classes." Mr. Horie gave Morse some literature about Soyament and promised to send samples of two grades of commercial products which differ principally in specific gravity. Address: Agricultural Explorers, USDA, Washington, DC.

282. Dorsett, P.H.; Morse, W.J. 1929. Green vegetable soybeans and Edamame varieties in Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Pages 802, 803 (24 April 1929). While in Tokyo, Dorsett purchases from T. Sakata & Co. in [Yokohama] Japan eleven varieties of soybeans (8 oz each), one variety of Dainagon Azuki, and 2 varieties of swordbeans. Vegetable soybean varieties are: Edamame Wase Aosakigake, Edamame Wase Kurome Oxaya, Otsubu Wase Aojiro Edamame, Daikoku Edamame, Edamame Wase Higanmame, Tsurunoko Daizu, Edamame Wase Kurosakigake, Edamame Wase Chamame.

Page 892 (7 May 1929). A photo shows two commercial retail bunches of soybean vines and pods, bound at the bottom with rice straw. The soybeans are "used as a green vegetable."

Pages 1201-02 (26 May 1929). While visiting the Hokkaido Agricultural Experiment Station at Kotoni, Sapporo, Mr. Morse notes: "The soybeans grown in Hokkaido are used entirely for food purposes, such as natto, bean curd, green vegetable bean, soy sauce, miso, bean paste and roasted beans."

Page 1270 (30 May 1929). In Hakodate, Hokkaido, in northern Japan, the authors visited a store where pickles were sold. There they saw "a tub of pickled soybean pods, the seeds of which were about full grown. These pods were pickled in the same manner as we pickle cucumbers and sauerkraut, that is by salting down. This is the first time we have ever heard of or seen this kind of soybean product. According to Mr. Suyetake [their guide], this form of soybean product is eaten along with refreshments, the kind we no longer have at home [alcoholic beverages]. It seems rather ironical that we should come to study soybean products for the United States and find so many that, to enjoy them most, they should be eaten along with the refreshments of the pre-prohibition era of our country, but such is fate."

Page 1837 (11 July 1929). "The country around Nishiarai raises soybeans to a very considerable extent for edible green beans. Not only are early and late varieties planted but the beans are planted at intervals so that there will be a continuous supply for the Tokyo market. A number of farms were visited and soybeans were found on all in various stages of growth."

Pages 1869, 1871, 1878-1879 (15 July 1929). "Left the hotel about 7:45 for a day's agricultural exploration in one of the trucking areas in the vicinity of Tokyo, where the growing of soybeans as a vegetable is an important industry." From Nishiarai they set out across country on foot. "Saw many plantings of soybeans from just coming up to ready to pull for market. It is extremely interesting to note how they are planted for succession. We saw many plantings of beans ready for pulling for market with rows interplanted as seedlings or transplants just coming into bloom. One photo shows "Vegetable soybeans only recently transplanted. The light color between the rows is caused by fertilizing with

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liquid night soil." Two other photos show soybeans "quite probably planted for use as a vegetable."

Pages 1897, 1898 (17 July 1929). "Secured interesting data and motion pictures of varieties of vegetable soybeans in the Tokyo market and outlying farming and trucking districts.

"Changed herbarium dryers on a large collection of plants and worked on estimates and tentative itinerary for the fiscal year 1929 and 1930. Also on official correspondence.

"In the morning we left early for the market to secure soybean pictures as soybeans in bundles of 30 to 50 plants each were very abundant. After securing two scenes we left for Kitasenju station where an agricultural association is located. It was learned from officers in charge that around Takenotsuka [near Tokyo] soybeans were grown extensively for green vegetable beans and that a village agricultural fair was being held. Arriving at Takenobu we found that the fair was being held in a school building about a mile from the station."

"Soybeans: Forty bundles of plants, 30-50 plants to the bundle representing several varieties used only for green vegetable beans. The two most common varieties use for green vegetable beans were the Sodefuri and the Chamame. The bundles were judged by color, size and shape of pod, and size and yield of each plant. Pods should be bright green and plump, that is the seed full grown. The size of the bundle for market purposes depends on the desire of the individual farmer. Three crops of vegetable soybeans are grown during the season–early, medium and late season.

"Perilla spikes: Small bundles of flower spikes which are much used for garnishing.

Page 1899. "Ginger flower buds (Mioga variety) 2 pans."

"Perilla plants (purple variety). 10 bundles of plants representing two purple foliage varieties. These are used for dying pickled plums [umeboshi], ginger, etc."

"Perilla plants (white). Bundles of a white variety used for pickling and as greens."

Page 1901. Still at the fair: "The prize awarding ceremony took place about 2:30 p.m. The fair only lasted two days. The prize winning bundles of soybeans were taken to the play ground outside the building and motion pictures were taken of the farmer winning the special soybean prize and the one winning the 1st prize.

"We were then taken to a farm house where soybean plants were being bundled for market. This was being done inside a shed and was too dark for taking motion pictures. The farmer very kindly brought out the bean plants and bundling box in the sunshine, and motion pictures were taken of the operation."

Pages 1925-1926 (19 July 1929). Negatives #44087, #44088, #44089. Three views of: "A native Japanese woman pulling soybeans to be bunched and sold as a fresh green vegetable."

Page 1927 (19 July 1929). Neg. #44090 and #44091. Two photos from the village of Hanabata: (1) "Children with their hands and aprons full of soybeans which have been boiled in the pod; they are eating them like we eat peanuts." (2) Details of how a farmer, sitting on the ground in his yard, bundles vegetable soybean plants for market and ties them with a grass string using a frame for support.

Page 1928. Neg. #44092. "The Japanese farmer shown in picture #44091 fixing a string of rice straw to tie about the top of the bundle of soybeans he has just fixed."

Neg. #44093. "A pile of soybeans awaiting bunching for the market."

Page 2065. Black and white movie film, DeVry camera, spool 23. Description of 8 shots of vegetable soybeans taken in Japan; undated. Page 2071 (3 Aug. 1920). "Visited the wholesale vegetable and fruit market and as usual found it full... and most interesting." "Soybeans: Bunches of soybeans are to be found in abundance on every turn, they are to be found in large and small piles at almost every stand. See picture #44162.

Page 2080. Neg. #44162. "Piled bundles of soybeans, one of the commonest vegetables in the market. They are to be found at every turn."

Pages 3501-3502 (10 Jan. 1930). The authors leave Tokyo for Urawa, the capital of Saitama prefecture in Japan, where they visit the Saitama Prefecture Experiment Station. The horticulturist explains that they have "three varieties of vegetable soybeans. These are grown especially as green vegetables. Plant seed in hot in hot beds about the middle of April and transplant to the field when danger of frost is over."

Page 3683 (24 Jan. 1930) states that at the Shizuoka Agricultural Experiment Station the authors "secured considerable information about vegetable and green manure soybeans for the Shizuoka prefecture."

Page 6911 (3 Jan. 1931). Morse writes from Tokyo: "At one of the department stores, in the vegetable market section, we found small bundles of soybean sprouts and also some bundles of green vegetable soybean plants. There were only 6 plants to a bundle, about 8 inches long and with 6 to 8 pods per plant. The seed in rather large pods seemed only about one half developed.

Pages 6931-6932 (7 Jan. 1931). Morse went to the Imperial Department of Agriculture in Tokyo and met the director, Mr. A. Manabe, who provided information, statistics, and recent publications on soybean acreage, production, utilization, and industries in Japan, Chosen [Korea], and Taiwan. The beans from Japan proper and Chosen are utilized primarily for food, such as bean curd (Tofu), confections, flour and green vegetable beans [edamamé]. A table shows that less than 1% (0.8%) of the soybeans used in Japan are consumed in the form of "Green vegetable beans."

Pages 7102-7103 (2 Feb. 1931). Morse is in Urawa,

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capital of Saitama prefecture. "The green vegetable soybean work, so much of which has been done at Urawa, has been transferred to the branch station at Koshigawa. A very extensive acreage of green vegetable soybeans is grown in the Saitama Prefecture. The beans are started in hot beds about March 1 and when warm weather sets in the plants are transplanted in the fields.

"Soybeans are not used extensively for green manure in the Saitama Prefecture. The station, however, is doing work with varieties best adapted to green manure purposes. Genge clover (*Astragalus sinensis*) is used most extensively by the farmers as a green manure crop in the rice paddy sections. We were given publications of results of the station's work for several years."

Note 1. This is the earliest English-language document seen (June 2009) that uses the term "Vegetable soybeans" (entry of 15 July 1929), or "green vegetable soybean" (3 Jan. 1931) or "green vegetable soybeans" (Feb. 1931).

Note 2. No mention is made of "edamame" (except in variety names; Apparently Dorsett and Morse don't yet understand the meaning of this word) nor of "vegetable-type soybeans" or "edible soybeans" as a larger category of soybeans. Address: Agricultural Explorers, USDA, Washington, DC.

283. *Foreign Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1929. The world situation in oils and oilseeds. 18(20):697-735. May 20.

• ***Summary:*** Pages 701-02: "Manchuria is reported to have produced another record soy bean crop in 1928, or approximately 3,500,000 short tons, against 2,952,000 short tons in 1927. Production also increased in the United States, but decreased in Chosen [Korea]. Manchuria provides about 70 per cent of the world's production of soy beans and is the only important source of supply for importing countries. Trade with the United States, however, appears to be diminishing, largely as a result of the increasing interest displayed by European countries in importing seeds for crushing. See table, page 708.

"The 1928 returns of imports into the chief consuming countries show a larger volume of business in soy beans and a corresponding reduction the quantities of soy-bean oil moving from China to Europe. Outstanding increases appear in the imports into the United Kingdom and Germany, while larger quantities also were taken by Japan. In the latter country, the amount of soy-bean cake required for fertilizer was an important influence upon the market for soy beans, while in Europe the chief use of the by-product is as a livestock feed. In the United States the bulk of the requirements are met from domestic production. The crop of 1928 is placed at 261,000 short tons. Only 18,102 short tons are reported having been crushed for oil, however, against 11,364 in 1927 when the domestic crop was placed at 224,000 short tons: Most of the American crop is used as feed or as a green manure. Since June 1928, the price of crude soy-bean oil in barrels at New York has stood at 12.3 cents pound, a figure slightly higher than that of the corresponding period of 1927-28."

There follow similar but shorter sections on olive oil, sesame oil, rapeseed oil, sunflower seed oil, and flaxseed oil.

Tables showing production of soybean oil or its equivalent, from 1924 to 1928, appear on the following pages: Page 704: Vegetable oil: Production of more important materials in terms of oil in important producing countries, 1924-1928.

Page 708: Exports (in short tons) of soybeans and [soy] bean oil in terms of beans, 1919-1928, from Manchuria, Chosen [Korea], Dutch East Indies, Japan, United States.

Page 720: Vegetable oils: Raw materials used in production in the United States, annual 1919-1928, and three-month periods 1926-1928. The raw materials are cottonseed (by far the biggest), copra, peanuts (kernels), olives, soy beans, flaxseed (#2 largest).

Page 721: Vegetable oils, estimated total disappearance in the United States, 1924-1928 (in 1,000 pounds). The oils are cottonseed oil (bigger than all others combined), peanut oil, soybean oil, olive oil (edible), coconut oil, corn oil.

Page 723: Animal and vegetable fats and oils: Factory production in the United States, fiscal year 1912-13, calendar years 1924-1928 (in 1,000 pounds). In 1927 the top 5 were cottonseed crude, lard (other edible), lard compounds and other lard substitutes, cottonseed refined, and oleomargarine. In 1927, crude soybean oil was 3.088 million lb whereas refined soybean oil was 5.681 million lb–both miniscule compared with 1,806.7 million lb of crude cottonseed oil.

Page 724: Animal and vegetable fats and oils: Factory consumption in the United States, 1924-1928 (in 1,000 lb).

Page 725: Animal and vegetable fats and oils: Stocks in the United States, December 31, 1924-1928.

Page 726: Oleomargarine: Materials used in its manufacture in the United States for the years ended June 30, 1924-1928. In 1927 the leading materials (in million lb) were coconut oil (107.6), milk (73.7), oleo oil [made from rendered animal fats] (48.7), neutral lard (24.87), cottonseed oil (23.72). Soybean oil was a mere 0.032 (=32,620 lb).

Pages 728-29: Fats and oils: Wholesale prices of some of the principal fats and oils in cents per pound, annual 1915-1926, monthly Jan. 1925 to March 1929. In March 1929, the 5 least expensive were: Coconut oil (crude) 9.2. Peanut oil (crude) 10.3. Cottonseed oil (crude) 10.6. Oleo oil (crude) 11.2. Soybean oil (crude) 13.3. The two most expensive were butter (49.2) and olive oil (30.0).

Page 732-33: Vegetable oils and oil materials: Imports into the United States by countries, 1913, 1924-28. Soybean oil imports were 12.3 million lb in 1913, 9.1 million lb in 1924, 19.4 million lb in 1925, 30.7 million lb in 1926, 14.9 million lb in 1927, and (prelim.) 13.1 million lb in 1928. In 1913 most of the oil came from Japan, but from 1924-1928

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most came from the Kwantung leased territory (in northeast China, controlled by Japan).

Page 735: Vegetable oils and oil materials: Exports from the United States by countries, 1913, 1924-28. In 1928 the USA exported an estimated 7.14 million lb of soybean oil, with the most going to Cuba (2.732 million lb) and Dominican Republic (1.638 million lb).

284. *Foreign Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1929. The world situation in oils and oilseeds. 18(21):761-89. May 27.

• ***Summary:*** Page 762: Germany: "The increase in the potential output of [vegetable] oil in 1928 was to a large extent the result of the augmented imports and milling [crushing] of soy beans, peanuts, and flaxseed.

Page 763: Great Britain: "Imports of vegetable oils as such during 1928, however, declined more than 4 per cent below the 1927 figure. The decline is accounted for largely by the smaller imports of soy-bean oil, peanut oil, palm oil, and vegetable oleo-margarine.

Page 764: The Netherlands had increased imports of flaxseed, soybeans, rapeseed, and sesame seed.

Page 768: A full-page table shows imports into Germany, 1924-1928, of seeds, vegetable oils and fats, and animal fats and oil (short tons).

The top 4 seeds imported in 1928 were: soy-beans (934,446), peanuts (655,760), linseed (488,273), palm kernels (327,788).

The top 4 vegetable oils imported in 1928 were: palm oil and butter (22,341), linseed oil (14,594), castor oil (9,141), coconut oil and butter (6,895). Soy-bean oil was only (1,233),

The top 4 animal fats imported in 1928 were: butter (139,500), fish oils (109,686), lard (96,478), oleomargarine (12,702).

Page 770: A full-page table shows imports into France, 1924-1928, of seeds, vegetable oils and fats, and animal fats and oil (short tons).

The top 4 seeds imported were: peanuts shelled (40% oil) (363,433), peanuts unshelled (318,797), linseed (231,590), copra (202,587). Soy-beans were only 8,782.

The top 4 vegetable oils imported in 1928 were: olive oil (21,901), palm oil (17,579), soy-bean oil (9,995), peanut oil (7,216).

The top 4 animal fats imported in 1928 were: fish oils (16,356), lard (14,768), margarine, oleogarine [oleomargarine], etc. (13,545), tallow (8,850).

Page 771: A full-page table shows exports from France, 1926-1928, of seeds, vegetable oils and fats, and animal fats and oil (short tons). The main exports were peanuts unshelled and peanut oil.

Page 775: A half-page table shows "Soy-bean oil: Monthly average price of Manchurian, crushed, in bulk, C.I.F., London, 1925-1929 (in cents): In 1925 the price ranged from a high of 9.15 cents in Jan. to a low of 7.78 in Dec. In 1928 the price ranged from a high of 7.09 cents in April and May to a low of 6.73 in Sept.

Page 776: A full-page table shows imports into the United Kingdom, 1925-1928, of seeds, vegetable oils and fats, and animal fats and oil (short tons).

The top 4 seeds imported in 1928 were: cottonseed (18% oil) (643,479), flaxseed (30% oil) (390,395), soy beans (13% oil) (215,531), palm kernels (45% oil) (179,805).

The top 4 vegetable oils imported in 1928 were: coconut oil (70,941), margarine (61,756), palm oil (59,039), soy-bean oil (27,627).

The top 4 animal fats imported in 1928 were: butter (342,766), lard (137,049), fish oils (81,902), and oleomargarine, oleo oil, premier jus and refined tallow oil (30,421). Note the UK's large imports of animal fats.

Page 777: Exports and reexports from the United Kingdom, 1925-1928 of seeds, vegetable oils and fats, and animal fats and oil (short tons). All quantities are relatively small.

Page 778: A full-page table shows imports into the Netherlands 1924-1928, of seeds, vegetable oils and fats, and animal fats and oil (short tons). The two main imports in 1928 are linseed (460,299) and copra (151,101).

Page 779: A full-page table shows exports from the Netherlands 1924-1928, of seeds, vegetable oils and fats, and animal fats and oil (short tons). The main exports in 1928 are margarine and other butter substitutes (97,878), linseed oil (77,962), coconut oil (62,239), butter (51,743).

Page 780: A full-page table shows exports from China 1925-1927, of seeds, vegetable oils and fats, and animal fats and oil (short tons). The top two seeds exported in 1927 are soy beans (1,940,728) and peanuts shelled (102,731). The top 3 vegetable fats exported in 1927 are soy-bean oil (164,649), wood oil (60,028), and peanut oil (39,448). Animal fats exported are small: lard in bulk (4,329), animal tallow (2,312).

Page 786: A half-page table shows: Soy beans: international trade, years 1926-1928 (pounds). Principal exporting countries: only China (3,376,789). Principal importing countries in 1928: Germany (1,868,891), Japan, incl. Chosen [Korea] (1,031,713), Denmark (474,218), UK (430,866).

Page 786: A half-page table shows: Soy bean oil: international trade, years 1926-1928 (pounds). Principal exporting countries in 1927: China (329,298), Denmark (33,837), Japan incl. Chosen (11,167). Principal importing countries in 1927: Netherlands (166,388), UK (118,075).

Note: This is the earliest document seen (May 2020) that contains the term "vegetable oleo-margarine."

285. Morrison, Ben. 1929. Re: Glad to hear of return of Dorsett's good health. Letters from Ryerson and Fairchild (Document part). In: P.H. Dorsett and W.J. Morse. 1928-

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1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. March 12. Unpublished log.
• ***Summary:*** Pages 5785-5786. Letter to Mr. P.H. Dorsett, c/o United States Embassy, Peiping, China.

Dear Dorsett: I have your letter of July 16 and, of course, have since had your cable saying that you have gone on to Peiping and are feeling fine. This is certainly good news and we are all very much relieved to know that you are getting on your feet again. However it seems to be my role this summer to always rush out with more shouts of precaution. Do see to it that after you get to Peiping you take care of yourself there, and if you find that it is getting too hot, too dry, or too anything else four your continued progress, find out where the other Europeans and Americans go and give yourself a short vacation to pick up."

"We have been having interesting letters from Ryerson who had to change his plans radically in order to meet the situation with Professor Biolotti [?], but everything seems to have taken a turn for the better there and I suppose by this time Ryerson is headed north for the congresses in London as his next important stop.

"Our last letter from Dr. Fairchild, written on board the yacht off Sicily, would indicate that he is thinking of coming back to this country after a long, interesting but somewhat tiring trip. He said he had written you two letters and I hope these have reached you safely as he is, of course, as interested as we all are in your recovery."

"When you get back at Christmas you will be as much interested as anyone to see all the things that have happened– new roadway, new reservoir, and endless miles of copper screen, as well as one additional pit house and a rebuilt lath structure.

"With kindest personal regards, I am

"Very sincerely yours,..." Address: Senior Horticulturist Acting in Charge, USDA, Washington, DC.

286. Dorsett, P.H.; Morse, W.J. 1929. Plans for further exploration (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Pages 2273, 2274, 2275 (30 Aug. 1929) "In view of the number of soybeans we have already collected and the large number which we have been promised by Japanese Experiment Stations this fall, as well as the very rapid increase of the soybean industry in the United States, Morse does not feel that it will be advisable or possible for him to remain in the field away from his work at Washington [DC] for more than two years. Dorsett does not have any special work which needs his attention at Washington and can remain in the Orient for another year or two if that appears necessary or desirable by those in authority at Washington.

"We are considering the following two plans of operation for the remainder of the time Morse feels that he can spend in the foreign field.

"1. Complete the work in Hokkaido which will possible require a month or six weeks longer then return to Tokyo and as soon thereafter as practicable make a trip into Chosen (Korea), and do what we can there within a week or ten days. Return to Tokyo and complete operations there by not later than December 15th or January first, 1930. Then leave for Formosa (Taiwan) and spend the remainder of the winter there. In early spring, April or not later than May 15th, proceed to Dairen and our headquarters there for the remainder of the time Morse can remain in the Orient. From Dairen work southern Manchuria and as far north as Mukden [now Shenyang], even making a short trip up to Harbin and vicinity. Also go from Dairen into Chosen during the spring or summer season and in the fall or early winter of 1930 get over to Peking to clean up the work of soybean milk production and other soybean products, in time for Morse and Dorsett too, if it is deemed advisable, to leave for America so that they will reach there in time for Morse to take up his spring work with soybeans.

#2. Complete our work here within the next six weeks or two months if possible. At any rate return to Tokyo as soon this fall as the work here is completed. Then at the earliest possible opportunity get over to Chosen (Korea) and do what we can there this fall, Return to Tokyo and complete our work there with soybean products, making when practicable excursions of a week or so into other parts of Japan for the purpose of picking up information and seed and pictures where possible of persimmons, green manure and cover crops as well as other features of Japanese horticulture.

"In early spring move headquarters to Dairen and work South Manchuria and the central portion as far north as Mukden and Chen Chung [Changchun], the region which was not worked by the Dorsetts in 1925-26. Chosen (Korea) might also be given additional attention throughout the summer and fall as opportunity permits. Dairen is perhaps the best place in the Orient to data if all kinds on soybean storage, handling, and by-products. Complete this work then get over into Peking to work up soybean products, especially soybean milk production. In the early winter go to Taiwan and work that region until Morse feels its time for him to leave for the states. If it is deemed advisable, Dorsett can return then or he could remain and finish up the work in Taiwan (Formosa) in case that was not done before Morse left. He could get in touch with McClure at Canton, which is nearby Canton, and together they might handle the *Placanea cornea*, edible Chinese acorn, and Tonkin cane proposition. Dorsett could then go to Java and look after the soybean and

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green manure and cover crop work...” Address: Agricultural Explorers, USDA, Washington, DC.

287. Nouelle, Georges. 1929. Le soja: Les produits coloniales [The soybean: Colonial products]. *Annales Coloniales* (*Les*) 30(137):1. Sept. 17. [2 ref. Fre]
• ***Summary:*** This is basically a good review of the literature, with no new information. It discusses the history, cultivation, and utilization of soybeans as human food, animal feed and in industry, with some emphasis on utilization.

For a long time, it has been considered in Europe as an object for botanical studies.

The milestone dates in its history are:

1779–The first cultural trials at the Museum of Natural History [Paris].

1868–Experiments are undertaken by the Society of Horticulture of the Côte-d’Or.

1880–Soybean seeds are sold by the house of Vilmorin [a seed company].

1888 [sic]–Introduction of soybeans into the United States, where it is adopted for the feeding of animals.

1906–Use of soybean in English oil mills, to make up for the shortage of cottonseed oil.

1908–Creation at Paris by Mr. Li-Yu-Ying of a research laboratory, later expanded into a factory named the *Caséo-Sojaïne* [soy casein factory = tofu factory].

The soybean is adapted to various climates and can be cultivated as far north as the haricot bean. It resists the cold better than the latter and is very tolerant of drought.

It is said that it grows from the Equator to 60º latitude. It is cultivated in China and from Manchuria large amounts are exported to China, Japan, Formosa, Korea, Indo-China and Siam.

In the Americas, it is cultivated in the United States. In Europe. it is cultivated in France in the area around Etampes, in several provinces of Italy, and in Russia.

In Oceania, it is grown in Philippines, Java, and Borneo.

In Africa, trials have been conducted in Algeria and Tunisia, as well as in the British colonies of southern Africa.

In 1908 about 100,000 metric tons were exported from China to Europe, of which 69,200 went to Great Britain and 21,390 to France. In 1909 England purchased 400,000 metric tons for its oil mills.

The soybean can be used profitably in crop rotations to add nitrogen to the soil for subsequent crops.

It is also widely used as a feed for animals.

For human food, it can be used in various forms, especially in the form of milk and of flour.

Soymilk (*Le lait de soja*), known in China before the Christian era, is obtained as follows: a brief description is given, including the process used at *Caséo-Sojaïne.*

Soymilk bears some resemblance to animal milk and it has analogous properties. It can be coagulated to make soy cheese (*fromage de soja* [tofu]). This is done in China and Japan using the water from salt marshes [nigari], or calcium sulfate (*plâtre*) or sour soymilk (*lait aigri*). At *Caséo-Sojaïne* it is made using a mechanized process, which ensures complete hygiene and uses pure coagulant solutions which leave no taste of bitterness.

They have also been able to make cheeses that resemble European cheeses, fermented or not.

Soymilk, like animal milk, can be concentrated, dried and reduced to a powder. Or it can be fermented to make kefir or yogurt (*Kéfir ou Yoghourt*). The cost of making it renders its use very economical.

Soy flour is obtained in the same way as wheat flour, by grind the seed–preferably dehulled. It is a very rich food which contains 4 times as much protein and 20 times as much oil as typical wheat flour. From it one can make bread (notably a diabetic bread using the formula of Dr. Menudier, 1890). By mixing it with wheat flour one can make biscuits that are easy to digest and have a long shelf life, or cakes, pâtes, etc.

From the seeds one can extract an oil which the Chinese presently use in their cuisine, and the English use to make margarine or soap. The cake remaining after oil extraction makes an excellent animal feed.

The soybean can also be consumed as a vegetable [green vegetable soybeans]. Its digestibility varies with the means of preparation. It is recommended to boil it (after soaking) in water to which had been added a pinch of sodium bicarbonate [baking soda]. Soy sprouts give salads a very agreeable taste. The Chinese make a bouillon base which can replace the bouillon from meat. And fresh soybeans can be prepared like peas. The Japanese and Chinese make soy sauce, using a complicated process, of which certain types are appreciated in England.

Finally, it can be used in confectionery in the form of a confection similar to *crème de marron*, or in the form of chocolate (with sugar and cocoa butter added). Grilled soybeans are served in certain European countries in place of coffee.

In addition to its alimentary uses, the soybean is used to make candles, paints, and *sojalithe* as an insulator for electrical devices.

The soybean is thus suited for numerous and diverse uses. It would be desirable to develop its culture in our colonies and even in France itself in places where it can be acclimatized. Address: Député de Saône-et-Loire, vice président de la Commission des Colonies, membre de la Commission des Mines.

288. Dorsett, P.H.; Morse, W.J. 1929. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant

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Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 2732 (22 Oct. 1929) "... at 8:50 [a.m., Oct. 23] we pulled into the station of Keijo (Seoul) Chosen [Korea; from Shimonoseki, Japan, via Pusan]. We went direct to the Chosen Hotel which will be our headquarters for the time we are working in Chosen." "We spent the afternoon at the Chosen Expedition where we saw many interesting products, among them quite a number of soybeans..."

Page 2773 (25 Oct. 1929). "We left Keijo [Seoul] at 7:30 this morning with Professor Dr. N.I. Vavilov, Member of the Academy of Sciences, Director of the Institute of Applied Botany, Leningrad, Herzen Street, 44, Russia, whom we met by chance at the hotel last night, to visit the Agricultural Experiment Station, Government-General of Chosen." "The experimental work of the station embraces breeding, selection and cultivation of rice, soybeans and other legumes,..." "They have a collection of about 625 samples of soybeans and are actually growing something like 200. Of these we hope to get samples for trial at home."

Page 2774. "We saw two varieties of fasciated soybeans which were developed at the Station which is [sic, are] very interesting, see Neg. #44443, 44444, and 44445. The stem is broad and flattened and the pods are borne in a cluster at the top of the broad flat stem. However, we understand that it is the intention of the Experiment Station to distribute this variety as a green vegetable bean."

Page 2775. Negative #44436 shows a "View (but a poor one) of... the Suigen Agricultural Experiment Station.

Page 2779. Neg. #44443. View of a variety of soybeans with fasciated stems. The beans are borne in clusters. Suigen Experimental Station, Suigen [today's Suwôn, South Korea], Chosen.

Neg. #44444. A nearby view of fasciated stems of soybeans; the pods are in clusters near the top. Suigen..."

Page 2787 (30 Oct. 1929). Left Keijo [Seoul] at 8:30 this morning for the soybean section at and in the vicinity of Chotan, where we arrived at 9:45 a.m." "In a number of instances the land from which soybeans was harvested is in winter barley or wheat, and in numerous instances the wheat is up and making a good showing.

"As soon as we arrived at Chotan we called at the office of the Village Cooperative Society. The Director or manager sent a man with us to show us the soybean area and to assist us in any possible way."

Page 2780 (Neg. #44445). An excellent, clear photo. "Prof. Dr. N.I. Vavilov holding two stems of the variety of fasciated soybeans. This shows well the fasciation and the clustering of the pods. Suigen Agricultural Experiment Station, Suigen, Chosen.

Page 2788. "We saw soybeans in sacks, two bushels to the sack, weight about 126 pounds. The rice straw bags cost this farmer 25 to 33 sen each, depending upon the quality and grade.

"We secured quite a number of samples of soybeans, got a lot of information concerning soybeans and also quite a number of still and motion pictures.

Ginseng: There are two commercial kinds, red and white. The 'red' ginseng, which we understand brings the highest price, is different from the white only in processing, which gives it its red color. The ginseng raised in the vicinity of Heijo [Pyongyang], the former capital, for 470 years, is considered the best ginseng in the world. It is recorded that the medicinal ginseng is obtained from the roots of plants six years old.

"The principal demand for ginseng is from China, especially South China."

Page 2789. Having missed a train and with a long wait for the next: "We secured quite a number samples of soybeans, and a number of still and motion pictures."

Page 2792. Neg. #44452. "Sacks of soybeans piled in a rick at the Chotan Railway Station. A motion picture was made of this.

Page 2792. Neg. #44455. "A view showing Korean farmers flailing out soybeans. Chotan, Korea.

Page 2792. Neg. #44456. "A close-up view of threshed 'Chotan' soybeans. The straw and litter was pushed aside to show the beans below, Chotan, Chosen."

Page 2793. Neg. #44458. "View at one of the soybean inspection stations at Koryoho, Chosen."

Neg. #44459. "Showing the taking of samples and inspection of soybeans at Koryoho, Chosen."

Page 2794. Neg. #44460. "A nearby view of sacks of soybeans on the river bank. Taken to show the rice straw sack and how the sacks are tied with rice straw rope. Koryoho, Chosen."

Page 2795. Neg. #44462. "Sacks of soybeans piled along the side of the road to be transported to the railway station, Koryoho, Chosen.

Neg. #44463. "Raking soybean straw and litter from the recently flailed soybeans. Near Chotan, Chosen."

Page 2799. Neg. #44470. "Mr. W.J. Morse and Mr. N. Suyetake and a group of Korean farmers taking soybeans. Near Koryoho, Chosen."

Page 2803 (31 Oct. 1929). "At 10:00 a.m. we visited the three Keijo markets: Nandaimon, Central, and Todaimon, where we rounded up the following seed: 28 numbers of soybeans, three of adzuki beans, 2 of cow peas, 2 of mung beans, 2 of rice, 2 of beans and 3 of barley.

"We also visited a mung bean vermicelli factory and saw them making bean vermicelli. The beans are soaked for about 12 hours then ground in dripping water. From the ground product the hulls and foreign matter is floated out and the resultant product is then put into a cloth and pressed into a more or less square form. When needed it is melted in hot water and after mixing, depending upon condition, in the following proportions: 3 parts bean paste to 2 parts of kaoliang flour, it is worked into a dough, then put through a perforated strainer or former into boiling water, from this it

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is transferred to cold water and then hung up in a sheltered place and later out in the air to dry.

Page 2807. Forecast of crops for 1929. "From American Consul General Ransford S. Miller. Seoul, Chosen. Date of completion: Sept. 17, 1929. Source of information: Official Gazette of the Government General of Chosen, Sept. 16, 1929."

"2. Forecast:... "Soya beans were forecasted at 4,077,028 *koku* (20,874,383 bushels) from 800,602.6 *cho* (1,962,037 acres) of land under cultivation, the former showing an increase of seven percent or 266,367 koku (1,363,901 bushels) but the latter decreased by 20.7 cho (51 acres), as compared with the previous year."

Page 2808. I. Comparison by years. (1 cho = 2.4507 acres. 1 koku = 5.12 U.S. bushels).

Soya beans: Area of land (cho); amounts of production (koku).

1924–690,858.7 cho; 3,657,623 koku
1925–803,495.1 cho; 4,612,033 koku
1926–791,636.9 cho; 4,351,527 koku
1927–793,628.8 cho; 4,747,062 koku
1928–800,623.3 cho; 3,010,641 koku
1929–800,602.6 cho; 4,077,028 koku

Page 2809. A large table shows land area under cultivation for soya beans by province, for 1928 and 1928, for the following provinces: Keiki, North Chusei, South Chusei, North Zenra, South Zenra, North Keisho, South Keisho, Kokai, South Heian, South Heian, Kogen [Kegen?], South Kankyo, North Kankyo.

Page 2810. A large table shows soya bean production by province, for 1928 and 1928, for the same provinces shown above.

Page 2849 (1 Nov. 1929). "In the forenoon we visited the Capitol... [then we visited] the Prefectorate Seed and Plant Nursery of Keijo... Here we met Mr. S. Yamaguchi, Director of the Institution. He explains that this organization tests for, and supplies tested seed... to farmers throughout the prefectorate. This organization, we understood, is really under the direction of the agricultural experiment station at Suigen... The Director showed us the two standard soybeans recommended by the Station, and the ones most generally grown by the farmers.

Page 2850. They are known as 'White eye,' best adapted for good ground in valley conditions, and the 'Black eye' most suitable for poor valley and upland soils. The former is the best yielder and most desired by the market, but on account of prevailing land conditions throughout the region, the 'Black eye' variety is most generally grown.

"Nematodes are present in a good many sections and this is frequently the cause or more or less small yields of grain. The average yield of soybeans is given at 8 bushels per acre, which is really quite low. Soybeans in the district are planted from about the middle of April to the last of May, and usually harvested in October.

"Soybeans are usually, in this region, planted by making a hole in the ground with the heel, dropping two or three beans in it and covering the seed with the foot. Sometimes soybeans, one or two rows about a foot apart, are planted between barley which normally is planted in rows three feet apart." "Green manure is seldom used by local farmers."

Page 2853. Neg. #44477. "A fairly close-up view of a hand stone mill, used for grinding beans and other small grain. Keijo, Chosen." Address: Agricultural Explorers, USDA, Washington, DC.

289. Dorsett, P.H.; Morse, W.J. 1929. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 2864 (1 Nov. 1929). "Left Keijo [Seoul] at 7:30 a.m. for Suigen [today's Suwôn, south of Seoul] where we arrived at 8:45 a.m. We went direct to the Agricultural Experiment Station from the railway station... We also secured two still pictures of fasciated soybeans.

Negative #44484. "A nearby view of fasciated soybean stems which are being grown at the Agricultural Experiment Station at Suigen."

Page 2866. Neg. #44485. Another nearby view of fasciated soybean stems..."

Page 2869 (4 Nov. 1929). "We left Keijo at 7:30 a.m. and arrived in Suigen at 7:45. [We visited] a farmers street market. We thought we would likely find a good collection of locally grown soybeans..." But they found nothing of interest. They then arrived at Jinsen [today's Incheon, west of Seoul] at 12:25. "Jinsen is a domestic and foreign shipping port for soybeans and other farm products as well as commercial products."

Page 2873. Neg. #44489. "Ricking sacks of soybeans near the wharf at Jinsen, Chosen. These are being unloaded from a car."

Page 2874. Neg. #44490. "Loading a cart with sacks of soybeans. Jinsen, Chosen."

Neg. #44491. "Loading sacks of soybeans onto a boat. Jinsen, Chosen."

Page 2875. Neg. #44492. "Loading sacks of soybeans on a boat by man-power, See #44491. Taken at Jinsen, Chosen.

Neg. #44493. "A good-sized rick of soybeans [in sacks] on the wharf at Jinsen. The sacks and tying are of rice straw. Jinsen, Chosen."

Page 2891 (7 Nov. 1929). "Left at 8:50 this morning for Rensen [today's Yeoncheon railway station, north of Seoul, in far northern South Korea] which is some 2 hour ride by train... The region is an extensive soybean growing section and we visited it to get pictures and samples of the several varieties said to be grown here... We also secured quite a nice

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collection of samples. We walked the distance from Rensen to Zenkoku, the next station en route to Keijo, a distance of some five miles or so, and in addition to getting some additional of soybeans we secured seed of several interesting native plants from the wild..."

Page 2892. "The more we see of Chosen the more convinced we become that it is an interesting country for plant exploration work."

Page 2893. Neg. #44503. "A native tying a sack of soybeans with rice straw rope. It looks easy! Try it! Rensen, Chosen."

Neg. #44504. "Another view of the same man shown in the above picture further advanced with the tying of the sack of soybeans."

Page 2821. Neg. #44505. "Another view of the same man at another stage of the soybean sack tying. Rensen, Chosen."

Neg. #44506. "The same man at still another stage of the tying of sacks of soybeans. Rensen, Chosen."

Page 2895. Neg. #44507. "The same man in the last stage of the tying of sacks of soybeans. Rensen, Chosen."

Neg. #44508. "At the left, from left to right, Mr. Suyetake and Mr. Morse discussing the sampling and inspection of soybeans. Rensen, Chosen."

Page 2896. Neg. #44509. "A fairly nearby view of the inspector attaching his inspection certificate to bags of soybeans which have been inspected. Rensen, Chosen."

Neg. #44510. "Loading an ox cart with bags of soybeans. Rensen, Chosen."

Page 2897. Neg. #44511. "Lashing the bags of soybeans onto the cart. Rensen, Chosen."

Neg. #44512. "Sampling and inspecting bags of soybeans. Rensen, Chosen."

Page 2899. "An oxen [ox] eating a feed of chopped kaoliang and soaked or boiled soybeans [from a wooden bucket], Rensen, Chosen."

Page 2900. Neg. #44517. "W.J. Morse examining soybeans in bundles in a farmer's yard. Rensen, Chosen."

Page 2905 (8 Nov. 1929). "Today we met with a serious disappointment. As previously noted, we arranged, or thought that we had arranged, to secure samples of soybeans, mung beans, adsuki beans, millet, sorghum and buckwheat from the extensive display which we found at the Exposition when we first arrived in Keijo.

"This morning we sent Mr. N. Suyetake (our interpreter) to learn how things were progressing and if we could be of any assistance in getting and bagging the material. He returned about 2:00 p.m. with 8 samples of seed, two each of soybeans, mung beans, adsuki beans and two kinds of garden beans." He was told there had been a misunderstanding.

Page 2918 (9 Nov. 1929). "We saw a good many small green planted soybeans alone and with corn and millet which was being harvested by cutting, or is yet to be harvested."

"Morse advised this morning that last night he met Mr. Oda, Secretary to the Governor-General, who inquired how we were getting along. (He had special reference to our getting grain samples from the collection at the Exposition which we had requested). Morse replied that we were not getting along at all, for we only got two samples of soybeans. Mr. Oda expressed surprise and arranged with Mr. Morse and Mr. Suyetake to call at his office about 10:30 this morning and he would go with them to see one of the principal officials about the matter of taking up with the 13 prefectorates the problem of getting samples for us."

Page 2919. "They attended to that this morning and reported that Mr. Oda had started things moving to get a collection of local as well as commercial varieties of soybeans, also samples of mung beans, adsuki beans, wheat, barley and buckwheat. We will supply the small bags to be sent to the proper authority in each prefectorate."

Page 2934. Neg. #44530. "Large bales of soybeans in a farmer's yard near the village of Koka, Koka Island [today's Ganghwa Island], Chosen.

Page 2935. Neg. #44533. "Picking a few soybeans from large bundles at a farm house. Koka Island, Chosen."

Page 2936. Neg. #44534. "Korean farmers standing in front of large bundles of soybeans. This is the only region where we have seen such large bundles. Koka Island, Chosen."

Page 2945. (12 Nov. 1929). Mr. Morse and Mr. Suyetake "also delivered the bags to Mr. H. Yamamoto who is getting for us a collection of soybeans and other seed from each of the 13 prefectorates of Chosen."

Page 2951. We "pulled into Shariin [today's Sariwôn / Sariwon, south of P'yongyang, North Korea], our destination." "When the wheat [planted in furrows] is harvested, the area is ridged and planted to soybeans, which are harvested in the fall." "They are testing about 300 varieties of soybeans at the Station and we have been promised samples of these."

Page 2955. "Tomorrow the Doctor is going to show us the use of a two-oxen Korean plow and will also stage for us to photograph, a soybean planting scene characteristic of the growing practices in this region."

Page 2956. Neg. #44546. "A Korean farmer and his wife flailing out soybeans. Shariin, Chosen.

Page 2957. Neg. #44547. "Soja max. Soybean hay. Shariin, Chosen. Korean farmers' wives bundling soybean straw after the beans have been flailed out."

Neg. #44548. "Soja max. Soybeans in the straw. Shariin, Chosen. A good-sized pile of soybeans, unthreshed."

Page 9258. Neg. #44549. Soja max. Soybean. Shariin, Chosen. "A Korean farmer's wife raking bean straw from the flailed out beans."

Neg. #44550. Soja max. Soybean. Shariin, Chosen. "Korean farmers at work cleaning soybeans which have been flailed out."

Page 2959. Neg. #44551. Soja max. Soybean. Shariin,

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Chosen. "Winnowing soybeans by means of a piece of matting."

Neg. #44552. Soja max. Soybean. Shariin, Chosen. "Balls of soybeans [*meju*] each prepared to grow the culture and make miso."

Page 2965 (14 Nov. 1929). "We called at the Experiment Station this morning and found Dr. Takahashi ready to demonstrate for us the common Korean practice of planting soybeans in this section, so that we could try to get still and motion pictures of the several practices.

"The first method he showed us was the planting in 4-foot hills on ridges among other crops. Opening the hill with a short handled hoe and dropping the beans (three or four) in a hill and covering with the hand hoe.

"Planting thickly, 6 inches to 8 inches apart in the row for grain or other purposes. Opening the hole with the heel, dropping the beans and covering with the feet.

"The Doctor also demonstrated for us the Korean double and single oxen plow in preparing land for seeding. From what we could see in a trial of this kind, the Korean plow does excellent work and perhaps for the Korean method of farming is superior to the Western plow."

"In the afternoon we visited a nearby village and tried photographing scenes and operations in the making of soybean mash balls [*meju*] for the home manufacture of miso and soy sauce.

Page 2966. Neg. #44558. "Planting soybeans on the side of ridges by means of a small short handled hoe. Shariin Agricultural Experiment Station. Shariin, Chosen."

Neg. #44559. "Another and a little closer view of women planting soybeans on the side of ridges with a short handled hoe. Shariin Agricultural Experiment Station. Shariin, Chosen."

Page 2967. Neg. #44560. "Planting soybeans by means of making a depression with the heel, dropping in the beans and covering them with the foot. Shariin Agricultural Experiment Station. Shariin, Chosen." Address: Agricultural Explorers, USDA, Washington, DC.

290. Dorsett, P.H.; Morse, W.J. 1929. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 2978 (15 Nov. 1929). "At 1:45 p.m. we all boarded the train for Kokaikoshu, a half an hour or so's ride from Shariin [today's Sariwôn, North Korea] to the north. We arrived at Kokaikoshu at 2:30 p.m., where we went to visit one of the large soybean sections. There we visited three concerns where they were receiving, grading, sacking and storing away in storage houses soybeans. We secured samples of their special varieties and still and motion pictures of some of their equipment and supplies, as well as of several of their operations.

"At the last commercial place visited they have 3,000 *cho* of land, about 7,350 acres, devoted to soybean culture. 15,000 *koku* of seed is required for the annual seeding. The yield for the 3,000 *cho* is 53,400 *koku* or 267,000 bushels (we question this yield as it gives over 36 bushels per acre, far beyond the yields in Japan or Manchuria)."

"The present price of beans is as follows:

"Extra (mostly Oiyakukon A1 variety, large beans), Yen 18.00 per *koku* (5 bushels). 1st grade, Yen 17.00 per *koku.* 2nd grade, Yen 16.00 per koku; and 3rd grade, Yen 15.50 per *koku.*

Page 2984. Negative #44582. "Soja max. Soybean grading. Kokaikoshu, Chosen. At work at a commercial establishment cleaning, grading and sacking soybeans."

Page 2985. Neg. #44583. "Soja max. Sacking soybeans. Kokaikoshu, Chosen. Another view showing primarily the sacking of the cleaned and graded beans."

Neg. #44584. "Soja max. Soybean. Kokaikoshu, Chosen. A rather nearby view of one of the graders through which soybeans are running."

Page 2986. Neg. #44585. "Soja max. Soybeans. Kokaikoshu, Chosen. A nearby view of one of the soybean graders in operation. It is simply a gravity machine" [Looks like a sloping screen].

Neg. #44586. "Oriza sp. Rice straw bags. Kokaikoshu, Chosen. A nearby view of rice straw bags which are almost universally used for soybeans."

Page 2987. Neg. #44587. "Soja max. Soybeans. Kokaikoshu, Chosen. A nearby view of a two bushel sack of soybeans with the first tie. To the right is a coil of rice straw rope used in tying about the sacks when filled. The regulation tie is 4 times about the perpendicular way and two the equatorial.

Neg. #44588. "Soja max. Soybeans. Kokaikoshu, Chosen. Grading soybeans at a commercial dealer's place."

Page 2990. They met Mr. Lutz who took them for a ride in his Ford car along with his secretary (a young fellow who speaks Japanese, English and Korean). They visited "a number of seed dealers, where we got some nice samples of soybeans. He drove us out to the Heian-Hando Shubyojo (Heian Prefecture Agricultural Experiment Station) where we met Dr. Sera Cura [?], the gentleman in charge. He showed us their collection of soybean samples and we arranged for him to send small samples of the ones grown this year to us at the Sankaido Building in Tokyo.

"Mr. Lutz put in the entire afternoon with us..."

Note: They have been in North Korea (as it is called in 2014). Address: Agricultural Explorers, USDA, Washington, DC.

291. William J. Morse and P.H. Dorsett (Photograph). 1929. Oct. 29

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• ***Summary:*** Morse is on the left and Dorsett on the right. "Suigen Experiment Station, Suigen, Korea... This picture was taken by Dr. N. Vavilov, one time head of the Soviet Department of Agriculture. A few years later in a controversy with Dr. Lysenko, Vavilov was [removed] and sent to a Siberian slave labor camp, where he died about a year later."

This small digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

Note 1. On this date, October 29, 1929, the stock market crashed in the United States, heralding the Great Depression. We wonder how this affected the remainder of the Dorsett-Morse expedition.

Note 2. This caption, which contains the word "Soviet" was written by Morse–we know not when–in a scrapbook below the photo.

292. Kyonggi. Kokumotsu Kensajo. 1929. Chôtan daizu [Chotan soybeans]. *Kyo-koku Panfuretto* (*Cooperative Grains Pamphlet*) No. 6. 64 p. Oct. (Keikidô Grain Investigation Office, Jinsen, Chosen [Korea]). [Jap]
• ***Summary:*** Chotan soybeans are a variety of soybeans that come from Chotan prefecture in Korea. Address: Kyonggi-do, Seoul, Korea.

293. Morse, W.J. 1929. Re: Impressions of Korea. Agricultural exhibition. Suigen experiment station and Dr. Nagai. Letter to R.A. Oakley, Office of Forage Crops, USDA, Washington, DC, Nov. 3. 3 p. Typed, with signature on USDA letterhead.
• ***Summary:*** "Just a few words to let you know that I am still in the land of this living but this is sure a strenuous life." Morse arrived in Keijo (Seoul), Chosen, the morning of Oct. 23. "The conditions in Korea, or Chosen, as they now call it, are quite different from those we have observed in other parts of Japan. This is surely one poor country, not only from the point of view of soils but also the people... at first it was very interesting to us to see the men in their funny 'happy Hooligan' hats and both the men and women dressed all in white.

"The Korean Agricultural Exhibition was still on when we reached here so we spent two days studying the agricultural products of the different prefectures of Chosen as well as some of the products from other parts of Japan... We also found a very large exhibit of soybean varieties from all over Chosen. It was the largest and nicest collection that I have ever seen. There were between four and five hundred samples and as many more of adsuki beans, mung beans, sorghums and millets." Through the American Consul–"We went to see the Japanese in charge of the agriculture exhibits and we were promised the seed desired. Mighty busy times ahead for several folks.

"We have been down to see the Suigen experiment station which is about an hour's run on the train from Keijo. This is the main station of Korea and surely is a fine one. We found that they are doing a very large amount of work with soybeans and have in the past few years tested out about one thousand varieties."

"We do not know just how long we will be in the 'Hermit Kingdom' but it is getting rather cold..."

"We are stopping at the Chosen Hotel which is a government railway place. When coming in the lobby the other night a man rushed up to me and called me by name. It was Dr. [Nikolai] Vavilov, Director of Applied Botany, Leningrad, Russia and whom I had met two or three times in Washington. He was touring Japan and had spent time in China and Turkestan... We went out to the Suigen [agricultural experiment] station with him and had quite a visit."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence, 1905-29. Box 93–Morse-Napier. Folder–Morse, W.J.-#4 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Keijo (Seoul), Chosen / Korea.

294. Dorsett, P.H.; Morse, W.J. 1929. Whole dry soybeans used as beans in Korea (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 2899 (7 Nov. 1929, Chosen [Korea]). "An oxen [ox] eating a feed of chopped kaoliang and soaked or boiled soybeans [from a wooden bucket], Rensen, Chosen." Note: Korea is, a this time, a Japanese colony, which the Japanese call "Chosen."

Page 2982 (15 Nov. 1929, Kokaikoshu, Korea). "A nearby view of a Korean farm animal [ox] eating a feed of boiled soybeans and chopped kaoliang stems. This is a common feed in this region" (Negative #44578).

Page 2983. "A nearby view looking into the nose bag shown in #44578 (Neg. #44579).

Page 5658 (30 Aug. 1930, Heijo, Chosen). "After lunch we visited a grain market section of the city... We obtained nine samples among which were the largest yellow and green seeded varieties [of soybeans] we have come across. These varieties are said to be used by the Koreans in making their own miso and soy sauce."

Page 5766 (6 Sept. 1930, Heijo, Chosen). "Heijo is noted for its fine beef cattle and in the prefecture there are about 10 cattle to every 30 farmers, The principal feed of the cattle is soybeans with chopped millet straw in the winter months and soybeans with grass or hay in the other months. In the late summer and early fall, soybean plants in the green stage are often fed. The Agricultural Society is encouraging

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the use of silos and in some parts of the prefecture, the use of silage is increasing."

Page 5836 (12 Sept. 1930, Jidori, Chosen). "We learned that the Koreans feed their hogs soybean seed, each hog receiving about 1/10 of a *to* (1 *to* = 3.9703 gallons) per day. In the summer the beans are soaked in cold water while in winter the beans are boiled. In addition to the beans, other ground grains are added such as wheat, adsuki [azuki] beans and in fact all sorts of grain. The mash from soy sauce factories and hochu (kaoliang liquor) are also used." Address: Agricultural Explorers, USDA, Washington, DC.

295. Dorsett, P.H.; Morse, W.J. 1929. Miso in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** * = Best photos. Page 2965 (14 Nov. 1929). Again visited the Shariin Agricultural Experiment Station near Shariin [today's Sariwon in North Korea] and met Dr. Takahashi, the director, who demonstrated the common Korean practice of planting soybeans in 4' hills on ridges among the other crops. "In the afternoon we visited a nearby village and tried photographing scenes and operations in the making of soybean mash balls for the home manufacture of soybean miso and soy-sauce.

Note: This is the earliest English-language document seen (April 2021) that uses the term "soybean mash balls" to refer to what in Korean are called *meju* and in Japanese are called *misodama.*

Photos (p. 2966-67) show women planting soybeans on the side of ridges using a small, short-handled hoe.

Photos (p. 2968-69) show close-up views of "Tenjan [doen jang = Korean soybean jang], soy sauce, and Kanjan [Kanjang = Korean soy sauce]; back row, left to right, two balls of freshly made bean mash, on the right, two made three weeks or more ago, these are pretty will cracked and covered with mould."



Note 1. Each ball is wrapped in straw which is joined and twisted at the top.

Note 2. This is the earliest document seen (April 2021) that uses a Korean name for Korean-style soybean jang (miso), or that uses the word "Tenjan" to refer to Korean-style soybean jang.

Note 3. This is the earliest English-language document seen (April 2021) that uses the word "Kanjan to refer to Korean-style soy sauce.

Same photo but with a crock of miso in the back. Photo of Korean planting soybeans using a large plow and oxen.

Page 2972 (14 Nov. 1929). Shariin, Chosen [Korea]. *

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"Pouring boiled soybeans into a wooden mortar for crushing" (neg. #44570).

Page 2973. "Crushing the boiled soybeans in a wooden mortar for use in making Miso balls for the growing of curing bacteria" [sic, koji mold] (neg. #44572).

Page 2974. "A Korean farmer's wife working the mashed soybeans into balls similar to the ones in the background, which are already more than two weeks

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old and are full of molds and bacteria, which apparently are necessary for the making of miso" (neg. #44575).

Page 2975. "A nearby view of the new and the old. From left to right, the first two are the newly made miso bean balls and the two with the [rice straw] strings tied about them are more than two weeks old. They are cracked and already pretty well covered with moulds of various kinds and also, presumably, bacteria of various kinds" (neg. #44576).

Note: The various types of traditional Korean miso and soy sauce are made from a dried soybean koji called *meju,* which is prepared in much the same way as Japan's *miso-dama.* The word *jang* is closely related to the Chinese word *chiang* [pinyin: *jiang*]. Traditional Korean miso and soy sauce contain no wheat, rice, barley, or other grain. For details, see *The Book of Miso,* 2nd ed., by Shurtleff & Aoyagi (1983, p. 245-47). Address: Agricultural Explorers, USDA, Washington, DC.

296. Dorsett, P.H.; Morse, W.J. 1929. Soybean farming in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 2965 (14 Nov. 1929). Again visited the Agricultural Experiment Station near Shariin [today's Sariwon, North Korea] and found Dr. Takahashi, the director, ready to demonstrate for us the common Korean practice of planting soybeans in this section, so that we could try to get still and motion pictures of the general practices.

Page 2971. Two photos (see next pages) show: "Opening a furrow with a single oxen and plow. Shariin, Chosen (neg. #44568).

"Opening a furrow with a single ox and plow. Coming toward the camera. Shariin, Chosen (neg. #44569)." Address: Agricultural Explorers, USDA, Washington, DC.

297. Dorsett, P.H.; Morse, W.J. 1929. Soybean sprouts in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 2977 (15 Nov. 1929). "This has been the 'gala' day of our trip thus far. This morning we went out to the Experiment Station [near Shariin = Sariwôn, North Korea] to meet Dr. Takahashi." They secured about 20 samples of soybeans and a sample of soybean sprouts.

Page 2998. Heijo (P'yongyang). Photo: A nearby view of a vessel of mungbean sprouts on left, soybean sprouts in the middle, and curd [tofu] on the right (Negative #44589).

Page 3002 (18 Nov. 1929). Heijo. Two good photos of soybean sprouts in earthenware vessels.

Page 3369 (31 Dec. 1929). "1,003 samples of soybeans secured from the Suigen Agricultural Experiment Station." "One of the most interesting is a very small seeded yellow sort, the seed being about the size of a mung bean. This is the smallest seeded variety of soybean we have ever seen and it should prove valuable as a bean for sprouting."

Page 5950 (27 Sept. 1930). In Heijo (North Korea), Morse visited Korean Farmers' Market. A photo shows a "Korean woman buying soybean sprouts from Korean farm woman on Farmers' Market Day" (Neg. #54904). Address: Agricultural Explorers, USDA, Washington, DC.

298. Dorsett, P.H.; Morse, W.J. 1929. In Heijo, Chosen [Korea] (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 2997 (17 Nov. 1929). The authors spend the day with Mr. D.N. Lutz. First they "collected seed of several soybeans..." Then he drives them into the mountains northwest of Heijo [Pyongyang / P'yongyang, as of 2014 the capital of North Korea]. He tells them that Korean farmers expend 10 million yen annually "for soybean oil cake for fertilizer."

Pages 2998. A photo shows: "A nearby view of a vessel of mungbean sprouts on the left and of soybean sprouts and curd [tofu] on right" in Heijo (neg. #44589).

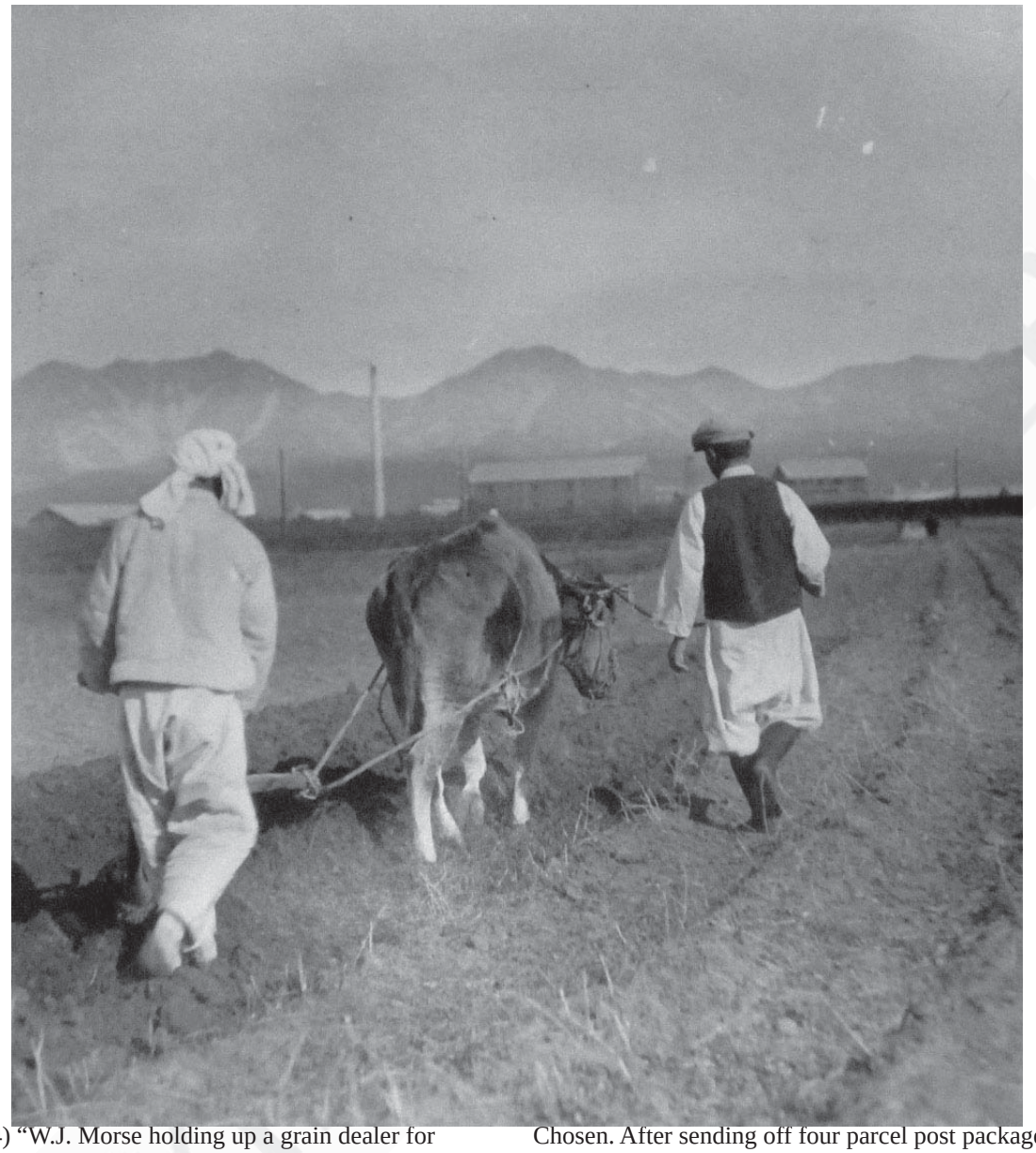
Page 3001 (18 Nov. 1929). During the morning, they visited retail grain merchants and "succeeded in getting quite a collection of samples of soybeans..."

Pages 3002-3005 (same day, in a small open-air market). Photos show: (1) "Crocks of soybean curd and jars of bean sprouts" (neg. #44595).

(2) "Nearby view of a [rounded earthenware] jar of mung bean sprouts on the left and soybean sprouts on the right (neg. #44596).

(3) "A nearby view of a tray of bean curd [tofu] (neg.

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#44597). (4) "W.J. Morse holding up a grain dealer for samples of soybeans" (neg. #45598). (5) "A close-up view of low rice straw grain display baskets. The one in front is soybeans, the one further back is rice (neg. #44599).

(6) See next page. "W.J. Morse in his glory! His hand is in a basket of fine looking soybeans." He is wearing a white driving cap and a long black coat (neg. #44601). Address: Agricultural Explorers, USDA, Washington, DC.

299. Dorsett, P.H.; Morse, W.J. 1929. Natto and soybeans in Chosen [Korea] (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 3015 (20 Nov. 1929). In Keijo [Seoul], Chosen. After sending off four parcel post packages, the authors "went to The Natto Co., 55 Nichome, Yoshino Cho, Keijo, and arranged for making snap and motion pictures of the various operations incident to the manufacture of this interesting food product."

The building is a rather low one-story structure with the cooker and fermenting room or chamber built inside the one-room building. There are shelves 18 inches or 2 feet below the ceiling and upon these the prepared rice straw packages of boiled beans are placed to cure or for the development of the bacterial germs.

"The beans are first soaked for about half a day and then boiled slowly for 7 to 9 hours. After the proper amount of cooking the beans (in a small amount, about a double handful) are placed in rice straw containers. They are then put into the culture chamber where they remain for 20 to 24 hours at a temperature of 40º to 45º F.

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"This curing or culture room is heated and the above noted temperature maintained by means of charcoal fire pots.

Page 3016 shows a floor plan of the factory with ten areas labeled in detail.

Page 3017. "We learned that there is a liquid residue from the cooking which is rich in soluble proteins and other valuable food constituents of the soybean. The owners have been trying to find a practical use for this by-product. They have utilized it in the sizing of dough in place of water or milk with fairly good results. They also tried to make a bean candy by adding sugar, but rather a poor product was obtained. A table compares the composition and food value of 75 gm of natto compared with beef. Natto contains 19.3% protein, 8.2% fat, 6.1% carbohydrates, 180 calories, and a cost of 0.03 sen (vs. 0.12 sen for beef). See next page.

Page 3018-3021. Photos show: (1-2) "Filling natto into the rice straw containers" (two views). (3-4) "Selecting rice straw for making into rice straw containers." (5) "Making natto containers of rice straw." (6) "From left to right are as follows (in a row on a table): 1. Selected rice straw; 2. holder before trimming; 3. holder after trimming; 4. holder open ready for filling. 5. filled. 6. trimmed, ready to use. (7) Trimming natto containers of rice straw. (negatives #44603-09).

Page 3043 and 3044 (21 Nov. 1929). "About 9:30 this morning we took our cameras and went to a Natto factory, Shuji Kamiga, at 72 Kantetsudo, Keijo, Chosen, to get information about the making of this soybean product. and also to try and get still and motion pictures of at least some of the operations as well as supplies utilized in connection with the handling and marketing of this product." They "secured a lot of information and made several motion picture shots and tried a lot of still pictures, both of which we trust will turn out to be good." Later that day they "visited several markets and picked up some samples of seed of soybeans and other crops.

"Today we got our Field Trip Report for the quarter September 1 to October 31 packed up for shipment via parcel post to Washington, D.C." A photo (p. 3045) shows a metal pan piled high with round white "Balls of the refuse after making Tofu" [okara] (neg. #44610).

Pages 3046 to 3049. Photos show: (1) (1) Bundles of natto containers at the Shuji Kamiga Natto Factory. (2) Trimming natto containers and preparing the packages for

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market. (3) Trimming and packing natto packages. (4-5) Making rice straw containers for natto. (6-7) "A nearby view from left to right: (in a row against a white background): 1. Selected rice straw; 2. made package container; 3. open container ready to be filled; 4. container filled but not closed; 5. container filled and closed; 6. container filled and trimmed; 7. trimmed and labeled; 8. open ready to eat. 9. wooden box of natto closed. 10. wooden box container of natto open. (8) A grain merchant's display of small grain, in baskets, in the market (Negs. #44613-20).

Page 3074. In Seihyaku, near Keijo, workers transporting sacks of soybeans from a river junk to a storage house several thousand feet away.

Page 3130. In Genzan [today's Wônsan, North Korea], Chosen. Photo of "Grading and cleaning soybeans" (neg. #44649).

Page 3179. In Tansen [today's Tanch'ôn, North Korea], Chosen. Two photos of men standing around stacked soybeans. "Within the court of a Korean farmer's place, W.J. Morse on extreme left, Suyetake next, beyond them a stack of soybeans, to the right Koreans" (neg. #44654-55).

Page 3181. In Tansen, Chosen. Photo of "A Korean farmer's front yard. Mr. Morse and Suyetake arranging for samples of soybeans" (neg. #44658). Address: Agricultural Explorers, USDA, Washington, DC.

300. Dorsett, P.H.; Morse, W.J. 1929. Okara in Chosen [Korea] and Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 3043-3044 (21 Nov. 1929). In Keijo, Chosen [Seoul, Korea]. A photo (p. 3045) shows a metal pan piled high with round white "Balls of the refuse after making Tofu" [okara] (neg. #44610).

Page 3499-3500 (9 Jan. 1930). Tokyo, Japan. A photo (p. 3500) shows: "A wagon load of Tofu curd residue being carted off for stock feed. View on a street near the Sankaido Building."

Note: This is the earliest document seen (June 2013) that uses the term "refuse after making Tofu" or the term "Tofu curd residue" to refer to okara. Address: Agricultural Explorers, USDA, Washington, DC.

301. Morse, W.J. 1929. Re: Collection of soybean

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products. Dr. Burlison. Korea. Soybean variety collections. Letter to Dr. E.A. Hollowell, Office of Forage Crops, USDA, Washington, DC, Nov. 21. 2 p. Typed, with signature on USDA letterhead.

• ***Summary:*** "Dear Holly: I have your letter of October 23 with reference to your visit to the Middle West and the discussion with Dr. Burlison concerning soybean products. I note that you say we are willing to loan him the products which we have at the office. Holly, I have had quite a bit of experience in the loaning of products and also enlarged pictures for special exhibits and I must say that most of such experiences have not been very pleasing, in spite of the many promises made. Many of the products and even the pictures were never returned, and more were broken or spoiled through lack of proper care. I have taken quite a little trouble to collect the various products we have on hand and it would be extremely difficult to duplicate many of them. Therefore, I think it the best plan not to loan out our products, for I have in mind to have in our office one of, if not the best, collection of soybean products in the world..."

"With regard to the products that I have sent in so far from the Oriental trip, I have written Oakley that he have Mrs. Donavan [Verna; Morse's secretary] and Miss Cruickshanks place them in the case in their room as the products are received. I am sending them in tins as much as I am able to or in other sealed boxes. I have asked that they be set aside thus so that they will not be opened until my return. After my return I want to have uniform containers to place the various products in and properly labeled... I wish, therefore, that you would also keep a kindly eye on these various products coming in from time to time to see that they are taken care of as I wish until my return. when I can fix them up for a permanent exhibit. I am sending duplicates of all, for if I sent only one there would be sure [sic] something happen to it. I wish the duplicates taken care of the same as the other."

"If Dr. Burlison, we can send him numerous products from Japan for Tokio seems to be quite a center for the manufacture of soybean products."

"We are finding Korea one big soybean country and we are getting so loaded up with the native varieties that I do not know 'where I am at.' The station at Suigen will already have for us on the 25th inst. samples of one thousand numbers. The station at Shariin is going to send us more than two hundred numbers. Various stations in Japan are sending in their best varieties this winter so I do not know where this variety business will end."

"In Korea one sees very few horses, for bulls are used almost entirely as beasts of burden. My point is that boiled soybeans are used as feed for these animals. The boiled beans are mixed with chopped rice or millet straw or sometimes kaoliang stalks. In fact the whole mixture is boiled. In Japan soybeans are rarely used for cattle feed. In the northern prefecture [sic] the boiled beans are quite extensively used for horse feed, especially the stallions. I do not know how many note books I have full of soy notes and only hope that I can find time to get them in ship-shape. We also have a great collection of movie film and still pictures from the planting to harvesting, threshing, marketing, and shipping, and also on to the manufacture of many products."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence, 1905-29. Box 93–Morse-Napier. Folder–Morse, W.J.-#4 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agricultural Explorer, Keijo (Seoul), Chosen / Korea; c/o American Consulate, Tokio, Japan.

302. Dorsett, P.H.; Morse, W.J. 1929. Year's end in Tokyo, Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 3341 (24 Dec. 1929). "Today Morse and Suyetake went to call upon soy sauce and natto manufacturers for the purpose of getting acquainted and also if possible arrange for getting still and motion pictures of their plants, equipment and operations.

"Dorsett worked at the office packing seed and making packages to go in the next outgoing diplomatic pouch..."

"The streets of Tokyo are a-blaze with colored banners, price lists, decorations and gaily dressed women and children." All this in preparation for the New Year. "The streets and stores are packed from early morning until late at night.

"At the Matsuya Department store on the Ginza, they have a spruce Christmas tree in the stairway well which looks to be fully... 50 feet or more in height. It is really very attractive and beautiful."

Page 3369 (31 Dec. 1929). "Introduction cards were finished on the 1,003 samples of soybeans secured from the Suigen Agricultural Experiment Station, Suigen, Chosen [Korea]. These samples showed a wide range in size, color and shape of seed, and also in the color of the hilum. Some most excellent and interesting varieties are included in this collection.

"One of the most interesting is a very small seeded yellow sort, the seed being about the size of a mung bean. This is the smallest seeded variety of soybean we have ever seen and it should prove valuable as a bean for sprouting. We are in hopes that in this collection will be found the high oil strains for our oil mills and low oil strains for our hog and cattle feeders in the United States. All in all we consider the collection the most interesting and valuable in our

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exploration work thus far." Address: Agricultural Explorers, USDA, Washington, DC.

303. N.I. Vavilov's collection of soybeans in 1927 and 1929. 1929.
• ***Summary:*** From 1927 to 1929 N.I. Vavilov collected soybeans in four countries; these soybeans are now at the VIR (N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russia). Information about these trips and soybean collecting was sent to Soyinfo Center Irina Seferova, Soybean Collection Curator at the VIR.

(1) Trip to Italy on business. Vavilov obtained 1 accession from Japan (number k-602).

In early June 1929 Vavilov left on a trip for East Asia. "In a whirlwind tour of western China, Japan, Formosa (now Taiwan) and Korea, he collected 3,500 kilograms of seed and Herbarium samples and also several thousand photographs of the farming and geography. He did not return until December. He concluded boldly that the crop diversity in these countries was 'wholly unique, that the cultivated plants were absolutely atypical, that the cultivation techniques were unmatched and that the ancient cultural center of East Asia was completely independent with its uncommon plants species and genera..." (Pringle 2008, p. 150)

(2) On his trip to Chinese Turkestan (western China), Vavilov, who was head of the expedition, collected 15 soybean seeds (numbers k-2944–2946; 3017-3028). The table also states: "Coll. Popov M.G."–meaning that M.G. Popov (Mihail Grigor'evich Popov) was a member of the expedition and also collected soybean seeds.

(3) On his trip to Korea, Vavilov collected 41 soybean seeds (numbers k-2949–2989).

(4) On his trip to Japan, Vavilov collected 30 soybean seeds (numbers k-2990–3016).

In total, on these four trips, he collected 87 soybean accession from East Asia.

The sequence of these trips was as follows (Irina Seferoa, Dec. 2010, personal communication): "Vavilov visited Japan in October 1929. Then he visited Korea and Taiwan (China). In November he returned to Japan, then left for the USSR. It was a business trip or expedition." Address: St. Petersburg, USSR.

304. Sasaki, S. 1929. [Mummy disease of black spot of soybean]. *Annals of the Agricultural Experiment Station, Government-General of Chosen* 4:1-28. [Jap]*
• ***Summary:*** The disease is due to a *Phomopsis*, the imperfect stage of *Diaporthe sojae* (=D. paseolorum var. sojae). Symptoms and morphology of the fungus are fully described.

305. Savich, I.N. 1929. [On classification of soya beans]. *Vestnik Manchzhurii* (*Manchuria Monitor*) (*Chinese Eastern Railway*) No. 11. p. 20-34. 4 plates, 7 tables. Russian edition. [56 ref. Rus; eng]
• ***Summary:*** In this botanical classification, Mrs. Savich verifies and criticizes the previous classification of the "Harbin explorer, B.V. Skvortzow, who gave a botanic description of the existing varieties and species of soya beans in his work 'Wild and Cultivated Soya Beans in Eastern Asia' (*Manchuria Monitor,* Nos. 9-10, 1927). At the same time the work of Mrs. Savich may be considered a verification and criticism of the classification that was proposed by the Harbin explorer Skvortzow.

"Taking for investigation several hundreds of specimens of soya beans, not only growing in the Maritime Province of Siberia, but also in Korea, Japan and North Manchuria, Mrs. Savich accepts the classification of B.V. Skvortzow, but extensively applies to it the law of homologous series in hereditary variation of the academician N.I. Vavilow [Vavilov]. Owing to this, the classification of B.V. Skvortzow, which is founded upon morphological symptoms, is placed upon a more sound basis.

"Mrs. Savich has come to the conclusion that only three hereditary botanical characters, are to be noted in our soya bean–*Glycine hispidae* [*hispida*] Max. which are ordinarily cultivated. They are:

"(1) Form of the stem a=erect; A=twining.

"(2) Form of the leaves index b=2; B=2

"(3) Colour of the flowers c=white; C=lilac

"These three characters in their combination give eight races or subspecies of soya beans and in each race we have homologous series according to the colour of the seeds (Law of prof. Vavilow).

abc 'Lutea' yellow green brown black bi-colored
abC 'Vulgaris'–ditto
aBc 'Lubrics'–ditto
aBC 'Nobilis'–ditto
Abc 'Nictans'–ditto
abC 'Rara'–ditto
aBc -
ABC 'Varians'

"'Lutea,' with white flowers and large leaves, is the most cultivated race of the south of Manchuria. 'Vulgaris' and 'Nobilis' with lilac flowers are the common races of the north. 'Rara' and 'Varians' are good as vegetable food.

"The highest yield' and the greatest percentage of oil is found in the heterogeneous and mixed varieties. We suppose that natural crossing is a very common fact in the Far East and that increased yield may be obtained by the use of mixed varieties, a method used to advantage with maize." Address: Harbin, Manchuria.

306. Savich, I.N. 1929. Soyevye boby v Primorye [Soybeans in Primorskiy Territory]. In: Zapiski Vladivostokskogo otdela Russkogo geograficheskogo obshchestva (Obshchestva izucheniya Amurskogo kraya) [Notes of the Vladivostok Division of the Russian Geographic Society (Society for

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the Study of Amur Territory)]. Vol. 4 (XXI). Vladivostok: Tipolitorg. 1, Knizhnoye delo. 327 p. See p. 161-219. [55 ref. Rus]
• ***Summary:*** Note: Primorsky Krai is in the Russian Far East. Vladivostok is its largest city and administrative center. It faces Hokkaido, Japan, across the Japan Sea and shares its far southern border with North Korea.

307. Seoul Woman's Club, Home Economics Dep. 1929. The Seoul women's cook book. [Seoul, Korea]: Seoul Woman's Club. 313 p. Index. 22 cm. *
• ***Summary:*** Title on cover also in Korean. Recipes in English and Korean. Also includes Japanese recipes, since Korea is now part of the Japanese empire. Address: Korea.

308. Pieters, A.J. 1930. Re: Zoyzia / zoysia and soybeans. Letter to Mr. W.J. Morse, c/o American Consulate, Tokyo, Japan, Jan. 3. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** Zoysia, a grass of the genus *Zoisia*, is also known as Korean lawn grass, or Manila grass.

"In regard to the soybean products, Mrs. Donovan advises me that these show no sign of having been opened. They have all been turned over to her, and she is holding them. I may say in this connection that I have been appointed a member of a committee to recommend an exhibit for the Chicago Fair [in Illinois] for 1933. This is to be a very big event, I understand, and the program for the Office of Cereals and the Office of Forage Crops and Diseases has been united into one. One of the things that I have strongly urged is a comprehensive exhibit of the soybean and things made from the soybean. If this idea is adopted, we may want you to send from Japan enough extra material so that the exhibit can include some Japan soybean products."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence, 1905-29. Box 93–Morse-Napier. Folder–Morse, W.J.-#4 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Senior Agronomist, USDA, Washington, DC.

309. Dorsett, P.H.; Morse, W.J. 1930. Work in Tokyo, Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 3553 (14 Jan. 1930, Tokyo). "Worked at the office today preparing, packing and sewing up five parcel post packages of soybean and other plant products to go to Washington [DC].

"We will have a good sized shipment for the diplomatic pouch about two weeks hence.

"Got the five backs for our picture albums finished up tonight. By tomorrow night we think we can use them to cover the leaves on which we have already mounted our pictures.

"Today Ruth [Dorsett's daughter-in-law; the widow of Dorsett's son] completed our field trip report for October and expects to page it tomorrow.

"We got behind in our trip report for October, November and December on account of not developing the pictures made in Chosen [Korea] until after our return to Tokyo. However we hope to get this work pretty well up to date before we transfer over to Dairen, Manchuria, this coming March." Address: Agricultural Explorers, USDA, Washington, DC.

310. Dorsett, P.H.; Morse, W.J. 1930. Soybean sprouts in Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Pages 3801 to 3802 (5 Feb. 1930). "We had some difficulty in finding the soybean sprout man, but finally succeeded in locating him in the village of Zoshiki. He has transformed one of the rooms in his house into a forcing chamber, and is sprouting soybeans in flats. This method we haven't seen before.

"The bottom of a flat, about 12 by 18 inches, is covered to a depth of about half an inch with [soy] beans, which have been soaked until plump, about 10 or 12 hours. These trays are then placed on shelves and covered with burlap. The room is kept at a temperature of about 70º [F.]. The beans sprout and are ready to market in 10 or 12 days. They are ready to dispose of when they get about even with, or a little above, the sides of the two flats, which are about three of four inches high. Photo: "Soja max. Soybean sprouts. A fairly nearby view of two flats of soybeans, the one in the foreground containing soaked soybeans, the one in the background sprouted soybeans, but past the marketing stage–they are too far advanced. On the edges of the two flats at the center are three small bunches of sprouted soybeans. This is the way Mr. Katakura puts them up for the market (Negative #44892).

Page 3802. "A nearby view of the same two flats... The picture really shows how the sprouts should *not* be treated. Mr. Katakura sprouts his mung beans in tubs, and he occasionally handles his soybeans in this way. He told us that it required more attention to grow bean sprouts in tubs than in flats" (Neg. #44893). Page 3824 (5 Feb. 1930) Tokyo. "A nearby (about life size) picture of a commercial bunch of long stem soybean sprouts. This bunch is over all about 4 inches wide and 11 inches long. Purchased at a vegetable

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stand in Komato, Japan, Feb. 7th, 1930. D. & M. #3786 (Neg. #44900).

Page 3825, "About a three-quarter life size picture of a commercial bunch of rather short stemmed soybean sprouts. Purchased at a vegetable stand in Komato, Japan, Feb. 7, 1930. D. & M. #3785 (Neg. #44901).

Page 3865. (12 Feb. 1930). "Morse and Suyetake were all smiles when they reached the office this morning, for they had great success yesterday. They corralled nine different soybean products."

"After lunch we called on Dr. T. Nakai, Botanist at the Tokyo Botanical Garden. We talked with him about soybeans of Quelpaert Island [*Jeju-do* in Korean. As of Aug. 2011 it is part of Korea; it lies in the Korea trait between South Korea and Kyushu, the southernmost of Japan's four main islands]. He told us that there they grow small soybeans only about the size of mung beans. He thinks it is a case of stepping down (degeneration) in place of up.

Page 6911 (3 Jan. 1931). Morse writes from Tokyo: "At one of the department stores, in the vegetable market section, we found small bundles of soybean sprouts..."

Page 7071 (31 Jan. 1931). Morse writes from Tokyo: "After our visit to the Botanic Gardens, we visited some market sections. At some we found soybean sprouts (6 inches long) in small bundles." Address: Agricultural Explorers, USDA, Washington, DC.

311. Dorsett, P.H.; Morse, W.J. 1930. Re: There is just too much to do and see concerning soybeans in Japan. Letter to Mr. Knowles A. Ryerson, Principal Horticulturist in Charge, USDA, March 5. 3 p. Typed, without signature (carbon copy).

• ***Summary:*** "I have been kept rather busy writing up and packing the material that has been coming in from many sources in Japan, Hokkaido and Chosen (Korea) in spite of the opinion that the Japanese are better receivers than givers. We think... that exactly the opposite is true. If you do not think that we have been busy, please note the number of packages that have been sent in since the first of the year. These are merely a start, for in winding up our work in Japan, we expect to send in quite a few packages.

In regard to plans for the coming year,... So many new things keep coming up during the work in Tokyo and adjacent districts that our plans change almost daily in trying to get the most out of our work for the soybean industry in the United States... We simply can not do it all and to do the most important that is of the most value to the new soybean industry in our country, we must change our plans from time to time to meet the new conditions constantly arising."

"We think it would be well worth our time to return by way of the Trans-Siberian to Germany, France and England as a sort of clean-up of our Manchurian investigations."

"Mr. Lee, who is bearing the brunt of testing the new introductions, writes us to keep up the good work."

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence, 1905-29. Box 93–Morse-Napier. Folder–Morse, W.J.-#4 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Tokyo, Japan.

312. Dorsett, P.H.; Morse, W.J. 1930. In Dairen, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 4499 (2 April 1930). Dairen, Manchuria. "This morning we called at the South Manchurian Railway Company and met Mr. Kan Matsushima, one of the high officials in charge of the agricultural activities of the company.

"Mr. Matsushima was in the United States a few years ago and visited the Department. During this visit he met Mr. Morse and a number of other officials.

"We went over the plan for this season's work with Mr. Matsushima, and got from him a number of interesting and valuable suggestions. He also presented us with a number of pamphlets of the South Manchurian Railway relative to soybeans and other Manchurian crops. He outlined for us the important soybean, fruit and vegetable sections which he thought we should visit.

"With the exception of 30 meters on each side of the S.M. Ry. in the Japanese leased territory, practically all farmers are Chinese.

"We had lunch with Mr. Matsushima and then went with him to the Museum building, where we saw a relief map of Manchuria and got a very good impression of the important agricultural producing regions.

"We also saw a rather extensive and interesting exhibit of soybeans, soybean cake and other soybean products. They had a very good collection of millets, sorghums, rice, barley, mung beans, adsuki beans;..."

Pages 4525, 4526, 4527 (10 April 1930, Dairen, Manchuria). "This morning we called at the office of Mr. K. Matsushima and a little later, in company with Mr. Yoshitane Sato of the Bureau of Agriculture of the South Manchuria Ry. [Railway Co.; S.M.R.] we visited the soybean exchange.

"Here, as in all other grain exchanges, of which we have had an opportunity to see everything, pandemonium raged on the floor of the chamber.

"The room looked to be 40 feet or more in width and 75 feet or so in length, with a gallery extending around the entire room." Of the 100 members, 60 are Chinese, 30 Japanese and 10 are of other nationalities–Russian, Danes, British, etc.

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"From the exchange, we went to one of the research laboratories of the Agricultural Branch of the S.M.R., where we met Mr. Takamori, also the assistant director of the Bureau of Economic Research, Mr. Igarashi. These gentlemen offered to assist in any way possible; both speak good English and understand a good deal. We next visited Dr. Y. Nakanishi, Secretary of the Soybean Oil Association."

"After lunch we visited a good sized shoyu sauce factory and looked over the plant, including culture chambers and ageing mash vat rooms. They demonstrated for us their method of vat mash stirring by compressed air. It is a simple method. The air passes through a one-inch pipe to the bottom of the tank, as the pipe is moved about over the bottom the air expelled from the pipe forces its way up through the mash, which gives the impression of boiling. The practice appears to be much more effective and easier than the hand or paddle method of stirring the mash which is pretty generally followed.

"The refuse left after pressing out the soy sauce is sold for cattle feed (we understand primarily for hog feeding). It is also resoaked and used for making a much inferior and cheaper grade of soy sauce, for which this concern has quite a demand."

"We received several official letters from the office today, the contents of which especially regarding our work for the year, are more or less disconcerting. They are at variance with our understanding of much of the work outlined and arranged for at Washington [DC] before our departure and by no means in accord with the policy concerning the work in Japan outlined quite differently to us in correspondence received shortly after we took up our work in Japan in the spring of 1929.

"The letters to which we refer are under date of March 10 and 13, these, together with our reply, where a reply is deemed advisable, will be found under a later date in this field trip report."

Page 4539 (14 April 1930). Dairen, Manchuria. "Went to the American Consulate in the morning and discussed with Mr. Langdon, the Consul, the soybean industry in South Manchuria. He has collected statistics on the exports of [soy] beans, bean cake and bean oil and gave us a summary of much data for 1929, which is as follows:"

The 1st table titled "Exports–Manchuria–1929" shows exports (in short tons) of the three commodities by country of destination.

Soybeans: To Japan 604,753 tons. To Europe 1,403,589 tons.

Bean cake: To Japan 652,687 tons. To Europe 62,775 tons.

Bean oil: To Japan 1,443 tons. To Europe 59,849 tons.

The 2nd table titled "Percentage of Manchurian area sown" gives figures for 1929 and 1928.

Soybeans 29.2% and 29.0%
Other beans 2.7% and 3.2.0%
Kaoliang 22.5% and 22.5%
Millet 17.2% and 16.9%
Corn 6.9% and 7.8%
Wheat 7.7% and 10.2%
Paddy rice 0.6% and 0.7%
Upland rice 0.9% and 0.8%
Miscellaneous grains 10.5% and 9.2%.

Page 4541 (15 April 1930). Dairen, Manchuria. In the morning visited Mr. Satoh of the S.M.R. with reference to soybean oil mills and soap factories using soybean oil in Dairen. Arrangements were made to visit the oil mill of the Mitsubishi Trading Co."

"This Oil Company crushes about 300,000 tons of soybeans yearly, producing about 270,000 tons of bean cake and about 30,000 tons of bean oil."

Page 4542. "For Japanese trade, where bean cake is used chiefly for fertilizer, and to a slight extent for poultry feed, the cakes are ground into a very coarse meal. Permission was given to take any pictures we might wish within the mills or mill yard."

Page 4543 (16 April 1930, Dairen). "In the morning visited the Mangylku Soap Mfg. Co. where crude soybean oil and hydrogenated soybean oil are used in the manufacture of soap."

"Mr. Satoh suggested that we get in touch with Dr. Satoh, botanist and author of the bulletin [on wild legumes which shows 28 genera and 102 species] as he might be of assistance to us in our collections of wild legumes in Manchuria, North China, and Chosen" [Korea].

Page 4546. "The wild soybean is very abundant throughout this vicinity..." No soybean work is being carried on by the station. Most of the work is placed on cotton and apples. "Mr. Nakatomi assured us of his hearty cooperation in our studies of Manchurian agriculture."

Page 4547 (12 [?] April 1930). Dairen. "In the morning we went to the South Manchurian Ry. Central Laboratory to see Dr. Kato concerning the various soybean products of which he had promised us samples. The products were not ready and I was promised to send them to our office in the Gohin [?] Building shortly.

"Mr. Kato is much interested in the utilization of soybean flour in bread making and is conducting extensive experiments along this line. He was very much interested in the work which Dr. J.A. Le Clerc of the U.S. Bureau of Chemistry is doing with various kinds of soybean flour and intends taking up correspondence with Dr. Le Clerc.

"At 5:00 p.m. Messrs. Morse and Suyetake went to the Auditorium of the South Manchurian Ry. Club and gave a talk on the soybean industry in the United States before Members of the Dairen Oil Mills Association, Dairen Soybean Trading Corporation, and the Agricultural Division of the South Manchurian Railway."

Pages 4553-4554 (21 April 1930, Dairen). "In the morning we went to the office of Mr. Satoh of the S.M.Ry.

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and found a package of fifteen varieties of soybeans that had been sent to us from the S.M.R. Experiment Station at Kungchuling. This station is the principal soybean breeding station and the varieties sent us represent selected varieties from their 1929 variety test of over five hundred varieties. The following list gives the varieties sent. An unnamed table gives the D.&M. number (from 5649 to 5663), varietal name, and use of each of the 15; the three uses are grain, forage, and pasture. The varietal names are:

Hakube (Mukden White)
Changchung #220
Kingen
Kungchuling #319
Kohonshu [?]
Kungchuling #543
Kungchuling #483
Kaiyuan #191
Mochoto
Kungchuling #480
Kungchuling #235
Chanchu #391
Kungchuling #262
Kungchuling #420
Kungchuling #224

"In the afternoon samples of different forms of soy bean oil cake and oil cake meal were received from Mr. Yoshida, manager of the Mitsubishi Soybean oil Mills." They are: (1) "Coarse flakes. Made for export to Japan for cattle feed and fertilizer. Moisture 11%. Protein 44%. Fat 7.5%." (2) Finely cracked like cracked corn. Made for export to Japan for cattle feed; 10%, 44.5%, 7%. (3) Coarse meal for export to the United States for cattle feed. 9.11%, 45.6%, 7%. (4) Finely ground meal for export to the United States. 9.10%, 45.6%, 7%. (5) Medium coarse flakes for export to Japan for poultry feed. 10%, 44.5%, 7%. (6) Coarse flakes for export to Japan for fertilizer. 11%, 44%, 7.5%.

Pages 4565-4566 (25 April 1930, Port Arthur, Manchuria). "We then visited the museum and looked over the agricultural exhibits of the Kwantung Province. The Nisshin Oil Mills of Dairen has rather an extensive exhibit of various forms of soybean oil and oil cake. The Manchuria Paint Co. has a very good exhibit of many kinds of paints, enamels, varnishes and plastic paints in the manufacture of which soybean oil was used" (Continued). Address: Agricultural Explorers, USDA, Washington, DC.

313. Dorsett, P.H.; Morse, W.J. 1930. In Kungchuling, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** (Continued): (6 May 1930). Page 4615. Negative #45103. "Soja max. Soybean. Kungchuling (today's Gongzhuling, Jilin province), Manchuria. View showing the [round] Osier storage bin in which soybeans are stored. This bin is made of straw matting. Taken in yard of Chinese Soybean oil Mill. This bin holds 3 carloads of beans. Each carload has 150 sacks of 160 pounds each.

Neg. #45104. "Soja max. Soybean. Kungchuling, Manchuria. View showing storage of soybean seed in Osier bins in the yard of a soybean oil mill.

Page 4651, 4652, 4653 (9 May 1930). Kungchuling, Manchuria. "Although may is the dry month of the year, it was anything but that during the night. A very heavy rain fell..."

"About 9:00 a.m. we went to the Experiment Station where we had a talk with Dr. Kanda on soybeans in this section. Although there are many insects and diseases affecting the soybeans in Manchuria, none of them, with the exception of the pod borer, affects the crop very seriously. The only way to combat these pests and diseases is by breeding resistant strains as it is impossible to get the Manchurian farmer to take up spraying for the soybeans are grown too extensively and the farmer is too poor.

"We were advised by Dr. Kanda, that Mr. Nakamoto, the soybean expert, had returned to his office this morning for the first time since his illness, and wished to talk with us on soybeans. After arriving at Mr. Nakamoto's office, we found that we had met in Washington [DC] a few years ago when he came to study the soybeans in the United States. Mr. Nakamoto took us to his laboratory room and showed us samples of his selections and native varieties. He is doing much work with the 'Moshito' variety, the seed of which appears identical with our U.S. Virginia variety. Complete chemical analyses have been made of all collections and varieties. On a moisture basis, the varieties ranged from about 14 to 21% fat.

Mr. Nakamoto said that he had tried out many Japanese and Korean varieties but they were not suited to the dry conditions of Manchuria. The small-seeded varieties from Siberia [in the eastern Russian SSR] make good growth and are considered the best forage sorts."

"Soybeans were being planted in a field of the station so we were taken to see the method of planting which is the same that the Dorsetts took motion pictures of at Harbin in 1926. A few snap shots were taken of the planting but under rather adverse conditions as a fine mist was falling. After the planting we visited Dr. Kanda to thank him and say good bye.

"We left on the 5:35 p.m. train, arriving at Ssu-ping-kai [today's Siping, Jilin province] at 6:39 p.m. and went at once to the Japanese Inn. Shortly after we had settled down in our rooms, Mr. Yukutaro Yamazaki, in charge of the local commercial office of the S.M.Ry., and his assistant, Mr. Yutaka Shimizu, called to make arrangements with us for tomorrow. Although there are six large Chinese soybean

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oil mills in this place, they have been idle for these years. In a Chinese village about five miles from here there are some of the old native wedge soybean oil mills which Mr. Yamazaki thought we might be interested in seeing. He said he would make arrangements with the Chinese governor for some soldiers as an escort as the country about Ssu-ping-kai is rather badly infested with bandits and only the previous day a Chinese policeman had been killed by bandits a short distance from the town." Arrangements were made to take a taxi with soldiers the next day.

Page 4654. Neg. #45109. "Soja max. Soybeans. Kungchuling, Manchuria. Tramping ploughed ridge for planting soybeans."

Neg. #45110. "Soja max. Soybean. Kungchuling, Manchuria. Planting soybeans [shows wooden plow].

Page 4655. Neg. #45111. "Soja max. Soybeans. Kungchuling, Manchuria. Scattering soil compost between last year's millet rows for fertilizing 1930 crop of soybeans."

Neg. #45112. "Soja max. Soybeans. Kungchuling, Manchuria. Showing Manchurian plow used in making ridges for planting soybeans and also used for covering seed.

Page 4657-4658 (10 May 1930). Ssu-ping-kai, Manchuria. Mr. Hideji Miura, director of the local office of the territory controlled by the S.M.Ry. "stated that soybeans are extensively planted in this region and in 1927 about 427,000 tons of beans were shipped from the station. Ssu-ping-kai is the terminal point of a Chinese railroad extending for a considerable way in Mongolia and large amounts of Mongolian crops, especially kaoliang, come to this place."

After a delay and suspecting trickery, the taxi trip to the native wedge soybean oil mill was cancelled.

"At 3:20 p.m. we left for Kaiyuan [Liaoning province] where a soybean seed farm of the South Manchurian Railway is located. As we passed along we noticed that the farmers were busy planting soybeans. Only occasionally did we see kaoliang or millet being planted... We arrived at Kaiyuan at 5:31 p.m. and were met at the station by Mr. Sazuo [?] Kofuku, director of the local office of the S.M.Ry. and also director of the soybean seed farm located on the outskirts of Kaiyuan. After a short talk with Mr. Kofuku, during which he said he would make arrangements to see the farm and soybean planting about Kaiyuan, we went to the Japanese Inn 'Futaba'"

Page 4659. Neg. #45113. "Soja max. Soybean. Ssu-ping-kai, Manchuria. View showing the floor or bottom of an Osier bin used in the storage of soybean seed. The floor is made of kaoliang stalks Osier bins of soybean seed are noted in the picture. In a Chinese merchant's storage yard."

Neg. #45114. "Soja max. Soybean. Ssu-ping-kai, Manchuria. Mr. Suyetake holding standard Manchurian bushel measure which is 22 kilos."

Page 4665 (11 May 1920). Neg. #45117. "Soja max. Soybean planting. Kaiyuan, Manchuria. Manchurian making ridges with plow. Soybeans are planted on top of ridges, covered with plow and then the ridges are rolled with a wooden roller."

Neg. #45118. "Soja max. Soybean. Kaiyuan, Manchuria. Making ridges for soybean planting on a farm near Kaiyuan."

Page 4666. Neg. #45119. "Soja max. Soybean. Kaiyuan, Manchuria. Making ridges for planting soybeans on a farm near Kaiyuan."

Neg. #45120. "Soja max. Soybean. Kaiyuan, Manchuria. View showing the tramping for a row on top of ridge, planting beans, and covering with plow."

Page 4667. Neg. #45121. "Soja max. Soybean. Kaiyuan, Manchuria. Planting and covering soybeans on a farm near Kaiyuan."

Neg. #45122. "Soja max. Soybean. Kaiyuan, Manchuria. View showing the wooden roller used in rolling down ridges or compacting soil after soybeans are planted."

Page 4668. Neg. #45123. "Soja max. Soybean. Kaiyuan, Manchuria. View showing the rolling down of top of ridges with wooden roller [pulled by a donkey ridden by a man]. Soybeans were planted on ridges and covered with plow.

Neg. #45124. "Soja max. Soybean. Kaiyuan, Manchuria. View showing soybean seed stored in Osier bins in the storage yard of a Chinese merchant."

Page 4669. Neg. #45125. "Soja max. Soybean. Kaiyuan, Manchuria. View of Osier bins full of soybeans. In the storage yard of a Chinese merchant.

Neg. #45126. "Soja max. Soybean. Kaiyuan, Manchuria. View showing the storage of soybean seed in Osier bins in a Chinese merchant's storage yard."

Page 4673 (13 May 1930). Dairen, Manchuria. "After lunch Mr. Tamakura of the S.M.Ry. Agricultural Bureau called at the office with reference to information on the various kinds of machinery used in soybean culture and harvest in the United States. We referred him to the International Harvester Company, Chicago [Illinois], as this concern manufactures many implements used in the planting, cultivation, harvesting and threshing of soybeans and other grain crops.

"Mr. Tamakura gave us more information on the transportation of soybeans through the port of Yingkou (Newchwang). Before the days of railroad transportation, Yingkou was the largest soybean port in the export of soybeans and soybean products. At the present time, little foreign trade is handled at Yingkou but it still remains the largest Chinese junk port in Manchuria. The junks and river boats bring down large quantities of soybeans and other grains from sections along the Liao River.

"We received today four samples of soybean seed from the Island Master of Saishu-to [today's Cheju-do, South Korea] Island, Chosen. This is the island on which we were told grow very small seeded varieties of soybeans." It was "stated that they were very small seeded and had been grown for many years with no export of seed. The seed received

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was by no means the small seeded varieties." Address: Agricultural Explorers, USDA, Washington, DC.

314. Dorsett, P.H.; Morse, W.J. 1930. Soybean sprouts in Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Pages 4671 and 4672 (11 May 1930). Mukden, Manchuria. "We found the officials very nice at the Consulate and within twenty minutes our passports were fixed for one year without reservation so that we can enter and visit Dairen, Chosen [Korea], Formosa, in fact, any part of the Japanese Empire for another year.

Then they visited the Mukden market. "Only one place had sprouted beans and these were mung beans."

"We spent some time looking around Chinese and Japanese stores for soybean products but found nothing but what we already have. In the window of a Chinese lunch room we saw soybean sprouts, the sprouts being about one-half to one inch long, and had been fried in oil. There was also a dish of mung beans..."

Pages 4733 and 4734 (30 May 1930). Yingkou, Manchuria. "Nearly all of the stores had large quantities and bundles of mung bean noodles and vermicelli. Many stores or outside shops had both mung bean and soybean sprouts. The latter were quite short and apparently had been allowed to germinate for not more than two days. These are said to be used alone fried in oil or mixed with chopped vegetables and fried in oil." Address: Agricultural Explorers, USDA, Washington, DC.

315. Dorsett, P.H.; Morse, W.J. 1930. Green vegetable soybeans in Manchuria, China, and Korea (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Pages 4911-4912 (19 June 1930) find the authors in Dairen, Manchuria. Morse writes: "A short visit was made to the Dairen market but about the only new thing noted was bundles of soybean plants with green pods for use as a green vegetable bean. These were notes at several stands and we learned that they had come from the Shimonoseki district (Japan)."

Pages 5431 and 5434 (13 Aug. 1930) find the authors in Peiping [Beijing], China. They visited an open street market in the northwestern part of the city on Chienmen Street. A list of fruits and vegetables observed include: "Soybeans in the pod, quite abundant." A photo shows these soybeans at Hsi Tan Pai Lou in Peiping.

Page 5587 (22 Aug. 1930) finds the authors in Heijo, Chosen (today's Pyongyang / P'yongyang, the capital of North Korea). They visited several Korean vegetable markets and among the farm products noted were "Soybeans (bundles of plants with pods)."

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Pages 5811, 5812, 5813 (11 Sept. 1930). Morse, still in Heijo (today's Pyongyang, North Korea) noted: "On our way through the city in the morning we saw shelled green soybeans in the baskets of several Korean vegetable stands." Negative #45793 and #45794. Two photos show these "green vegetable soybeans" and "shelled green soybeans."

Page 5845 (16 Sept. 1930). Fa Hua Ssu Temple, Chihli, China. P.H. Dorsett's notes. "We left Tang Shan about 8:30

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this morning with two mules, four donkeys and ten pieces of official baggage, en route to Fa Hua Ssu.

"It has been a lovely day and we had a very pleasant ride. Through the valley we saw the farmers harvesting and getting their crops of millet, kaoliang, corn, peanuts and in a few instances, soybeans.

"Going through the valley we made three single plant selections of soybeans, two yellow, #7190 and 7191, and one black variety #7192, and on the way up the canyon we made another one-plant selection of black soybeans #7193 which was growing on decomposed granitic soil. We also collected seed of a Deutzia sp. #7189, what we call the thin-leaved type."

"The mountain sides are covered with several species or varieties of Lespedeza. There may be as many as a half dozen or more. They are full of flowers and for the most part very attractive."

Pages 5888-5889 (19 Sept. 1930). Morse is now in Keijo [today's Seoul, South Korea], Chosen. A long list of vegetables he observed at the large central Korean market included "Soybean sprouts" and "Green vegetable soybeans." In the grain section he found: "Millet, adsuki beans, susu (sorghum), mung beans, and soybeans."

"After the visit to the Central Market, we visited the East and West Markets and found about the same products. Two photos (Neg. 45859; Neg. #45860) show these.

Page 5890. Neg. #45861. "*Soja max.* Soybean. Keijo, Chosen. Korean Grain Market showing different varieties of soybeans in front of a grain merchant's store.

Neg. #45862. "*Soja max.* Soybean. Suigen, Chosen. Korean farmer with bundles of green vegetable soybeans on pack [tied to his backpack] at Keijo Korean market."

Pages 5911-5912 (23 Sept. 1930). Morse is now in Ritsuri, Korea. (Note: As of 1994 Ritsuri was named Yul-li and located in North Korea, about 25 miles east of Pyongyang, the capital.) In a farming section he noticed some farmers roasting soybean plants over a fire and "making their lunch of the green roasted soybeans." Each cart the farmers drove to market in the morning "had a bundle of green soybean plants. The green soybean plants are used extensively for food at this season of the year."

Page 5913. Neg. #45874. "Soja max. Soybean. Ritsuri, Chosen. Korean farmer bundling harvested soybean plants for hauling to the farm yard. The plants were cut yesterday when fully mature. The food is allowed to cure in the farm yard rather than in the field."

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Neg. #45875. "Soja max. Soybean. Ritsuri, Chosen. Ox cart loaded with bundles of mature soybean plants. Plants cut yesterday and are hauled to farm yard to cure until threshed (November)."

Page 5914. Neg. #45876. "Soja max. Soybean. Ritsuri, Chosen. Ox cart loaded with bundles of mature soybean plants which are to be carted to the farm yard for storage until threshed."

Pages 5948, 5949, 5950 (27 Sept. 1930). In Heijo (Pyongyang, North Korea), Morse "visited Korean Farmers' Market Day at the Daidomon Gate. One of the most notable things was the abundance of shelled green soybeans and adsuki beans being sold as green vegetable beans."

One photo (p. 5949) in Heijo shows: "View of green soybeans (shelled) on sale at small farmer's stand. Market Day" (neg. #45902).

Another photo (p. 5949) shows "Korean farm woman on Market Day with bundle of green vegetable soybean plants and shelled green soybeans in large basket and shelled green adsuki beans in gourd" (neg. #45903).

A third photo (p. 5950) shows "Korean woman buying soybean sprouts from Korean farm woman on Farmers' Market Day" (neg. #54904).

Page 6113 (9 Oct. 1930). Green vegetable soybeans in the pod and shelled green soybeans were observed in Dairen, Manchuria. Address: Agricultural Explorers, USDA, Washington, DC.

316. Dorsett, P.H.; Morse, W.J. 1930. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 4989 (25 June 1930). W.J. Morse's notes. [Dorsett is in Dairen, Manchuria]. He is en route to Kokai [today's Kanggye, in North Korea], Korea. "We went to the railway station about 7:00 a.m. as our baggage had to be passed by the Japanese Customs. Our mission to Korea was explained to the officer and our suitcases and camera cases were opened, merely looked at, and then marked o.k.

"We left Antung [Dandong as of 2014] at 7:50 a.m. and after crossing the Yalu River arrived at Shingishu [today's Sinûiju, North Korea] on the opposite side of the river from Antung [today's Donggang, Liaoning province, China].

Page 4990. "Upon leaving Shingishu we entered rather an extensive rice country. Soybeans were noted to a very considerable extent but all were planted with corn as is done in Southern Manchuria. Some fields of millet have hills of soybeans planted along side of the rows.

"We arrived at Shin-Anshu, Korea at 12:25 p.m. and left on the 12:40 bus for Kokai and 'Zoysia,...' Soybeans were everywhere in evidence and seemed to be planted with every sort of crop. Even fields of soybeans and cucumbers planted together were noted.

Page 5003. W.J. Morse's notes. He is en route to Kokai, Korea.

Page 5013 (27 June 1930). W.J. Morse's notes. Kokai, Korea. "In the morning we went to the village agricultural society where we met the Village Master... We spent the morning at the farm looking over the experimental work with soybeans... Soybean breeding work is being carried on and several excellent varieties have been developed by the farm."

Page 5015. Negative #45314. *"Soja max.* Soybean. Kokai, Korea. View showing Korean grain merchant on Korean Farmers' Market Day. The pile of grain in front of the merchant is that of soybeans."

Neg. #45315. Soja max. Soybean. Kokai, Korea. View showing the purchasing of soybean seed samples from Korean grain merchant on Korean Farmers' Market Day."

Page 5035 (29 June 1930). W.J. Morse's notes. En route, Kokai-Kisen, Korea. "We left Kokai at 9:00 a.m. by bus... On the hillsides we saw some Korean farmers cultivating soybeans and corn with plows and also hoeing."

Page 5036. "In the evening Mr. Ritaro called on us and gave some very good data on the soybeans in the Kisen region [today's Hûich'ôn region in North Korea] He also brought samples of different grades and varieties. Before leaving he gave us some soybean samples representing the best varieties grown in this section." Neg. #45329. "Soja max. Soybean. Kisen, Korea. View showing Korean farmer and wife hoeing soybeans and corn with short handles hoes."

Page 5037. Neg. #45331. "Soja max. Soybean. Kisen, Korea. View of Korean farmer with plow used in cultivating soybeans and corn."

Page 5158 (14 July 1930). This is a letter written from Dairen, Manchuria, to Dr. A.J. Pieters, Senior Agronomist, Acting in Charge, Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC. "Kokai was found to be rather a large Korean village snuggled in a very mountainous country along the right bank of the Seinoko [?] River (Photo #45318) which flows into the Yalu River... The village is situated at 41º N. Lat. and the temperature during December and January goes as low as 40º below zero. The ground is said to freeze to a depth of 2½ to 3 feet... The field crops are planted the first week in May and for the most part are corn, soybeans, sorghum and millet."

Page 5558 (19 Aug. 1930). Dairen, Manchuria. W.J. Morse's notes. "In view of the fact that the legume seed now mature has been collected in this region and that the millet is beginning to mature, we thought this would be the best time to visit Korea around the Heijo [Pyongyang, as of 2014 the capital of North Korea] to collect some of the missing links of our Korean story of the soybean industry. Last season, no observations or pictures (movie and still) of the growing crops were made, due to [our] late arrival in Korea. We were advised that soybeans in Northern Korea begin

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too mature the forepart of September. This will allow us to obtain pictures of the growing crop as well as data, methods of culture and harvesting, and return to Manchuria in time for note taking and the beginning of harvest. Not needing much in the way of supplies, we decided to try to get away tomorrow." Sent shipping boxes to Mr. Dorsett who is now in Peiping.

Page 5559 (20 Aug. 1930). En route to Heijo [Pyongyang], Korea. W.J. Morse's notes. "We left on the 9:00 a.m. express [train] for Heijo, Korea." Passed the stations from Chinchou to Wafangtien. "From Chinchou to Liaoyang very few soybeans were noted planted alone, and from Liaoyang to a few stations below Mukden kaoliang and millet were most extensively grown with very few soybeans in mixed or single plantings.

"Leaving Suchaton at 4:00 P.M. and going to Antung we began to see numerous fields of soybeans [planted] alone."

Page 5550. "Corn and soybeans and kaoliang and soybeans were being grown quite extensively. It was noted that the soybean fields were more general in the hill sections while the mixed plantings were on the lower lands. At the ends of the rows of the fields a few feet of hemp, castor beans, sesame or sunflowers were grown. This is said to be done to keep cattle out of the fields.

"We arrived at Antung at 7:55 P.M. where we remained over night."

Page 5561. A letter from Dorsett in Peiping, China, dated Aug. 20, 1930, to W.J. Morse c/o Yamato Hotel, Dairen.

Page 5563-5564. A letter dated 13 Aug. 1930 from W.J. Morse, c/o American Consulate, Dairen, Manchuria, to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China. "Dear Dorsett: I had just started another letter to you when your came as I am beginning all over again."

"From recent reports from friends in the middle west [Midwest] the [soybean] oil industry [in Manchuria] is coming along by leaps and bounds. Mr. Cartter, my assistant at Holgate, in a recent letter thinks that it is going too fast. He is making a trip this summer with Dr. Jamieson of the Oils and Fats Lab. [Bureau of Chemistry and Soils, Div. of Forest Crops and Diseases, USDA] to visit the various soybean oil mills. From this you can see that I will have to get every bit of information on storage, analysing, grading (oil, cake and beans), shipping, varieties, methods of culture, etc. etc. I am positive that our best oil yielding beans will come from Manchuria. The soybean oil industry will be the biggest thing and I am going to try and serve it from A to Z, that is if my allotment holds out."

Page 5573 (21 Aug. 1930). En route Heijo, Korea. W.J. Morse's notes. "We left the [Antung, in Manchuria] station a little early to have our bagged passed by Japanese Customs before going into Korea. Our baggage quickly passed and we left Antung on the 7:50 a.m. train. At Shingishu, Korea, on the opposite side of the Yalu River from Antung, we set our watches ahead one hour.

"After leaving Shingishu we entered a very extensive rice paddy section. Soybeans were grown along the edges of the paddies as is so commonly done in Japan. In passing out of this large rice section we began to see mixed crops; soybeans and millet, soybeans and corn, kaoliang and soybeans, kaoliang and mung beans. The millet and soybean fields were very interesting as they were planted in various ways.

"We arrived at Heijo (Pyongyang), Korea at 2:18 p.m. and went to the Chosen Railway Hotel. All of the foreign rooms were occupied by representatives of the Corn Products Company and would be so for a year. This company is erecting near Heijo an immense plant for the manufacture of corn products. We arrived in a rain and it continued raining all night.

Page 5587 (22 Aug. 1920). Heijo, Chosen. W.J. Morse's notes. "In the morning we visited several Korean vegetable markets to note the farm products handles this season." A list of 20 products is given, including: "5. Soybeans (bundles of plants with pods) [probably green vegetable soybeans].

"In the afternoon, between showers, we visited grain markets in three different sections of the city. Millet, adsuki beans, mung beans and soybeans were the principal grains. Millet in several varieties predominated. Not as many varieties of adsuki beans and soybeans were noted as during our visit here last fall."

Page 5601 (23 Aug. 1930). Heijo, Chosen. W.J. Morse's notes. "The wild soybean was also found growing abundantly in waste places. The plants here appear to be somewhat different from those in Manchuria. The Korean plants have much larger leaves of a little different shape.

"Plants of the wild adsuki bean and the wild mung bean were also found. The former is very vining while the latter is a (Page 5602) bush type. Both species are now in full bloom."

Page 5603. Neg. #45649. "*Soja ussuriensis*. Wild soybean. View of wild soybean plants growing along roadside on outskirts of Heijo." Address: Agricultural Explorers, USDA, Washington, DC.

317. *Fortune.* 1930. Soy beans: Which may be glue, milk, cheese, sauce, varnish, axle grease, fertilizer, soap, soup, buttons, artificial leather, enamel. 1(5):102, 104. June.
• ***Summary:*** Discusses the history of the soybean in various countries. Its uses in the United States are outlined. A plastic named Satolite is used to make combs and buttons. In "Paris there is a cheese factory that makes Rocquefort [Roquefort] from soy bean curd." Soy bean "milk has more proteins than cow milk and little danger of contamination. Its flour contains four and one-half times more fat, four times more proteins, half as much water, and nearly half as many carbohydrates as the flour of wheat. These chemical ingredients make it a food, more interesting, perhaps, than

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palatable. Though the milk is supposed to be good for one (it arrests cases of retrogression, causes normal growth), it has generally to be drunk sweetened with sugar. Soy bean sauces are better spiced. (For the Chinese taste Lean & Perrins Worcestershire is too hot. The Chinese themselves make their sauces by exposing the crushed bean to sunlight and actually melting it. Certain Korean sauces are thus matured thirty years before they are considered palatable.) But if the bean's chemical make-up only indirectly contributes to its success as human food, it is nevertheless the basis of the bean's industrial importance. Because of its nitrogen, the bean is valuable as fertilizer and also as poultry and stock feed. And the bean's hereinbefore mentioned oil has proved of value to many a manufacturer of paints, enamels, lacquers, and even explosives."

The Anglo-Chinese Company at Harbin and the Suzuki Mill at Dairen, both of which use chemical solvent extraction, have succeeded in extracting virtually all of the oil from the soybean; Manchuria's traditional crude stone presses were able to extract only about half the soybean's oil content.

"Perhaps the greatest economic and industrial triumph of the soy bean occurred, oddly enough, in Denmark. Until some thirty years ago this pleasant country was more than self-supporting in the production of cereals, especially wheat. But U.S. mass production and low prices made for perilous and in some cases disastrous competition, even in Denmark's home markets. The Danes bethought themselves of raising live stock, imported the soy bean (using the oil for its usual purposes), and used it as feed for their live stock and poultry. Today 70 per cent of Denmark's export trade consists of live stock and animal products: milk, butter, cheese, bacon, ham, eggs, and the like. And for their country's regained economic health Danes give thanks to the soy bean...

"In the United States the paramount importance of soy bean is still its agricultural use. But it is significant that 75 per cent of the soy bean oil consumed in United States is being used by paint and varnish industries and in manufacture of linoleum, oil cloth, artificial leather. Lesser quantities are utilized in printer's ink, liquid soaps. Few soy beans are imported into this country."

Note: This is the earliest English-language document (Feb. 2007) seen that contains the term "mass production."

318. Dorsett, P.H. 1930. Re: He tires easily after illness. Plans have been materially changed (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. July 2. Unpublished log.

• ***Summary:*** Pages 5086-5087. This letter from Dairen, Manchuria, is a reply to Mr. Paul Russell. Assistant Botanist, Foreign Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC.

"This is a belated reply to your kind letter under date of March 20th, which arrived in Dairen on the day that I was taken to a Japanese hospital [in Dairen], and where I remained in a critical condition for approximately two months.

"We were in hopes that the flowering cherry scions which we sent in could be grown at least in the open greenhouses at Bell, in place of what might well be designated as the morgue. However, the rulings of the Federal Horticultural Board are final, and if they prescribe growing them in special quarantine there is nothing that can be done to prevent it."

"I am beginning to feel in pretty good shape, but find that I tire rather quickly under exertion. Our plans for work during the remainder of the year, as you may already know, have been materially changed. Morse will remain with headquarters at Dairen and continue his research work with soybeans. I plan to leave Dairen shortly after July 15th for Peiping, for the purpose primarily of exploring in that region for wild legumes. At present Mr. Morse is in northern Chosen [Korea] getting seed and plants of what is supposed to be Zoysia" grass.

"I can do light work here in the laboratory and gradually getting such supplies packed as I am to take with me to Peiping."

Page 5090 to 5091. A letter of July 2 from Dairen to Mr. George M. Darrow, Senior Pomologist, Horticultural Crops and Diseases, Bureau of Plant Industry, repeats much of the above information in more or less detail. "I was taken sick with double pneumonia on the night of April 11th, and on the 14th was taken to a Japanese hospital, where I remained critically ill for the greater part of two months. I left the hospital on June first but am still under the doctor's care, though going to the laboratory and doing light work part time." Address: Agricultural Explorer, USDA, Washington, DC.

319. Dorsett, P.H.; Morse, W.J. 1930. In Dairen, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5254-5255 (30 July 1930). Hsiungyaocheng, Manchuria. W.J. Morse's notes. "We went to the experiment station early in the morning and met Director Watanabe and Mr. Hisatake. Their station recently issued a bulletin on the diseases of the four principal crops of Manchuria, namely; soybeans, kaoliang, millet and corn. A copy was given us and it was found to contain excellent information on soybean diseases."

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"After lunch a trip was made by basha [horse-drawn cart, in Japanese] to the farming section to the west of Hsiungyaocheng. Soybeans were noted planted in kaoliang [*Andropogon sorghum*] to a considerable extent. The kaoliang rows were 21 inches apart and hills of soybeans were planted about every 12 feet just to the side of the kaoliang row. The same method of planting was also observed with millet and soybeans."

Neg. #45405. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Soybeans and corn in alternate rows 21 inches apart. Corn planted about May 1 in 42 inch rows, [soy] beans planted about June 1st midway [between] the corn rows."

On pages 5256 and 5257 are panorama photos with illegible captions similar to Neg. #45405.

Page 5258-5259 (31 July 1930). Hsiungyaocheng, Manchuria. "W.J. Morse's notes: In the morning we went to the experiment station for a conference with Mr. Arakawa, the entomologist, regarding insects affecting soybeans in Manchuria. According to Mr. Arakawa, the leaf hopper does not occur in Manchuria."

"Mr. Arakawa is making very extensive studies on the damage to soybeans by the pod borer which is the most serious insect pest of the soybean in Manchuria. (We found this insect pest also the most in Hokkaido and the Main soybean sections of the Main Island [Honshu] of Japan.) There are no serious insect pests affecting soybean foliage. The grub or larva of *Lachnosterna* sp. [a genus of beetles] enters the stem of the soybean at the base and ofttimes does very serious damage in the early growth of the plant. This larva also does very serious damage to millet, adzuki beans and kaoliang."

Page 5261. Neg. #45409. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Soybeans grown in the same row with corn. Corn planted in hills 42 inches apart (21-inch rows) about May 1. Soybeans planted midway [between] the corn hills about June 1st."

Neg. #45410. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Soybeans grown in 21-inch rows in pear orchard for green manure. On South Manchurian Railway Experiment Station."

Page 5262. Neg. #45410. "Soja max. Soybean. Hsiungyaocheng, Manchuria. General view of soybeans grown in rows in pear orchard for green manure. At South Manchurian Railway Experiment Station."

Page 5293-5294 (1 Aug. 1930). Feng Tai, China. "P.H. Dorsett's notes: We left on the 8:00 a.m. train this morning for Feng Tai" to look for alfalfa.

"We returned from Feng Tai to Peiping by motor car... Along the edges of bogs or low moist to wet places where reed grasses grow abundantly, we saw beans climbing to the top of reed grass 8 feet or more in height. We assumed that they were wild soybeans and verified this assumption by asking Chinese farmers. The plants impress us as being more robust and to have larger leaves than the wild soybeans we saw in abundance in Manchuria in 1925-1926.

"We also saw in actual operation the stripping of the lower leaves of kaoliang, interplanted to soybeans.

"The farmer told us that stripping is never done until the kaoliang is in full head. It is claimed that the stripping not only admits more air and light for the under-growing soybeans, but also benefits the kaoliang.

"We made a number of 3¼ by 4¼ pictures in an endeavor to secure good views of this interesting farm practice.

Pages 5300. Neg. #45425. "Soja max. Soybean. Near Feng Tai, China. A Chinese farmer at the edge of a field of kaoliang interplanted with soybeans. Note that he carries a palm leaf fan and a 'kasa' or umbrella to protect him from the sun."

Page 5301. Neg. #45426. "Soja max. Soybean. Near Feng Tai, China. A good crop of both soybeans and kaoliang. These are two very important crops in this section of China."

Neg. #45427. "Soja max. Soybean. Near Feng Tai, China. To the left is a portion of a planting of soybeans alone. To the right are soybeans planted with kaoliang which has recently been stripped of its lower leaves to a height of about four feet."

Pages 5302-5303. Negatives #45428, #45429, and #45430 show variations of the photo in #45427.

Pages 5306-5307. Negatives #45436, #45437, #45438 and #45439 show variations of the photo in #45427.

Page 5212 (2 Aug. 1930). Dairen, Manchuria. "W.J. Morse's notes: Another trip was made to the Dairen wharf warehouses and the S.M.Ry. storage yards to secure good samples and pictures of soybean shipping scenes. We found the wharf houses well filled with sacks of beans and there seemed unusual activity in bean exports. In our rounds of the warehouse we collected twenty-four samples of soybeans and one sample of mung beans. The beans of which samples were collected were said to have come from various parts of North Manchuria and were mostly for export to European countries for oil and meal.

"The German ship *Preussen* was being loaded with 3500 tons of [soy] beans. Nearby a Dutch ship was being loaded with beans. One Japanese freighter was taking on beans which were a little better quality than the oil beans and were being shipped to the main island for the manufacture of soy sauce and miso.

"Two Japanese freighters were being loaded with large amounts of soybean oil cake for shipment to Japan and other points for fertilizer and cattle feed." Page 5313. Neg. #45445. "Soja max. Soybean. Dairen, Manchuria. Loading the German freighter *Preussen* with 3500 tons of soybeans for Europe to be used for oil and oil meal, at the Dairen wharves."

Neg. #45446. "Soja max. Soybean. Dairen, Manchuria. Views of unloading soybeans from freight cars and loading Dutch freighter with beans for export to Java. Dairen

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wharves."

Page 5314. Neg. #45447. "Soja max. Soybean. Dairen, Manchuria. Loading the German freighter *Preussen* with 3500 tons of soybeans for export to Europe to be used for oil and oil meal. At the Dairen wharves."

Neg. #45448. "Soja max. Soybean. Dairen, Manchuria. Views of loading soybeans on Dutch freighter for export to Java. Dairen wharves."

Page 5315. Neg. #45449. "Soja max. Soybean. Dairen, Manchuria. Soybean oil cakes in Wharf Warehouse for export. Taken at the Dairen wharves."

Page 5380 (8 Aug. 1930). Dairen, Manchuria. "W.J. Morse's notes: We received a package of forty-one varieties of soybeans from the Kankyo Hokudo Prefecture Seed & Nursery Farm, Kyojyo, Chosen" [Kyojo, Korea]. Address: Agricultural Explorers, USDA, Washington, DC.

320. Stewart, Ralph T.; Wentz, John B. 1930. A defective seed-coat character in soy-beans. *J. of the American Society of Agronomy* 22(7):658-62. July. [5 ref]

• ***Summary:*** "During their breeding and genetic studies with soybeans (*Soja max*), the authors observed a defective seed-coat character in one of their crosses. Data were taken on the inheritance of the character and an attempt is made in this paper to interpret these data.

"Piper and Morse (2) reported that a number of black and brown varieties of soybeans were introduced from Korea which had the outer layer of the testa cracked so as to expose the inner white layer of the seed. In one variety, Widower, which had a black seed-coat, the splitting occurred in such a way as to give a net-like appearance of black and white color to the seed. The character reported in the present paper is very similar to, or possibly identical with, the one described by Piper and Morse." Address: Iowa State College, Ames. Stewart then went to Texas A&M.

321. Dorsett, P.H.; Morse, W.J. 1930. Tofu, soybeans in the pod, and soybean sprouts in Peiping, China (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5431 and 5432 (13 Aug. 1930). "We visited an open street market in the northwestern part of the city this morning." Vegetables include: (1) "Soybeans in the pod, quite abundant." Also: "Pea sprouts. Soybean sprouts." "In the afternoon we went to the Temple of Heaven grounds and got more seed..."

Page 5434. Vegetable market scene. Hei Tan Pai Lou, Peking. Cucumbers, eggplants, soybeans,... displayed on the ground for sale" (neg. #45540). At the same market, photo of bean curd. "This Chinese bean curd looks firmer than the Japanese curd" (neg. #45541).

Page 5435. "Peiping. Square cakes of brown bean curd. The cakes of white curd are put into cold soy sauce and when the combination is brought to a boil the cakes are of a brown color" (neg. #45543).

Pages 5436 and 5437. Four photos taken in an open-air show: "Southern soybean curd, Peiping. This curd appears quite firmer than the ordinary curd. The curd, that is the grain, appears to be finer and is considered much better than ordinary curd. It also sells for more money." (2) "White and brown cakes of soybean curd in a Chinese market." (3) "To the left is a pile of shredded soybean curd, on the right a pile of the sheets of curd from which the shredded curd is made" (Negs. #45544-46). Note: Pressed tofu sheets are called (in Wade-Giles transliteration) *pai-yeh* or *ch'ien-chang p'i*. Pinyin: *Qian zang pi.* Tofu is pressed into very thin sheets that look like a 6-to-12-inch square of canvas.

Page 5455, 5456, 5467. This is a letter dated Aug. 14 from P.H. Dorsett in Peiping, China, to Mr. W.J. Morse, c/o Yamato Hotel, Dairen, Manchuria. "Dear Morse: I was delighted to get your letter of August 3rd, for it seems an awful long time since we left you and the family... on July 21st.

"Yesterday we visited an open street fruit and vegetable market which extends for several blocks along Chien-men [Chienmen, Chinman?] Street. It was surely an interesting experience. We saw bean curd at quite a number of stands, also soy sauce. The curd was in several different forms. The white, in somewhat thinner and smaller pieces, small pieces in different forms fried, also round and square brown cakes which they call dry curd [*doufu-gan*]. It is not really dry but is pressed much dryer than the ordinary curd and can readily be handled without breaking, The brown color, we learned, is the result of putting the curd in cold soy sauce and bringing the sauce to a boil."

Pages 5779 and 5780 (18 Aug. 1930). Letter from Mr. W.J. Morse in Dairen, Manchuria, to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China. "Today by mail I sent you all of the negatives of pictures that I have taken up to date. The negatives were sent in two lots–one of the 3¼ by 4¼ and the other of the panoramas. Tomorrow I will send you the field reports to date which may be destroyed after they are copied in the report.

"I am planning to go to Korea for two to three weeks in the very near future to complete our movie story of the soybeans as well as the still picture story. We lack the connecting links–scenes of varieties, fields, methods of culture and harvesting–and I hope to get these if possible in a short time to complete the whole soybean story of Korea. I also desire to get some data on the growing varieties for you will recall that we did not see the beans growing at all. The Manchurian maturing season soon will be here and again I want to take notes on varieties and make a complete story of the Manchurian soybean. You can rest assured that I am

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going to collect all possible data, seed and products of the crop. I trust that my allotment holds out for I do not want to miss anything."

"I regretted very much to learn of Dr. Harvey Wiley's death [on 30 June 1930] as I knew him very well. Several years ago he came to see me about soybeans for his dairy farms up at Bluemount [Note: After leaving government in 1912, Wiley raised dairy cows and became head of the laboratories at *Good Housekeeping* magazine]. I started him with the Virginia as a silage bean and it was a great success. He became quite a soybean man and occasionally came around to talk soybeans with me.

"Your comments on the bean-curd at the Chinese market are very interesting and I hope to be able to see some of these different things when I come down to [China] some time this fall. I doubt if I will find anywhere in the Orient such a collection of products as we picked up in Japan last year. You will note in the field reports being sent you that lately we have stumbled across a few new products and we are always on the lookout for new ones." Address: Agricultural Explorers, USDA, Washington, DC.

322. Dorsett, P.H.; Morse, W.J. 1930. Kudzu seed (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 5449 (14 Aug. 1930). Dairen, Manchuria. W.J. Morse's notes. In the morning they called at the office of Mr. Ohara of the Manchu Nosen Shokai, at Pulentien, Manchuria, the northern border of the Kwantung Leased Territory. He had 100 pounds of the seed of *Zoysia pungans.* "The seed is to be shipped on a freighter leaving Dairen Aug. 19 and should arrive in San Francisco in about one month.

"With reference to kudzu seed, Mr. Ohara said that most of the seed was obtained from northern Korea and only small quantities obtained from the district between Mukden and Antung, Manchuria. The twenty pounds of seed ordered by us recently will come from Northern Korea so we ordered five pounds to be obtained from the Mukden-Antung District. Most of the orders for kudzu seed are received during September from the United States." Address: Agricultural Explorers, USDA, Washington, DC.

323. Dorsett, P.H.; Morse, W.J. 1930. In Chinchou, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 5479 (15 Aug. 1930). Chinchou, Manchuria. "W.J. Morse's notes: Left on the 9:00 a.m. bus for the Chinchou Experiment Station to have a talk with Mr. Nakatomi regarding soybean work. We were told that soybeans and kaoliang are seldom grown together. In some of the back hill or mountain districts some of the farmers plant soybeans and kaoliang together similarly to the planting of corn and soybeans. The blades of the kaoliang plant are never stripped from the kaoliang plants as Dorsett saw in the Peiping district. Kaoliang and mung beans or adzuki beans are most generally planted together in the Leased Territory.

"The soybean plots grown for green manure in the station orchards have been for the most part turned under which is done about the time the plants are just past bloom. The station is conducting some green manure experiments in an apple orchard using soybeans, alfalfa, millet, vetch and wheat. These crops are planted in the forepart of July and will be turned under about October."

Page 5617. This is a letter dated Aug. 28 from P.H. Dorsett, Agricultural Explorer, in Peiping, China, to Mr. Julean Arnold, U.S. Commercial Attache, Shanghai, China. He is sorry not to have been able to meet Mr. Arnold, but asks if Mr. Arnold has any statistics on the production or use of "American jute" [genus *Corchorus*] in China.

Page 5926-5927. "Package # 9, contains our quarterly report for the quarter ending June 30, 1930, The *original* is for the office and the *carbon copy* for Mr. W.J. Morse. The negatives for the report are also included in this package.

Packages #'s 10, 11, 12, and 13 contain seed, in regard to which the following detailed notes, we hope, will prove of interest and possible value." Seeds of many different plant species are described.

Page 5968 (29 Sept. 1930). Mukden, Manchuria. "W.J. Morse's notes: Awoke about 5 A.M. and upon looking out saw a few farmers cutting soybeans and kaoliang, For the most part, the crops have been harvested and many were curing in shocks in the fields."

"We arrived at Mukden at 6:20 a.m. As soon as the stores were opened we searched for the Hoton Shubyoen, Importer, Exporter and collector of seeds. The proprietor of this store advised that he collected seed of wild plants in Manchuria." Alfalfa "seed sells to the farmer for 80 sen per kin (1.1 lb).

"We left Mukden on the 3:58 p.m. train for Kaiyuan where the soybean farm of the S.M.Ry. is located.

"From Mukden to Kaiyuan, the crops for the most part have been harvested. Some soybean fields were being cut but only occasionally did we see a standing field. In many fields the bean plants were in shocks of upright bundles, while in other fields, the bundles were being placed in carts or being hauled to the threshing ground."

Page 5982-5983 (30 Sept. 1930). Kaiyuan, Manchuria. "W.J. Morse's notes: "Mr. Kofuka, director of the soybean farm called shortly after nine and advised that most of the

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soybeans in the Kaiyuan district had been harvested but we would be able to find some standing fields. The crops have mostly been harvested during the past two weeks.

"After soybeans are cut, they are tied in bundles with a kaoliang stalk. The bundles are placed in loose upright shocks and allowed to cure in the fields for about a week. The bundles are carted to the threshing ground and stacked in large round or oblong stacks along the sides of the threshing grounds. Soybeans are threshed first, then kaoliang heads, and lastly millet (the whole plant)."

"Near one threshing ground we saw many bundles of bean plants that had been cut before the leaves had fallen."

"As it was too muddy to get around very much in the country, we returned to the city and visited the Stock Exchange where soybeans (including oil and cake) and kaoliang are the only crops dealt in. As yet very few beans have appeared on the market. Threshing is mostly done during the latter part of October and in November."

Page 5983. Neg. #45934. "Soja max. Soybean. Kaiyuan, Manchuria. Bundles of soybean plants that had been cut before fully mature. When the Manchu farmer starts harvesting, he harvests all of his crops. Should he leave a field uncut, some kindly persons would harvest for him and also take the crop."

Page 5984. Neg. #45935. "Soja max. Soybean. Kaiyuan, Manchuria. Close-up view of stack of soybean plants along side of threshing ground on farm near Kaiyuan."

Neg. #45936. "Soja max. Soybean. Kaiyuan, Manchuria. Stacks of soybean plants around threshing ground of Manchurian farm near Kaiyuan."

Page 5985. Neg. #45937. "Soja max. Soybean. Kaiyuan, Manchuria. General view of a field of mature soybeans near Kaiyuan."

Neg. #45938 "Soja max. Soybean. Kaiyuan, Manchuria. Close-up view of stone roller used in threshing out soybeans. The roller is drawn by mule or horse."

Page 5987. A table appears to show that P.H. Dorsett's total expenses for one quarter (3 months) are $1,261.02 or about $420 per month, including hotel, meals, travel, research expenses, mailing, etc.

Page 6004. USDA Bureau of Plant Industry Weekly Itinerary Report.

Page 6005. A table appears to show that W.J. Morse's total expenses for 3 months are $1,693.62 or about $423 per month.

Page 6030-6031 (2 Oct. 1930). Kungchuling, Manchuria. W.J. Morse's notes: Mr. Nakamoto, director of the station, advised: "Threshing season begins about the middle of October and extends until the latter part of November. The shipping season reaches its height during December and January, beginning about the middle of November."

"We also met Mr. Kochi in charge of swine investigations who stated that Chinese farmers did not feed soybeans to hogs. They do, however, feed soybean oil cake extensively after the hogs are six months old, the previous feeding being kaoliang bran. The skins from the mung bean seed obtained from mung bean vermicelli and noodle factories, and from sprouting places, are used exclusively as hog feed. Mr. Kochi advised that the Manchurian farmer has no soft pork problem as he desires soft pork and does not have ham or bacon to make."

Page 6032. Neg. #45948. "Soja max. Soybean. Kungchuling, Manchuria. Close-up view of Manchurian farmer showing type of sickle or knife used in harvesting soybeans.

Page 6036-6037 (3 Oct. 1930). Kungchuling, Manchuria. W.J. Morse's notes: "The threshing ground was being rolled after the heavy rains in preparation for the threshing of soybeans. This village is growing soybean seed of one of the improved varieties. The seed is a medium large glossy yellow, much larger than any of the native varieties we have seen. A large percentage of the plants had many 4-seeded pods."

"There were many excellent varieties and selections which looked as though they might be heavy grain yielders. We are in hopes that most of these will be included in the series promised us, for the early and medium sorts no doubt will be of great value for our corn belt and northern states."

Page 6038. Neg. #45951. "Soja max. Soybean. Kungchuling, Manchuria. Cutting soybeans with sickles or knives on a farm near Kungchuling."

Page 6044. Neg. #45959. "Soja max. Soybean. Kungchuling, Manchuria. Close view of rolling down the threshing ground after a heavy rain in preparation for threshing soybeans. The rollers noted in the picture are used for threshing beans, kaoliang and millet."

Neg. #45960. Same as #45959 but a different view.

Page 6047-6048 (4 Oct. 1930). Kungchuling-Dairen, Manchuria. "W.J. Morse's notes: At Kaiyuan Dr. Lene Müller [Mueller, Muller], a scientist from Germany, sent to the Orient to study soybeans, got on the train to ride as far as Mukden to talk soybeans. Dr. Mueller has spent three months in the southern Amur district of Siberia where they are trying to grow soybeans extensively but with very poor success. She has spent about ten days in Manchuria and plans to spend a few days in Chosen and Japan studying varieties, breeding methods and utilization. She told of a wild species of soybean in the Amur district that matures in about 75 days.

"At Mukden, Dr. Mueller left us and Dr. Oza, teacher in the Mukden Agricultural High School, and at whose home Dr. Mueller is staying, got on the train. We found that he had visited Washington [DC] in 1927 and we had a visit on soybeans." Address: Agricultural Explorers, USDA, Washington, DC.

324. Dorsett, P.H.; Morse, W.J. 1930. Soybeans in Chosen

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(Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5616 (25 Aug. 1930). Heijo, Chosen. W.J. Morse's notes. "In the morning we went on a plant collecting trip in the Botandai [Botan-dai] and collected the following species." A list of 8 species is given, including 1 Pueraria (regular) and 1 Pueraria with leaf-spot.

"Some of the grain markets in West Heijo were visited in the afternoon. Millet seed predominated followed by adsuki beans and mung beans. Only one or two soybean varieties were found at each store. The soybean stock at this season is low and some of the dealers advised they would not have a full stock of varieties until the arrival of the new crop. We succeeded in collecting eleven samples of soybeans which appeared interesting for trial."

Page 5630 (26 Aug. 1930). Kosai, Chosen. W.J. Morse's notes. "We took an early morning bus for Kosai, about 30 miles northeast of Heijo and went to the Kosai Village Agricultural Society. We met Mr. Tajima, the agricultural director who gave us information concerning the crops in Kosai county. About 60 per cent of the total cultivated area is devoted to paddy and upland rice. Millet, kaoliang, adsuki beans, mung beans and soybeans are quite extensively grown but mainly in the hill and mountain regions. About 25,000 koku (125,000 bu.) [1 koku = 5 bushels] of soybeans are produced. Very few soybeans are produced for the sale of the seed. They are used chiefly for cattle feed, and for home use as miso, soy sauce and boiled beans. Adsuki [azuki] beans and millet are the principal foods and more attention is given to the culture of adsuki beans than other crops.

"On the way from Kosai to Heijo the various mixed plantings in which soybeans were included, were noted as follows:

"1. Soybeans and kaoliang.
"2. Soybeans, millet, adsuki beans.
"3. Soybeans, mung beans, buckwheat.
"4. Soybeans, castor beans.
"5. Soybeans, melons.
"6. Soybeans, corn (several methods).
"7. Soybeans, millet (several methods).
"8. Soybeans, mung beans."

Page 5631. Negative #45670. "Soja max. Soybean. Kosai, Chosen. Field of soybeans and millet. The millet in 21 inch rows and soybeans planted between two rows of millet. Every alternate middle is planted to soybeans.

Neg. #45671. "Soja max. Soybean. Kosai, Chosen. Buckwheat, mung beans and soybeans in same row. This mixed planting is quite common in this region.

Page 5632. Neg. #45672. "Soja max. Soybean. Kosai, Chosen. Mixed planting of soybeans and millet. Soybeans were planted at the edge of the millet rows when the millet was 2 inches high. Millet has just been harvested. Neg. #45673. "Soja max. Soybean. Kosai, Chosen. Soybean and millet field. The millet has just been harvested and the Korean boy is cutting the heads from the millet plants. Soybeans planted at intervals of about 8 feet along side of millet row."

Page 5635 (27 Aug. 1930). Chuwa, Chosen. W.J. Morse's notes. "We left on the 9:30 mixed train for Chuwa, south of Heijo and went at once to the Village Agricultural Society where we met the Village Master and an agricultural engineer. We were told that the west side of the county grows primarily paddy and upland rice while on the east side soybeans, millet, kaoliang, mung beans and adsuki beans were the leading crops.

"Soybeans are quite generally grown alone but are also grown extensively with other crops as corn, millet and kaoliang. Large seeded varieties are grown in the mixed plantings while in the single crop plantings the small seeded varieties are used. Native Korean varieties are chiefly grown though the Society has tried to persuade the farmers to grow the Heijo and Hokkaido which are improved varieties. Soybeans are quite generally grown in this county as a cash crop and are also used by the farmers as a food for oxen and in the home manufacture of miso and soy sauce. A large number of native varieties are grown in the county and the Village Master promised to collect and send us samples this fall.

Page 5636, "After our visit to the Agricultural Society we took the main road to Heijo, a distance of about 15 miles from Chuwa." "Along the way we saw many excellent fields of soybeans alone and in mixed plantings with corn, kaoliang, and millet. Various methods were used in these mixed plantings."

Page 5637. Neg. #45675. "Soja max. Soybean. Chuwa, Chosen. Field of soybeans and field of kaoliang in farming section about 12 miles north of Chuwa."

Page 5707 (1 Sept. 1930). Senkyori, Chosen. W.J. Morse's notes. "During the day we made a trip through the Senkyori section east of Heijo and covered about fourteen miles. Throughout the farming section we found soybeans extensively grown, both alone and in mixed plantings. In the mixed plantings, corn was the most generally grown, one stalk of corn from 4-8 feet apart in the row and from 2-4 hills of soybeans between the corn hills. Some fields of kaoliang were mixed with soybeans, with two hills of soybeans between the hills of kaoliang (4 feet apart)."

Page 5708. Neg. #45714. "Soja max. Soybean. Senkyori, Chosen. Close-up view of soybeans and millet. Soybean hills planted at intervals of 8 feet along side of the millet rows."

Neg. #45715. "Soja max. Soybean. Senkyori, Chosen. Field of soybeans and millet. The hills of soybeans planted along side of millet rows at intervals of 15 feet."

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Page 5709. Neg. #45716. "Soja max. Soybean. Senkyori, Chosen. Soybeans and kaoliang planted together. Alternate hills of soybeans and kaoliang in rows 21 inches apart.

Neg. #45717. "Soja max. Soybean. Ritsuri [today's Yul-li, in North Korea], Chosen. Corn and soybeans in same row with one stalk of corn every eight feet and three hills of soybeans between corn hills. Corn thus planted is used as roasting ears."

Page 5719 (2 Sept. 1930). Ritsuri, Chosen. W.J. Morse's notes. "Mr. Lutz, agricultural advisor of the Union Christian College, took us in the morning near Ritsuri village where the farm of the Nippon Sugar Co. is located. This farm of 250 acres is primarily for the raising of sugar beets, but a four year rotation is followed: sugar beets, millet, soybeans and wheat." "We were taken over the farm by the manager and saw some excellent fields of soybeans.

Page 5730. "The wild soybean was found in great abundance along the roads and paths as was also the wild adsuki bean."

Page 5731. Neg. #45728. "Soja max. Soybean. Heijo, Chosen. Row of soybeans and kaoliang growing along the rice paddy in a rice section about four miles northwest of Heijo.

Neg. #45729. "Soja max. Soybean. Heijo, Chosen. View of soybeans and kaoliang growing on the edge of a rice paddy in a rice section about four miles northwest of Heijo.

Page 5733. (4 Sept. 1930). Chinnampo, Chosen. W.J. Morse's notes. "Left Heijo at 7:45 a.m. for Chinnampo where there is considerable shipping of soybeans. On the way the lowlands were given to paddy rice while the uplands were quite generally devoted to kaoliang and mung beans, millet, soybeans and adsuki beans. Soybeans were grown in all of the millet fields but at the present time about 90% of the millet has been harvested leaving the soybeans in full possession of the fields."

Page 5734. At Chinnampo we went too the Heian Nando Grain Inspection Office where we met the director, Mr. Ozeki. We were given considerable data on exports, inspection, grading, trading, varieties and uses of soybeans in this prefecture. The trade in trade in beans at the present time is rather dull. The price per koku (5 bushels) is ¥12.80, The highest prices are in the fall and winter when better grades of beans are obtained.

"We were taken to a Korean merchant who does a large export business in soybeans to Japan and who handles several varieties of soybeans. We visited the warehouse of this merchant and were given samples of the different varieties he had in stock (16). We were advised that mostly yellow beans are shipped to Japan for miso, soy sauce and bean curd [tofu]. Some black [soy] beans are shipped for cooking purposes but bicolored beans are not allowed to be exported." Address: Agricultural Explorers, USDA, Washington, DC.

325. Dorsett, P.H.; Morse, W.J. 1930. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5739 (5 Sept. 1930). Taihei, Chosen. W.J. Morse's notes. "Yesterday while returning from Chinnampo it was noted that soybeans alone and soybeans in mixed plantings were very generally grown from Taihei to near Heijo, a distance of fifteen miles. This morning we started for Taihei..."

"Wild legumes were found in great abundance along the roadsides, especially the wild soybean. Wild adsuki beans and several species of lespedeza were also found in abundance along the roadsides. A small patch of wild soybean was found badly affected by leafspot. In previous trips in Manchuria and Korea we had not noticed leafspot on the wild soybean.

"In the mixed plantings of soybeans and other crops several small fields of castor beans and soybeans were found. The castor plants were anywhere from 2-4 feet apart in the soybean rows. In this region we saw more buckwheat and soybeans together than in any section yet visited. Hills of buckwheat were sown along side of the soybean row at intervals of 2-3 feet. Many fields of cucumbers and soybeans and melons and soybeans were observed. These were on ridged beds about 4 feet wide. The cucumbers and melons were planted up the middle of the beds while soybeans were planted in hills along the edges of the beds from 2-4 feet apart."

"Some excellent fields of soybeans alone were seen...

Page 5740. "A few kaoliang fields have been cut. In the millet and soybean fields at least 90% of the millet has been harvested. Many soybean fields are beginning too yellow and with good weather should mature rapidly.

Negative #45353. "*Setaria italica.* Millet. Taihei, Chosen. Millet curing in large shock in millet and soybean field. Millet is one of the principal foods of the Koreans. The millet stalks are used chiefly for animal feed."

Neg. #45734. "Soja max. Soybean. Taihei, Chosen. Soybean and melon field. Soybeans planted in middle of 4 foot beds and hills of soybeans planted along edges of beds. Melons have been harvested & soybeans now have whole field. The shelter is used during the melon season for the watchman."

Page 5741. Neg. #45736. "Soja ussuriensis. Wild soybean. Taihei, Chosen. Wild soybeans growing very abundantly along embankment in Taihei section. Wild soybeans were found quite generally throughout this region."

Page 5742. Neg. #45738. "Soja max. Soybean. Taihei, Chosen. Soybeans growing along the edge of a rice paddy in

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a rice section of the Taihei District."

Page 5743. Neg. #45739. "Soja max. Soybean. Taihei, Chosen. Soybeans and castor beans grown in same row (rows 21 inches apart). Castor plants 30 inches apart, hill of soybeans between castor plants."

Neg. #45740. "Soja max. Soybean. Taihei, Chosen. Soybeans and castor beans grown together in the same row. Castor bean plants 30 inches apart with hill of soybeans between. Rows 21 inches apart."

Page 5744. Neg. #45741. "Soja max. Soybean. Taihei, Chosen. Field of soybeans and buckwheat. Rows 21 inches apart. Buckwheat planted in hills at intervals of 3-4 feet along row of soybeans."

Neg. #45742. "Soja max. Soybean. Taihei, Chosen. Close-up view of soybeans and buckwheat planted together. Rows 21 inches apart. Buckwheat planted in hills 3-4 feet apart along row of soybeans."

Page 5745. Neg. #45743. "Soja max. Soybean. Taihei, Chosen. Soybeans and cucumbers planted on ridged bed about 4 feet wide. Cucumber plants about 15 inches apart in row in center of bed. Hills of soybeans about 5 feet apart along each side of bed.

Neg. #45744. "Soja max. Soybean. Taihei, Chosen. Field of soybeans and millet with millet just harvested. Soybeans were planted in hills at intervals of 8 feet along side of millet row.

Page 5771 (9 Sept. 1930). Shariin, Chosen. W.J. Morse's notes [Dorsett is in Peiping, China]. "We left at 9:30 a.m. to visit the Agricultural Experiment Station at Shariin to look over the soybean experimental work. From a short distance west of Kokai-Koshu [Kokaikoshu] we began to observe quite extensive plantings of buckwheat more than any section yet seen. Many large fields were sown alone but for the most part buckwheat was in mixed plantings. In most of the [soy] bean fields, two to four rows of buckwheat were grown on the sides. Mixed plantings of soybeans and buckwheat and mung beans and buckwheat were quite common.

After reserving rooms at the Shariin Inn we went to the Experiment Station where we met Mr. Hoshino, one of the crop assistants."

Page 5772. "Mr. Takehashi is at present on the Main Island and it is not known just when he will return. We were taken to visit some of the experimental plots between showers.

"In the soybean variety work, they have over 1,500 numbers under test. Over 200 are varieties that the Shariin station has been working with while 800 were received from the Suigen station the past spring. About 500 samples were received from the Chosen Fair last fall, representing the best native varieties from all prefectures in Chosen. In the variety tests and breeding work 10 plants are grown to a number, the plants being about [?] inches apart in the row and the rows about 30 inches apart. many very interesting varieties were noted in the various tests.

"The soybean expert, Mr. Sawamura, was sick today but may be with us tomorrow to give more information concerning the soybean work and also to take us out to some of the farming sections.

Page 5773. Neg. #45769. "Soja max. Soybean. Shariin, Chosen. View lengthwise of rows of soybean-millet field. Bean hills about 12 feet apart along side of millet row. No fertilizer was applied to this field.

Neg. #45770. "Soja max. Soybean. Shariin, Chosen. View at right angle to rows of millet-soybean field after the millet has been harvested. Hills of soybeans about half way up row ridge and about 12 feet apart. Rows 21 inches apart."

Page 5800 (10 Sept. 1930). Shariin, Chosen. W.J. Morse's notes. "In the morning we went to the Shariin Experiment Station where we met Mr. Sawamura, the soybean expert. With reference to not sending seed of the soybean varieties the past winter. Mr. Sawamura advised that when they came to check up the seed of the varieties the past winter they found the seed of many varieties did not check up with the native varietal names. They decided to grow the varieties again, correct the errors and send us seed of the 1930 crop.

"We were taken to the variety and breeding plots and the work [was] explained to us by Mr. Sawamura. All work is being done with native Korean varieties toward the development of improved pure strains. The varieties received from the 1929 Chosen Fair (500 numbers) showed some very interesting and valuable sorts. This is the collection we saw at the Fair last October and tried to secure. Through a misunderstanding, we only received six soybean seed samples. When the situation was explained to Mr. Sawamura, he thought he could give us the sample of each this fall. In addition he will give us samples of the 208 native Korean varieties the station has been working with.

"We then went out in the farming sections and saw some excellent fields of soybeans." See next page.

Page 5802. Neg. #45784. "Soja max. Soybean. Shariin, Chosen. Field of soybeans, adsuki beans, mung beans, and buckwheat in same rows (21 inches apart). A very common practice in this district. See next page.

Neg. #45785. "Soja max. Soybean. Shariin, Chosen. Close-up view of the large flat-stemmed soybean selection in variety test at the Shariin Experiment Station. The pods are bunched at the top.

Page 5803. Neg. #45786. "Soja max. Soybean. Shariin, Chosen. An excellent field of a native variety of soybeans near Shariin.

Neg. #45787. "Soja max. Soybean. Shariin, Chosen. Close-up view of large flat stem selection in variety test at Shariin Experiment Station. The pods of this variety are bunched at the top.

Page 5811 (11 Sept. 1930). Heijo, Chosen. W.J. Morse's notes. "Went to the office of the Agricultural Society to see

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Mr. Yamazaki with reference to silos and silage in Daido County. He advised that he was going to look over some of the silos in a nearby section on Saturday and would be glad to have us go with him. Soybeans were grown also in this section but were used principally for cattle feed. As yet no tests have been made with soybean and corn silage. The silage for the most part is corn, weeds (grasses and legumes), and alfalfa. In 1929 there were five silos in the county and in this year (1930) there were forty silos scattered about in the county."

They then went to a hill section west of Heijo. "We found the wild soybean growing abundantly and it is quite evident there are two distinct varieties–one with narrow pointed leaves and the other with larger leaves more rounding at the tip. Again we found leafspot [disease] very bad on the wild soybean."

"On our way through the city in the morning we saw shelled green vegetables in baskets at several Korean vegetable stands. Mung bean sprouts are now on the market, more generally than when we first came to Heijo. At several stands soybean sprouts were noted for the first time."

Page 5814. Neg. #45795. "Soja max. Soybean. Shariin, Chosen. View of soybean-millet field on steep hillside about two miles west of Heijo. Millet has been harvested. [Soy] Bean hills are about 6 feet apart in row." Address: Agricultural Explorers, USDA, Washington, DC.

326. Dorsett, P.H.; Morse, W.J. 1930. Tofu in Heijo, Chosen [Pyongyang, North Korea] (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5658-5659 (30 Aug. 1930). Heijo. "In the morning we went to the Grain Inspection Office where we met the grain inspectors and went with them to the grain storage and shipping yard of a Korean grain merchant along the Daido [today's Taedong] River. Two hundred bags of soybeans were to be inspected and graded for shipment to the Main Island... At least 80% of the beans were found to have brown germs indicating either poor storage or curing of the beans. The inspectors refused to pass the seed in any grade. The merchant had expected 3rd or 4th grade and had sold the seed to an exporter in Chinnampo [today's Namp'o, the port city for Pyongyang].

"The following items on the inspectors cards were used in grading soybeans: 1. Koku. 2. Dirt or stones. 3. Trash–pods, stems, etc. 4. Rotten seed. 5. Immature seed. 6. Insect injured. 7. Broken seed. 8. Per cent total. 9. Remarks.

"As some boats were loading soybeans for shipment to Chinnampo we were able to secure still and movie pictures of inspection and landing of the small Korean boats.

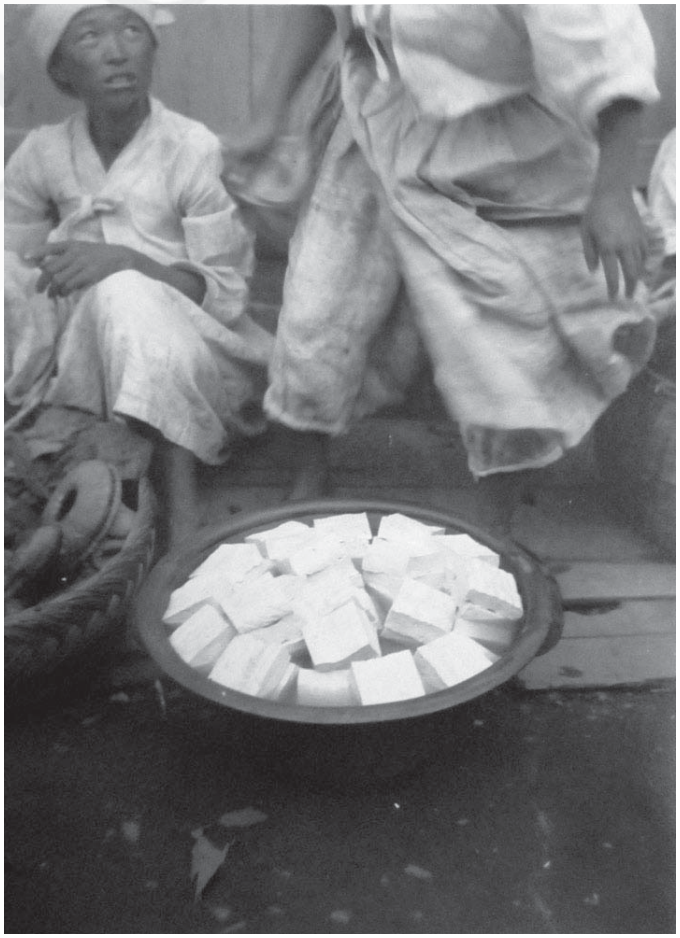
After lunch we visited a grain market... We obtained nine samples among which were the largest yellow and green seed varieties [of soybeans] we have come across. These varieties are said to be used by the Koreans in making their own miso and soy sauce.

"In a small market place, we found jars of mung bean sprouts and dishes of bean curd at nearly every vegetable stand. Several stands had dishes of boiled mung bean sprouts, a product we have not seen before in our work.

Four photos (p. 5659-5661) show: "View of weighing bags of soybeans during inspection and grading in the storage and grading yard of the Korean grain merchant along the Daido River (Negs. #45699-702). Then 3 more similar photos are on pages 5662 and 5663.

Page 5661. A photo (see below) shows: "Soja max. Soybean. Heijo, Chosen. Small blocks of fresh soybean curd sold by Korean women in a Korean market" (neg. #45703).

Page 5751 (6 Sept. 1930). Heijo, Chosen. W.J. Morse's notes. We visited the office of the Heian Nando [today's P'yôgan-namdo in North Korea] Prefecture Grain Inspection Service... The earliest [soy] beans were said to be grown around Junsen [today's Sunch'ôn in North Korea] and harvest will begin between the 15th and 20th of this month. Crops are in excellent condition and above average yields



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will be obtained. Junsen is the center of a large soybean grain producing region and the inspector advised that we should by all means visit the Junsen section.

"It was learned that market day was being held on the outskirts of the city, so we went to look over the products."

"At some of the small lunch stands scattered about the grounds, mung bean and soybean foods were being cooked and sold. Mung beans as batter cakes with chopped vegetables and fried soybean curd were the chief foods.

Page 5754. A photo shows: "Frying small blocks of bean curd on piece of sheet iron at small open lunch stand on Korean Market Day" (neg. #45752). Address: Agricultural Explorers, USDA, Washington, DC.

327. Morse, W.J. 1930. Re: Investigating soybean production in Korea (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Aug. 31. Unpublished log.
• ***Summary:*** Pages 5781 and 5782 (31 Aug. 1930). Letter from Mr. W.J. Morse in Heijo, Chosen [Pyongyang, North Korea], to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China. "Well am over in Korea picking up missing links in our Korean soybean pictures and word story... We [Morse and Suyetake] left [Manchuria] on the 20th and arrived here on the 21st."

"... I feel that we will be greatly repaid even for a two or three week's visit. I simply had no idea that the beans were planted in so many different ways. From last season's data, I got the impression that soybeans were grown principally with millet. I find that they are planted with millet, corn, buckwheat, kaoliang, castor beans, and mung beans. In one section we found some excellent fields of buckwheat, soybeans and mung beans planted together. Many fields are planted to soybeans alone and we have seen many excellent fields We have taken many pictures and about 1½ reels of movies (here's hoping they are good)."

"The wild soybean about here seems to be larger than the one in Manchuria and I am wondering if it is not like the one you have found in China."

"Thus far we have collected over seventy-five seed and plant specimens The director of the experiment station has promised to collect seed of all the native Korean varieties of soybeans for us this fall. We have picked up several very interesting samples of soybeans. We have also the promise of the Agr. Soc. at Kosai to collect native samples in that region."

"Please send mail to Dairen address as I won't be so long in this region. As soon as I get what I needed here for the Korean story and some wild legume seed we will return to Dairen to begin soybean operations."

"P.S. With reference to soybean samples in China, I would like it very much if you would pick up small samples wherever you come across them." Address: Agricultural Explorer, USDA, Washington, DC.

328. Dorsett, P.H. 1930. Re: Collecting seeds and herbarium specimens (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Sept. 9. Unpublished log.
• ***Summary:*** Pages 5775 to 5778. This letter dated Sept. 9 is from P.H. Dorsett in Peiping, China to W.J. Morse, c/o Yamato Hotel, Dairen, Manchuria.

"Dear Morse: Come on over, the weather is cool and it is fine here."

"We spent a week in the vicinity of Hankou, the Chinese Great Wall, Ming Tombs and Tang Shan [Tangshan, a city in today's Heibei province], and secured some seed, a few pictures, and quite a number of herbarium specimens. We also spotted quite a number of plants of which we hope to get seed later."

Page 5776. "In a recent letter from Ben... he voices the opinion that all think I should return to Washington [DC] in December. Oh well, I guess I can stand it!

"Perhaps we had better give some consideration to the time and arrangements for our making the trip home. If you will, as soon as you conveniently can, let me know when you will be ready to sail and whether or not you will leave via Peking or Shanghai, Kobe or Yokohama. I will arrange my affairs so as to take the same steamer" with you and Margaret.

"One evening last week [in early Sept. 1930 in Peiping] we took dinner with Dr. Yamei Kin, and during the course of the conversation, which drifted, among other things, to soybeans and soybean products, the Doctor challenged my statement to the effect that I thought the Japanese utilized soybeans as human food more extensively than do the Chinese. She said the Chinese have a large number of soybean jams [jiang] and other products which are used extensively. Well, when you get to Peking, you will have to look these matters up. The Doctor may be right about this matter but I have my doubts."

Page 5777. "I am pleased to learn that you are there and are getting along so nicely in filling in the gaps of our Chosen [Korea] work last fall where additional data and pictures are required to round out a complete story of the soybean work in that region.

"We, to my surprise, find that throughout the regions we have visited about Peiping, that the soybean is grown here in conjunction with practically all other farm crops, but primarily with kaoliang, corn, millet, sesame, peanuts, etc. Jim and I did not observe this when we were here in 1924-25."

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"I suppose you will get seed of the large wild soybean. We expect to get seed here of the large leaved tall growing form."

Page 5778. "We will arrange to collect as many small samples of soybeans as is possible from the regions we visit... Very sincerely yours." PHD/rd. Incls. [Inclosures]. Address: Agricultural Explorer, USDA, Washington, DC.

329. Dorsett, P.H.; Morse, W.J. 1930. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5828-5829 (12 Sept. 1930). Heijo (today's Pyongyang) and Jidori, Chosen. W.J. Morse's notes. Neg. #45805. *"Soja max.* Soybean. Jidori, Chosen. Kaoliang-soybean field. Rows 21 inches apart. Two kaoliang plants every five feet apart in row and three hills of soybeans between the hills of kaoliang."

Page 5837. Neg. #45512. Silo. Ryojo. Chosen. Cement silo on Korean farm near Ryojo. Silo is 6 feet deep and 5 feet in diameter. It extends about 12 inches above ground and holds about 6,000 pounds of silage. Chopped corn (without the ears), alfalfa, and weeds are most commonly used. Wooden cover on silage is weighted with stones.

Neg. #45513. Korean silo. Ryojo. Chosen. Cement pit silo is 6 feet deep, 5 feet in diameter and the wall 4 inches thick. It holds 6,000 pounds of silage which lasts one ox from 3-4 months. Corn, alfalfa and wild legumes & weeds are used for silage."

Page 5842-5843 (15 Sept. 1930). Rikiho to Chuwa, Chosen. "Left by train this morning for Rikiho and walked from Rikiho to Chuwa." "Nearly all of the millet has been harvested and about 50 per cent of the kaoliang. The fields are for the most part mung beans, soybeans, adsuki beans and buckwheat. Many fine fields of soybeans were noted and are beginning to mature. All millet fields have only soybeans in them while the harvested kaoliang fields have mostly mung beans."

"Arriving at Chuwa we found market day on so we looked over the different farm products. In the grain section [?] kaoliang seed predominated followed closely by wheat. There are also more or less mung beans and adsuki beans but very few soybeans. Neg. #45815. *"Soja max.* Soybean. Chuwa, Chosen. Soybean section of grain market on Korean market Day. Farmers' Market Days are held in Korean villages and cities every 5 days."

Page 5844. A large and interesting vertical panoramic photo with illegible handwritten description.

Page 5871 (17 Sept. 1930). Heijo, Chosen. W.J. Morse's notes. "Field notes from August 17 to September 15, inclusive, as well as eighty-nine 3¼ by 4¼ negatives and 12 panoramas of pictures covering the above period were sent to P.H. Dorsett at Peiping, China to be included in our quarterly field trip report.

"In view of the fact that the Shariin Experiment Station soybean expert said it would pay us to visit the Suigen Experiment Station to see the soybean variety and breeding work, we left Heijo at 2:31 P.M. and arrived at Keijo [today's Seoul] at 8:50 P.M.

"In the Shariin region we noted as we passed through many excellent fields of soybeans and the crop seemed to be more advanced in maturity than we have observed elsewhere. Millet and soybeans are most generally seen. The hills of soybeans seemed [?] to be planted at no uniform distances apart along the millet rows. The hills ranged from 4 to 20 feet apart in different fields.

Pages 5879-5880 (18 Sept. 1930). Suigen, Chosen. W.J. Morse's notes. "We left early in the morning for the Suigen Experiment Station where we met Dr. Nagai, plant breeder of the station.

"The principal work at the station with soybeans consists of developing pure strains from native Korean varieties through selection and hybridization. The variety test is made up of about 80 varieties selected from more than one thousand samples of the native Korean, Japanese and Manchurian sorts.

"We were taken out to the experimental plots by Dr. Nagai and had an opportunity of seeing the grown varieties which we missed last season due to the lateness of our arrival in Chosen. In the variety test some excellent varieties were observed ranging from 3-4½ feet high and very prolific. Especially interesting and promising were the Chotan and Orusan, selections from native Korean varieties.

"In the selection tests, many hundred individual plant selections were being grown in 30 inch rows, the plants about 9 inches apart in the row. Dr. Nagai tries to have fifty plants per individual plant selection. In planting a seed is dropped every 8 inches so there is no thinning to do. There were many very promising selections but all of the grain type.

During the spring, Dr. Nagai received a full set of named American varieties from the U.S. Department of Agriculture. Each variety was given about two rods [1 rod = 16.5 feet] and with the exception of the very early sorts were showing up exceptionally well. The Harbinsoy (S.P.I. 54906) placed in the U.S. farmers' hands in 1927 looked to be the best and was highly spoken of by Dr. Nagai. The varieties ranging in maturity from 115-130 days appear to be best under Korean conditions in this section.

"After looking over the experimental plots we went to the farming section west of the station. Soybeans were grown in rows with susu (sorghum) and perilla, and with millet and susu. All of the crops are planted in beds 3-4 feet wide. In the planting of susu, millet and soybeans, the soybeans are sown first, right after barley harvest (about the 20th of June). The

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beans are sown in hills (4-6 plants per hill), four across the bed, 8-12 inches apart. At the same time susu plants 24-30 inches high, are transplanted in a row in the center of the bed at intervals of about 5 feet–4-5 susu plants per hill... Very few mung beans, adsuki beans and buckwheat are grown in this region in comparison with the planting of these crops in northern Korea. Soybeans are grown in mixture with many other crops such as cotton, cucumbers, upland rice and melons."

"Dr. Nagai found that the number of stems per leaf bore a direct correlation to the resistance of the plant to disease. The most susceptible plants had the largest number of stems per plant."

Page 5881. Neg. #45852. "*Soja max.* Soybean. Suigen, Chosen. Plot of 'Koshu' [?] a native Korean variety of soybeans in the variety test at the Suigen Experiment Station.

Neg. #45853. "*Soja max.* Soybean. Suigen, Chosen. Field of soybeans, millet and susu (sorghum) on a farm near Suigen.

Page 5882. Neg. #45854. "*Soja max.* Soybean. Suigen, Chosen. Plot of 'Chotan' a native Korean variety, fully mature... This variety is an excellent grain sort and is extensively grown in the Chotan region.

Neg. #45855. "*Soja max.* Soybean. Suigen, Chosen. Soybeans and susu (kaoliang) planted in beds about 4 feet wide. Bean hills (4-6 plants per hill) about 10 inches apart and four across the bed. Each row of four hills about 21 inches apart. The sorghum (susu) is transplanted when about 30 inches high about every 8 feet in the center of the bed."

Page 5883. Neg. #45856. "*Soja max.* Soybean. Suigen, Chosen. Dr. Nagai, plant breeder of the Suigan... Station, showing the growth of the 'Harbinsoy (S.P.I. 54906–American variety) under Korean conditions.

Neg. #45857. "*Soja max.* Soybean. Suigen, Chosen. Dr. Nagai (on right) in a plot of 'Orusan' variety of soybeans at the Suigen... Station. This appears to be one of the most promising varieties for the Keijo [Seoul] section."

Page 5897 (20 Sept. 1930). Seoul (Keijo), Chosen. W.J. Morse's notes. They took a bus to Tokusan which is a valley region they found largely devoted to truck crops. "No soybeans were found in the lowlands but when we came to the hill region we found soybeans planted with susu, perilla and millet. We also observed many rather small fields of peppers planted in beds with soybeans in hills on the edges of the beds. Several fields of upland rice were also seen with hills of soybeans between the beds and on the ends. We walked as far as Senyari where we took a bus back to Keijo."

Page 5598. Neg. #45868. "*Soja max.* Soybean. Tokusan, Chosen. Soybeans planted between beds of upland rice."

Neg. #45869. "*Soja max.* Soybean. Tokusan, Chosen. Perilla planted with soybeans on beds about 4 feet wide. Perilla plants are about 4 feet apart and extend up center of bed."

Page 5899. Neg. #45870. "*Soja max.* Soybean. Tokusan, Chosen. Mixed planting of soybeans, perilla and susu (sorghum). Perilla is grown to a considerable extent in this region with soybean. The plantings are in beds about 4 feet wide."

Neg. #45871. "*Soja max.* Soybean. Tokusan, Chosen. Soybeans grown on the edges and between pepper beds. Peppers were grown quite generally in this section and always with soybeans."

Page 5900. Neg. #45872. "*Soja max & Coix lachryma.* Soybeans & Job's tears. Tokusan, Chosen. Soybeans and Job's Tears grown on the edges of a rice paddy."

Pages 5902-5903 (21 Sept. 1930). Seoul (Keijo) to Heijo, Chosen. "We left Seoul at 9:05 a.m. and passed through an extensive which we came through at night on our way down to Seoul. Some rather different methods of planting crop mixtures were observed in the region north of Kinkou than we have ever seen elsewhere.

"Soybeans on ridges 24 inches apart and millet planted in the furrows.

"Soybeans on ridges 24 inches apart and castor beans planted at intervals of about 8 feet along the side of the soybean ridge.

"Many excellent fields of soybeans alone were noted and in nearly all cases the leaves were nearly all yellow... In many millet and soybean fields, the millet has been harvested and the soybean, though not yet mature, were being cut to make ready for planting barley... Arrived at Heijo at 3:06 p.m." Address: Agricultural Explorers, USDA, Washington, DC.

330. Dorsett, P.H.; Morse, W.J. 1930. Soybeans in Chosen (Korea) (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 5915-5916 (24 Oct. 1930). Junsen, Chosen. W.J. Morse's notes. "We left on the train this morning for Junsen which is in a mountain region and the center of a large section producing soybean seed. Near Shaninjo [today's P'yôngsông, North Korea] and for a short distance beyond this station we observed farmers cutting not quite mature soybean plants in the millet-soybean fields, The bean plants were being removed (the millet had been harvested for some little time) in order to fit the ground for planting barley or wheat. As we approached Junsen we noted many fields being plowed and a few being sown to barley or wheat.

Around Junsen, we saw more soybean fields and fewer mixed plantings. A few fields were noted here and there of mixed plantings of perilla, susu [sorghum, kaoliang], and soybeans..."

"At Junsen we went directly to the office of the Village

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Agricultural Society where we met the director. As yet, we were advised, no soybeans are ready for harvest in the Junsen region as crops are a little later than usual this season. From 70-80 per cent of the varieties grown in this region are improved varieties distributed by the Agricultural Society. The principal variety is the Heijo and the next in importance is the Oriarkon. Although both of these varieties have excellent seed they do not command as high prices as the native varieties. This is said to be due to the thick skin of the seed, a character in poor favor by manufacturers of soybean products such as tofu, miso and soy sauce... We collected a nice lot of information on soybean production in this area from the director who seems to be quite a soybean man. Soybean harvest will not begin until the middle of October so our chances of obtaining movies in this section of harvest scenes before leaving Korea are nil.

Negative #45878. *"Perilla* sp. Perilla. Junsen, Chosen. View of susu and perilla in field near Junsen. Perilla is quite generally grown in this mountain region but never alone. It is always grown with susu or with susu and soybeans."

Page 5933-5934 (26 Sept. 1930). Ritsuri, Chosen. W.J. Morse's notes. "We took the 9:00 a.m. bus for the Ritsuri farming section to search for soybean harvesting. When we arrived at the Nippon Sugar Beet Farm, we thought it would be a good plan to see the director to see if he could give some information as to the places where we might see soybean harvesting... he stated that a large field of soybeans was being harvested by some Korean farmers nearby.

"Upon arriving we found several Koreans cutting or rather breaking soybean plants. The plants are left for harvest until fully mature. In harvesting a long handled knife with a short curved blade is used and the plants are bent over the edge of the blade and snapped off instead of being cut off. Conditions were excellent for movie and still pictures, and several harvesting scenes were taken. With these pictures we now have a complete story–movie and still–of the Korean soybean industry.

"After this we left the farm for the main road to walk toward Heijo until the bus overtook us. Farmers were quite busy plowing the land and planting wheat and barley. We visited one of these fields and found small piles of compost soil distributed along the sides of the field. In examining the piles we fond that wheat was mixed with the finely pulverized compost. The land was thrown in ridges and a man with a basket of the wheat-soil mixture was dropping handfuls about every ten inches in the furrows. Another man with a stick was kicking the soil from the side of the ridges with his feet to cover the grain. It was found that 8-12 grains of wheat were dropped with every handful of soil.

"In the spring, (about the middle of May) soybeans are sown in hills along the ridges between the wheat rows. Following the soybeans, the ground is left fallow during the winter and the spring (the latter part of April), millet is sown on ridges. About the first of June, soybeans are planted in hills–anywhere from 8-25 feet apart–along side of the millet ridges.

"As we were going along the road, we met Mr. Lutz with his Korean assistant on their way to the sugar beet farm to purchase rye seed. We went along with them and then returned..."



Page 5935. Negative #45884. "Soja max. Soybean. Ritsuri, Chosen. Close-up view of Korean boy with harvesting knife used in harvesting soybeans. The mature bean plants are broken over the blade instead of being cut off.

Neg. #45885. "Soja max. Soybean. Ritsuri, Chosen. Old Korean farmer harvesting soybeans. The plants which are fully mature are broken over the edge of the sickle blade rather than cut off."

Page 5960 (28 Sept. 1930). Enroute Heijo, Chosen to Mukden, Manchuria. W.J. Morse's notes. "We left Heijo, Chosen, at 3:18 p.m. for Mukden, Manchuria. Along the way it was noted that nearly all of the susu and millet had been harvested. Soybean fields were fast approaching maturity but it will probably be ten days or two weeks before harvesting this crop... The rice plants are cured in shocks in the dry paddy or along the edge of the paddy.

"We arrived at Antung [Manchuria] about 7:45 p.m. where the train waited 30 minutes for Chinese Customs

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Inspection. Our suit cases were examined on the train without much trouble. Our trunks were examined in the customs baggage room. One of the inspectors was rather inquisitive about out motion picture films and our seed samples."

Page 5961. A vertical panoramic photo and illegible handwritten caption.

Page 7653 (27 Jan. 1931). Tokyo, Japan. W.J. Morse's notes. P.H. Dorsett is in Peiping, China. "We received in the Consulate this morning a package of 52 samples of soybeans from the director of the Heian Nando Prefecture Seed and Nursery Farm, Heijo, Chosen. The samples represent native varieties collected by the director from farmers Northeastern Chosen.

"Mr. Suyetake came and we spent the day numbering and writing up the samples. Very fortunately the director obtained the native Korean name of each variety. In writing up this group some very interesting types were found. In coming from the Northern section of Korea they should be of some value to our middle and northern States." Address: Agricultural Explorers, USDA, Washington, DC.

331. Morse, W.J. 1930. Re: Am still in Chosen, but planning to leave soon. (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Sept. 16. Unpublished log.

• ***Summary:*** Pages 5909-5910. This letter dated Sept. 16 is from W.J. Morse in Heijo, Chosen [Pyongyang, North Korea] to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China.

"Dear Dorsett: Am still in Chosen but am planning to leave within a few days as the soybeans in Manchuria are calling. The time spent in Chosen has been of the greatest value not only from the soybean standpoint but also from the wild legumes. This far we have collected 150 numbers of seed and plant material and have nearly filled the note books brought with data. We have two hundred feet of movie which we hope will turn out good. We expect to secure harvesting scenes within a few days as we saw several fields yesterday about fully mature. With these scenes the Korean soybean story will be complete. Am planning on making the Manchurian soybean story as complete as the Korean and the Japanese. I do not know how long it will take but I plan to stick it out.

"I am sending you under separate cover 89 3¼ x 4¼ negatives and 12 panorama negatives taken in Korea. With the panorama package is the report from August 17 to Sept. 15 inclusive. I hope that they reach you safely and in good condition. Also in the panorama package are two subvoucher books which were sent me from Forage Crops."

"In view of what you have said of the soybeans around Peiping and perhaps I could learn something in that section, I think I will plan on going down the forepart of October and will be with you three weeks or so. As I see the situation that would be my best time for I would like to see some of the Chinese fields and also see what products there are around Peiping. As I wrote you and also told you in Dairen, I want to make a thorough study of the soybean oil industry in Manchuria. Most of the oil mills will be in operation by Nov. 1 and field plant operations will be past so that I will be unhampered in making a complete study of storage, oil, oil cake and shipping.

"I have several letters from U.S. Experiment Station friends and they report that soybeans everywhere are doing fine in spite of the continued dry weather. This will be a big boost for the soy and will do much toward a greater increase in the oil industry. From all reports the oil mills have increased greatly this past season. So you can readily see that I will be expected to know all about the oil industry in Manchuria when I return. October is a little early for the oil industry and I think that this time would be best for the Peking visit as I would also like to get around in the farming sections a little with you. As I recall, Mr. Liu said there were not many products about Peking so that won't take much time. I wish you would let me know as soon as convenient if the October visit will find you home and suitable to get around the Peking district.

"As when you left, I have no definite plans as to exact time of visits to places. I have only the soybean industry to push ahead to and in this I am taking things as they come. This I find much better than in planning ahead for if plans are made it seems that always bobs up and changes things about. In other words I work today and let the morrow take care of itself.

"With kindest regards from all to all I remain

"Very truly yours, W.J. Morse, c/o American Consulate, Dairen, Manchuria." Address: USDA, Washington, DC.

332. Dorsett, P.H.; Morse, W.J. 1930. Soybean milk in Heijo (Pyongyang), Chosen [Korea] (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Pages 5905-5906 (22 Sept. 1930). Heijo, Chosen. W.J. Morse's notes. "After lunch we went to the Prefecture Seed and Nursery Farm. On the way we found mature seed of the wild soybean and collected a fair sized sample.

"At the station we met the director, Mr. Shiramura, and asked concerning the harvesting of soybeans. He thought we would have a better chance of seeing the harvest of beans

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around Junsen, which is an extensive soybean section and is in a mountainous region. When the soybeans are grown alone, the plants are allowed to become fully mature before harvesting.

"After returning from the Seed and Nursery Farm we visited a soybean curd factory. In addition to selling bean curd this factory sells about five gallons of soybean milk daily during the summer months. This factory runs two stone grinders and uses 4-5 bushels of dry beans daily. Various forms of fried bean curd are also sold by this factory. The same process of making bean curd and milk is used on the Main Island. In the milk, however, less water is used, thus giving a higher quality of milk. The milk is used only by the Japanese and sells for 4 sen per bottle (5 bottles to the quart)." Address: Agricultural Explorers, USDA, Washington, DC.

333. Morse, W.J. 1930. Soybeans in the Orient. *Proceedings of the American Soybean Association* 3:96-100. Eleventh annual field meeting. Held 10-12 Sept. 1930 in Illinois.
• ***Summary:*** This letter (which appears on pages 5196 to 5199 of the unpublished Dorsett-Morse Log) was written by William J. Morse on 20 July 1930 from Dairen, Manchuria, to Dr. W.L. Burlison, President of the American Soybean Growers Assoc. at the University of Illinois, Urbana. It is reprinted in full:

"Dear Soybean Friends:

"When the writer addressed a letter of your 1929 Annual Meeting, the soybean experience of the U.S. Department of Agriculture Oriental Agricultural Expedition was just beginning and there was but little to write about on this important crop of the Asiatic countries. It is quite different now, however, for explorations have been made in Hokkaido Island, Hondo (the main island of Japan [now called Honshû]), Korea and to some extent in Manchuria. If an attempt were made to write at all fully on the different phases of the soybean industry we have observed in these countries during the past year or more, a volume or perhaps several, would have to be written instead of a mere letter.

"It is recalled that last season the use of the soybean as a green vegetable was described. Throughout the season, it was found that the green vegetable was a very popular food with the Japanese from one end of the Japanese Empire to the other. The vegetable soybean is classed as a garden bean and as such is extensively grown by the Japanese truck farmers."

The authors were in Hokkaido from mid-August until early October, and they visited all the principal soybean sections. "The Obihiro station in the eastern part of the island [of Hokkaido] is conducting the most extensive work in breeding and variety testing. We succeeded in collecting a very large number of varieties and selections of this northern region as well as information on culture, harvesting, threshing, insect pests, and diseases. To supplement this material, we obtained a large number of still and motion pictures of very interesting scenes of the Hokkaido soybean industry."

They arrived in Korea on 20 Oct. 1929 and established headquarters at Keijo (Seoul). "We found Korea to be a most interesting country and different from anything we had seen in Japan. One of the most amazing things was the extent to which soybeans are grown. Almost equally amazing was the large number of native Korean soybean varieties we found in the various sections and at the experiment stations. At the Suigen Experiment Station, they have more than one thousand native Korean varieties and selections under test. The authorities were very generous and gave us samples of each. In addition to this collection, we obtained a few hundred samples from Korean farmers, grain merchants on village market days and from village and city grain dealers. The Korean Department of Agriculture added about 300 samples to our collection by obtaining seed of the principal varieties from the village agricultural societies in each of the prefectures of Korea.

"Altho the Koreans do not use the soybean as extensively for food as do the Japanese, considerable quantities are used and in quite different ways. The beans are used principally boiled with other grains such as millet or kaoliang. They are also used in making miso and soy sauce, but these products are made quite differently from those of Japan or China. Soybean sprouts are found very abundantly in all of the markets and at all of the small food stores. The beans produced in Korea are for the most part excellent quality and are largely shipped to Japan for the manufacture of miso, soy sauce, bean curd, and natto. Soybeans when soaked with chopped millet or kaoliang straw are used universally for feeding oxen and cows, the common work animals of Korea.

"We left Korea about the first week of December [1929] for our Tokyo headquarters and collected seed samples and products as we went along. From the latter part of December until the latter part of March, we put in full time collecting soybean products and learning of their use and manufacture. We succeeded in collecting a large number of interesting products, as the Japanese use the soybean very extensively in their daily diet. In the making of cakes, candies, and numerous other confections, the roasted soybean is used in a similar manner to the peanut in America. Of course, soy sauce, miso, bean curd, and natto are the principal soybean products and the ones most extensively used. As an example of the large use of miso, which is used as a breakfast soup with vegetables and also in preserving fish, vegetables, and meat, we visited three large miso factories in the Tokyo district and found that each produced about one million pounds of miso yearly. In addition to these three large factories, there were numerous small factories scattered thruout [sic] the same district.

"As the planting time was approaching in Manchuria,

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we left Tokyo the latter part of March and arrived in Dairen, Manchuria, the first of April. We expect to have headquarters at Dairen until late fall or early winter, working out in the various soybean sections of North and South Manchuria. This country is the real land of the soybean and Dairen, the real city of the soybean. In 1929, 29.2 percent of the total cultivated area of Manchuria was devoted to the growing of soybeans, producing more than 178,000,000 bushels of seed, thus leading all other crops in acreage and production. The Port of Dairen handles about eighty (80) percent of the exports of beans, bean cake, and bean oil.

Note: This is the earliest document seen (Aug. 2011) that uses the term "land of the soybean" in connection with or to refer to Manchuria.

"The planting season for soybeans in Manchuria begins about the first of May and extends to about the 25th of May in some northern sections. We, therefore, had an opportunity before the planting season, to study the methods of grading, storage and transportation of [soy] beans, bean cake and bean oil in the oil mills. The storage yards and warehouse yards of the South Manchurian Railway cover several hundred acres and the immense quantities of bags of beans and bean cakes stored in the open storage yards and in the warehouses are well worth seeing. In connection with the storage yards are the Dairen wharves where one may see daily the loading of freighters from European countries, America, Japan, and China with beans, bean cakes, and bean oil.

"We had rather expected to find a large number of products made from beans, bean cake, and bean oil but our findings thus far have been very meager. The oil is used in the manufacture of soaps, paints, lard substitutes, and salad oils, but only a very few factories are engaged in producing these products. The beans are used chiefly for oil and oil cake, but during the last three or four years, the demand of European mills for beans has had a serious effect, not only on the Dairen soybean oil mills, but also on the oil mills throughout North and South Manchuria. In Dairen, at the present time, only about forty-five soybean mills are active during the crushing season, whereas four years ago there were about ninety. The oil cakes are for the most part shipped to the Japanese Islands for feed and fertilizer (chiefly fertilizer), to China and the East Indies for fertilizer, and to America and Europe for cattle and poultry feed."

"Our experience in the field up to the present time has been the study of methods of planting and cultivation practiced in different sections of North and South Manchuria."

"We have collected quite a large number of seed samples during our travels thus far in Manchuria and have obtained some very interesting types. It may interest the members to know that we have visited Yingkou (Newchwang), the source of the Virginia and Wilson varieties. We obtained several other black and brown-seeded samples similar to the Virginia and Wilson, and are hoping that some of them may prove equally valuable. It was learned that the black and brown-seeded sorts are grown in some northern sections along the Liao River. In the study of varieties in different sections of North and South Manchuria, it has been very interesting to note the number of varieties, their utilization and adaptability to various soil and climatic conditions. At the Kungchuling Experiment Station, more than one thousand varieties and selections have been tested but at the present time only five hundred are under test. The Manchurian varieties do not succeed in the Japanese Islands or Korea and neither do the Japanese varieties succeed in Manchuria or Korea. The Korean varieties also give rather poor results in most parts of Manchuria.

"With this letter we are sending some lantern slides illustrating various scenes of the soybean industry in oriental countries. At some future meeting we hope to have our movie films so arranged that you may have an opportunity of seeing in motion the many, many ramifications of the soybean industry as we have seen them.

"We hope to be with you at your next annual meeting, that we may try to catch up with the rapid progress the soybean has made in the United States during the past two years.

"With best wishes for a most interesting and successful 1930 meeting, we remain

"Very truly yours,..."

Note 2. This is the earliest English-language document seen (Feb. 2004) that uses the term "vegetable soybeans" (not preceded by the word "green") to refer to green vegetable soybeans.

Note 3. This letter was reprinted in *Soybean Digest* (April 1945, p. 11-12). Address: USDA, Washington, DC.

334. Morse, W.J. 1930. Re: Just received your letter of Oct. 2 (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Oct. 5. Unpublished log.
• ***Summary:*** Pages 6121, 6122, 6123. This letter dated Oct. 5 is from W.J. Morse in Dairen, Manchuria, to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China.

"Dear Dorsett: Your letter of Oct. 2 just handed me this morn and very glad to hear from you. The last letter was received at Heijo but I presume there may be some at the Consulate as I have had no mail for the past 10 days.

"Just arrived here last night from Kungchuling [Gongzhuling, Jilin]. In a previous letter you stated you were as busy as an old man with chickens. During the past 5 or 6 weeks I have felt many times like a mother duck with a big brood of chickens. I have been in sort of a daze for things have been moving so swiftly. Before I forget it, if you can catch 'old father time,' I wish you would grab him by the

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forelock and halt his progress for a time. I have never seen time pass so quickly. It seems but a few days ago that we left for Heijo.

"I do not believe it worth while to write you details from the Korean trip as you can get these from the quarterly report. The report and prints up to Sept. 16 were sent were sent you from Heijo. From that date to Oct. 1, I hope to get to you as soon as I have the films developed. I may say, however, that from every angle, I consider the trip to Korea a most successful one but must hold my breath and hope for the best regarding the movie films. I took about 40 feet of movie films which will give us the complete movie story of the Korean soybean. If the film is good, the whole story will be a mighty interesting one and so much different from those of Japan, Manchuria and China.

"On our trip we collected over 200 numbers with but very few soybeans. It was too early for the soys and these will be sent later to us in Dairen... You will recall last fall of the great disappointment in not receiving samples of the excellent collection of Korean varieties of soybeans on exhibit at the Keijo Fair. While on a trip to Shariin we found that the station had received samples of the whole collection and had them in a variety test plot. Or course, there were many duplicates, but as a whole, it was a most promising series of varieties and made me more anxious than ever to receive it. The station people promised to give us selections they have under test. You can be assured that I am going to keep after this collection until I get it.

"With all the data and pictures collected on the soybean in Korea, I think I could write a nice little book rather than a bulletin. The visit in the growing season was so valuable to my soybean work. The picture of culture, etc., given last fall by the station and other people and the actual picture were so much different in spite of the unusual weather conditions.

"While at Heijo I received word from Kaiyuan and Kungchuling, Manchuria, that soybean harvest are in progress. As soon as we finished our Korean harvest scenes (which were a little late on account of the unusual weather conditions), we went to Kaiyuan and ran into a rainy spell which was very unusual at this time. However, we made some harvesting scenes. We then went to Kungchuling and met another rainy spell, which also was very unusual for the season. It cleared up and we got some excellent harvest and storage scenes, that is if they develop up o.k. Dorsett, I swear if you hand us any unusual weather when we are in Peiping, I will throw you in a river."

"With regard to the visit to Peiping, I am hoping to get away within the next ten days or two weeks. There is some seed collecting I want to do around here. Then I want to get up the films and get some material off. The oil and threshing season begin here in November and then I want to devote the time from then on to a most thorough study of the soybean oil, storage, and shipping. I think I can have other work such as legumes all finished up so I can just live with my life work for a few weeks or so (just a few weeks of soybean heaven).

"I was much interested in the clipping regarding soybeans in Russia. While at Kungchuling I received a wire from Dr. Oga of Mukden advising that Dr. Lene Muller [Müller, Mueller] a soybean expert (perhaps expertess, for the Dr. is a lady), desired to get in touch with me. The experiment station wired that I was returning to Dairen the next morning. Later I received a wire stating that the Dr. would meet me at Kaiyuan and ride as far as Mukden so that we could have a soybean conference of two or three hours. I had a very interesting visit with Dr. Muller and learned we had had correspondence before I left America. She had just come from Russia where she had been studying the soybean, so I received a nice lot of information on the crop in Russia. In addition, she gave me much information on the soybean industry in Germany.

"At Mukden station, Dr. Oga, biology teacher at the Mukden High School, got on the train to see me and I was much pleased to learn that we had met in 1927 at Washington. He called at my office with regard to soybean work in the U.S."

"Well, old fellow, trust this finds you and your party well and we hope to see you all soon... After our return, I want wholly soybean work.

"With best wishes from all to all, I am

"Very sincerely,..." Address: Agricultural Explorer, USDA, Washington, DC.

335. Dorsett, P.H.; Morse, W.J. 1930. In Chinchou, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 6069-6070 (7 Oct. 1930). Chinchou, Manchuria. "W.J. Morse's notes: In a small valley section we found a large patch of wild soybeans (*Soja ussuriensis*) with mature seed. The leaves and seed are much smaller than the seed collected of the wild soybean in Chosen [Korea]."

"After lunch at Chinchou we went to a farming section southeast of Chinchou and at a small Chinese farm village we saw farmers cleaning soybeans by the wind method."

"At one of the yards we found them threshing a light green soybean, one of the nicest looking green varieties we have yet seen in Manchuria, It was said that this variety is used solely for food. Just outside the village we found some farmers cutting a filed of the Moshito soybean that had been planted with corn... During the say we collected seed of the following;" 11 species or varieties are listed including "1. Soja max–4 varieties." "6. Soja ussuriensis."

Page 6073. Neg. #45982. "Soja max. Soybean. Makaton, Manchuria. Small piles of mung beans and soybeans curing in the field. The plants were pulled instead of being cut. In

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general, soybean and mung bean plants are cut with knife when fully mature." Neg. #45983. "Soja max. Soybean. Chinchou, Manchuria. General view of threshing ground showing soybean plants ready for threshing."

Page 6074. Neg. #45984. "Soja max. Soybean. Makaton, Chinchou. Mature soybean plants placed or spread out on threshing ground. After drying in the sun for a few hours the plants are threshed with stone rollers or flails."

Page 6075. Neg. #45985. Panorama with handwritten caption showing general view of threshing ground.

Page 6076. Neg. #45986. "Soja max. Soybean. Chinchou, Manchuria. Cleaning soybean seed on a threshing ground in a farming village near Chinchou." Neg. #45987. "Soja max. Soybean. Chinchou, Manchuria. View showing Chinese farmers sacking soybean seed on threshing ground in a small farm village near Chinchou."

Page 6078. Neg. #45988. "Soja max. Soybean. Makaton, Manchuria. General view of field showing small piles of roots and stubble of soybeans and corn which are used for fuel in the winter. The Chinese farmer makes use of the entire plant.

Page 6084. Neg. #45995. "Soja max. Soybean. Near the village of Lo Ton Wen, between Peiping and Feng Tai, Chihli, China. View of Peter Liu holding several grass reeds cut from the patch nearby, showing wild soybeans climbing to the top of the reeds, 10 feet or more in height. Seed secured and numbered 7334."

Page 6085. Neg. #45996. "Soja max. Soybean, wild. Near the village of Lo Ton Wen, between Peiping and Feng Tai, China. R.B. [Ruth] Dorsett holding a bunch of grass reeds cut from the area nearby, showing [wild] soybeans which have climbed to the top of the reeds. See picture #45997."

Page 6086. Neg. #45997. "Soja max. Soybean, wild. Near the village of Lo Ton Wen, between Peiping and Feng Tai, Chihli, China. This bundle of reeds, which P.H. Dorsett is holding is the same as shown in picture #45996.

Page 6108 (8 Oct. 1930). List of soybean varieties being sent to USDA, Washington, DC. "#'s 7190, 7191, 7192, 7193, 7204, 7205, 7245, 7267, 7271, 7273, 7375, 7281, 7282, 7308, 7309. These 16 numbers of soybeans are all of interest. They are for the soybean collection of Foreign Crop Investigations."

Page 6112-6113 (9 Oct. 1930). Dairen, Manchuria. "W.J. Morse's notes: A visit was made to the main market to see the various products now in season." The following numbered list was made of the different things seen. It includes:

12. Green vegetable soybeans in pod.
13. Shelled green soybeans.
14. Soybean sprouts.

"We visited some Chinese and Japanese food stores to see if we could find any new soybean or mung bean products. At one store we found a new kudzu product–Kudzu vermicelli made up of fine sticks or straws and in small bundles. This product is used in soups and vegetable dishes."

Page 6114. This is a letter dated 9 Oct. 1930 from P.H. Dorsett in Peiping, China, to Mr. H.N. Vinall, Senior Agronomist, Forage Crops and Diseases, Bureau of Plant Industry, U.S. Department of Agriculture, Washington, DC.

"Dear Mr. Vinall. I very much appreciate your letter of August 5th which reached me here in Peiping on September 3, 1930.

"I am pleased to report that I feel that I am fully back to normal after my illness in the spring in Dairen, Manchuria. Since my daughter [Ruth] and I arrived in Peiping, July 22nd, we have been doing considerable field work and feel that the results really are quite satisfactory.

"Morse, as you no doubt know, remained with headquarters in Dairen and has been continuing his soybean investigations both in Manchuria and Northern Chosen. A recent letter from him indicates that his work in Chosen has resulted very satisfactorily. He also stated that he would likely get over to Peiping early in October to see what is being done with the soybean in Peiping and vicinity."

"After the Morses arrive here, he and I will likely make definite plans for our return home. I would like to remain another year, in fact outlined enough important work to keep me here another year, but was advised that all at the Office felt that I should return home with Morse this winter.

"I am resigned to their action in this connection."

Page 6151 (11 Oct. 1930) Chinchou-Nanzankai, Manchuria. "W.J. Morse's notes: "Another visit was made to the farming regions about Chinchou and Nanzankai to make observations on threshing and cleaning crops."

"In this section we have found only three varieties of soybeans, namely, black Moshito, brown Moshito and a light green variety (yellow germ) which is used for food. The Moshito varieties are used for forage and green manure purposes."

Page 6152. Neg. #46027. "Soja max. Soybean. Nanzankai Village, Manchuria. "Soybean plants spread out on threshing ground for first rolling of flailing."

Neg. #46028. "Soja max. Soybean. Nanzankai Village, Manchuria. Various tools used by Manchurian farmers in cleaning of soybean seed as well as other grains."

Page 6155. Neg. #46031. "Soja max. Soybean. Nanzankai Village, Manchuria. Close-up of measuring soybean seed after cleaning. In threshing ground of Manchurian farmer."

Neg. #46032. "Soja max. Soybean. Nanzankai Village, Manchuria. Measuring soybean seed after cleaning on threshing ground of Manchurian farmer."

Page 6156. Neg. #46033. "Soja max. Soybean. Nanzankai Village, Manchuria. Measuring soybean seed and sacking after cleaning on threshing ground of Manchurian farmer."

Neg. #46032. "Soja max. Soybean. Nanzankai Village,

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Manchuria. Carry away soybean pods after cleaning, The pods are used as cattle feed. The baskets which are being filled are made of kaoliang stalks."

Page 6157. Neg. #46035. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese women and children gathering leaves, stalks, roots and stubble from a harvested soybean field. The material is used for winter fuel."

Neg. #46036. "Soja max. Soybean. Nanzankai Village, Manchuria. Manchurian native hogs pasturing on a field of harvested soybeans after plants have been removed."

Page 6158 Neg. #46037. Panoramic view of a Manchurian village. Address: Agricultural Explorers, USDA, Washington, DC.

336. Hepburn, Joseph S.; Sohn, Keum Sung. 1930. Do fu: An Oriental food. *American J. of Pharmacy* 102(10):570. Oct.
• ***Summary:*** "The Oriental food, known as *do fu* in Chinese and *doo pu* in Korean, is a soy bean preparation." The beans are soaked in cold water, then ground with the water. "The resulting mass is filtered through a coarse linen bag. The white, milky filtrate is heated in a vessel, with occasional stirring, until it begins to foam. Then a saturated solution of sodium chloride is added until coagulation is complete..."

A sample of *do fu,* purchased in the 'Chinatown' of Philadelphia [Pennsylvania], was found to have the following percentage composition: Total solids: 13.37%. Moisture: 86.63%. Ether extract: 4.65%. Crude fiber: None. Crude protein: 4.22%. Ash: 0.59%. Nitrogen-free extractives: 3.91%.

Note: This is the earliest English-language document seen (Aug. 2013) that uses the term "milky filtrate" to refer to soymilk. Address: John Clifford English Laboratories of Physics and Chemistry; Hahnemann Medical College and Hospital of Philadelphia.

337. Dorsett, P.H.; Morse, W.J. 1930. In Dairen, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 6514. Neg. #46246. "Soja max. Soybean. Dairen, Manchuria. Close view of coolies loading soybean oil cakes on flat cars in S.M.Ry. yards."

Page 6450 (14 Nov. 1930). Dairen, Manchuria. "W.J. Morse's notes: In the morning we went to the S.M.Ry. Wharves and storage yards. Along the wharves we found the warehouses well filled with beans and a German freighter and a Japanese freighter being loaded with a large tonnage of beans. Most of the beans were of the new crop from the Harbin and Changchun districts.

"We also went around the bean cake warehouses and found them being well filled up. At the present time 16 oil mills are operating turning out about 60,000 bean cakes per day. As yet there are no bean cakes in outside storage as there has been more or less meal exported to America this [year?]. In view of the high tariff on cake or meal into the U.S. this is rather unexpected.

"Several warehouses storing beans were visited and twenty-one samples were collected, representing many places in Central Manchuria.

Pages 6456-6457. This is a letter dated 16 Nov. 1930 from W.J. Morse, c/o American Consulate, Dairen, Manchuria, to Mr. Knowles A. Ryerson, Foreign Plant Introduction, S.P.I., U.S. Dept. of Agriculture, Washington, DC.

"Dear Mr. Ryerson; We are sending you today by commercial parcel post parcel packages numbers 229 and 230 which contain the following items:" Each package contains soybean products. No. 229 contains soybean seed and one sample of *Soja ussuriensis* (wild soybean).

"Parcel No. 230 contains mostly soybean seed samples collected from the Dairen Wharves seed storage warehouses. The samples represent seed from the various parts of Manchuria that are used for oil and oil cake. The soybean product is a Chinese soybean drink that is only made and used during the winter months. It consists of roasted soybean flour, walnuts, sesame seed, squash seed, kudzu flour, and pine nuts."

Pages 6458, 6459, 6460 (17 Nov. 1930). Dairen, Manchuria. "W.J. Morse's notes: We visited Prof. Matsushima of the S.M.Ry. Office and had a rather long talk on the present soybean situation in Manchuria. The price of soybeans is much lower than a year ago and the movement in beans is very slow due to the light demand from European countries. This is the first time that the bean situation has been so dull at this time of year."

"The demand for oil cake and oil meal from the United States is larger than one year ago at this time in spite of the high tariff on cake into the U.S. Bean cake from Harbin oil mills is said to be of poor quality, containing more or less dirt. In exporting from the Harbin district, bean cake or beans are not inspected, that is if the products are shipped to Vladivostok. If the beans are for export through Dairen, they must pass inspection before being placed in mixed storage.

"We were given a parcel of seed sent from the S.M.Ry. Exp. Sta. at Hsiungyaocheng." This parcel contained samples of 34 species, which are listed.

"After lunch we went to the motion picture laboratory of the S.M.Ry. to see about winding of negative film on spools. We were invited by Mr. Akutagawa in charge of the laboratory to inspect scenes of soybean storage and shipping which he made last February at Anda, Hankou, Harbin and Changchun, North Manchuria. In all he took 1735 feet of such scenes, and we had the pleasure of viewing them."

Pages 6510-6511 (22 Nov. 1930). Dairen, Manchuria. "W.J. Morse's notes: We went to the Nisshin Oil Mill in

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the morning and met Mr. M. Ogawa, who is acting for the general manager, Mr. Furasawa [Furusawa?]. At the present time the mill is not working at full capacity owing to the light demand for oil and oil meal or cake. More cake or meal is being shipped to the United States than at this time one year ago."

"The mill is now putting out only the English type of cake (oblong), and Mr. Ogawa promised to send three of these to our office for our soybean exhibit."

Page 6512. Neg. #46243. "Soja max. Soybean. Dairen, Manchuria. General view of loading soybean oil cakes on flat cars from oil cake storage warehouse in the S.M.Ry. yards."

Page 6513. Neg. #46244. "Soja max. Soybean. Dairen, Manchuria. General view of loading soybean oil cakes on flat cars in South Manchurian Railway yards."

Neg. #46245. "Soja max. Soybean. Dairen, Manchuria. General view of loading flat cars with soybean oil cakes at oil cake storage warehouse in S.M.Ry. yards."

Neg. #46247. "Soja max. Soybean. Dairen, Manchuria. View showing coolies loading soybean oil cakes on flat cars in South Manchurian Railway yards."

Page 6515. Neg. #46248. "Soja max. Soybean. Dairen, Manchuria. View showing coolies carrying soybean oil cakes from oil cake storage warehouse and loading on flat cars in S.M.Ry. yards."

Neg. #46249. "Soja max. Soybean. Dairen, Manchuria. Close-up view of coolies loading flat car in S.M.Ry. yards."

Page 6516. Neg. #46250. "Soja max. Soybean. Dairen, Manchuria. Close-up view showing loading of soybean oil cakes on flat car along side of oil cake storage warehouse in South Manchurian Railway yards."

Neg. #46251. "Soja max. Soybean. Dairen, Manchuria. Coolie carrying four oil cakes (soybean) from oil cake warehouse to flat car in S.M.Ry. yards. Flat cars are used only in transporting cakes and beans from storage houses to wharf warehouses in Ry. yards."

Page 6517. Neg. #46252. "Soja max. Soybean. Dairen, Manchuria. Oil cakes in storage warehouse (oil cake) S.M.Ry. yards."

Neg. #46253. "Soja max. Soybean. Dairen, Manchuria. View of wagon loaded with oil paper lined baskets for soybean oil. Oil is shipped in these containers to China."

Pages 6529 (24 Nov. 1930). Dairen, Manchuria. "W.J. Morse's notes: "We visited the Dairen wharves and the S.M.Ry. storage yards but found very little activity in the soybean line about the wharves. At one wharf we saw soybean oil in large oil paper lined baskets being loaded on a Chinese boat..."

"Received a package of eighteen samples of soybeans from Mr. Noboru Tajima, Agr. Engineer of the Kosai Co. Agr. Soc. [Agricultural Society] Kosai, Chosen [Korea]. There are native varieties collected by Mr. Tajima from Korean farmers in Kosai Co. The collection is a very interesting one ranging from very small seed (nearly as small as the mung bean) to very large seed, and containing only four yellow seeded sorts. The remainder were black, brown, green and bicolored (black and brown)."

Neg. #46254. "Soja max. Soybean. Dairen, Manchuria. View of coolies carting oil paper lined basket containers of soybean oil at wharf in S.M.Ry. Storage Yards, Dairen."

Page 6530. Neg. #46255. "Soja max. Soybean. Dairen, Manchuria. Close-up view of oil paper lined basket container used for shipping soybean oil."

Neg. #46256. "Soja max. Soybean. Dairen, Manchuria. Coolies placing rope around oil-paper lined basket containers of soybean oil at wharf in S.M.Ry. Storage Yards."

Page 6531. Neg. #46257. "Soja max. Soybean. Dairen, Manchuria. Close-up view of cart with oil-paper lined basket containers of soybean oil."

Neg. #46258. "Soja max. Soybean. Dairen, Manchuria. Oil-paper lined basket containers of soybean oil on wharf awaiting shipment to Chinese ports."

Page 6532. Neg. #46259. "Soja max. Soybean. Dairen, Manchuria. General view on wharf showing carts of oil-paper lined basket containers of soybean oil."

Neg. #46260. "Soja max. Soybean. Dairen, Manchuria. General view of large oil-paper lined basket containers of soybean oil on wharf awaiting shipment to Chinese ports."

Page 6533. Neg. #46261. "Soja max. Soybean. Dairen, Manchuria. Close-up view of load of soybean oil cake to be unloaded in oil cake storage house in South Manchurian Railway Yards."

Neg. #46262. "Soja max. Soybean. Dairen, Manchuria. Close-up view of wagon of soybean oil cakes awaiting unloading at oil-cake storage house in S.M.Ry. Yards."

Page 6534. Neg. #46263. "Soja max. Soybean. Dairen, Manchuria. View of coolies unloading wagons of oil-cakes at oil-cake warehouses in South Manchurian Railway Yards."

Neg. #46264. "Soja max. Soybean. Dairen, Manchuria. Coolies unloading oil cakes at warehouse in South Manchurian Railway Yards."

Pages 6535, 6536, 6537. Negs. #46265, #46266, #46267. Panoramic views similar to photos on previous pages. Handwritten captions are illegible.

Pages 6540-6541. This is a letter dated 25 Nov. 1930 from P.H. Dorsett, Agricultural Explorer, Dorsett & Morse Agricultural Expedition, Peiping, China, to Mr. B.W. Skvortzow, 76 Potshtevoya St., Harbin, Manchuria. "I was extremely anxious that you and he [Mr. Morse] should meet, for I am sure that you would have found much of common interest in talking over the soybean problem of both the Orient and the United States."

Pages 6538-6539 (25 Nov. 1930). Dairen, Manchuria. "W.J. Morse's notes: In the After lunch we visited Mr. Sato of the S.M.Ry. Agr. Bur. [Agricultural Bureau] who had just returned from a month's visit in Japan relative to the use of soybean cake and soybeans. He gave us some very interesting general information concerning the utilization

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of cake and beans that he had collected during his trip. Several chemists, animal husbandry men and agronomists are working on the food value and feed value of the oil cake and beans. Later he advised he would give us more specific data on the bean and bean cake utilization problem in Japan." Address: Agricultural Explorers, USDA, Washington, DC.

338. Dorsett, P.H.; Morse, W.J. 1930. In Harbin, Manchuria (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 6617 (2 Dec. 1930). Harbin, Manchuria. W.J. Morse's notes. "About 8:00 A.M. Mr. Takiya of the S.M.Ry. office called to take us on a visit to Chinese merchants' storage yards and farmers' inns."

"After visiting the inns we went to the Sungari River which was frozen over and was open to ice traffic for the first time yesterday. Large strings of farm carts loaded with sacks of soybeans were coming across the ice road to Harbin, Still, motion and panorama pictures were taken of this traffic."

Page 6618. "Prof. B.W. Skvortzvow called and we met him at the hotel. He has not done any work on soybeans for the past two years. His only interest at the present time is in the botanical study of wild species of soybeans. He has collected two specimens in addition to *Soja ussuriensis*, namely *G. tomentosa* and *G. gracilis.* As he has no time or facilities for making a systematic study of these species he wishes the U.S. Department of Agriculture to take up the study in connection with the study of cultivated varieties from various parts of the world."

Negative #46310. "*Soja max.* Soybean. Harbin, Manchuria. Manchurian farmers carting sacks of soybeans across the ice of the Sungari River to the Harbin market."

Page 6619. Neg. #46311. "*Soja max.* Soybean. Harbin, Manchuria Manchurian farmers carting soybeans across the Sungari River to the Harbin market."

Neg. #46312. "*Soja max.* Soybean. Harbin, Manchuria. Manchurian farmer carting soybeans across the Sungari River to the Harbin market."

Page 6620. Neg. #46313. "*Soja max.* Soybean. Harbin, Manchuria. General view of a section of the yard of a farmers' inn. The farmer is furnished lodging, meals and the care of his horses for 80 cents Mex. per day.

Neg. #46314. "*Soja max.* Soybean. Harbin, Manchuria. View in the yard of a farmers' inn where the farmers bring their seed and it is sold through the inn master to the grain merchants."

Page 6621. Neg. #46315. "*Soja max.* Soybean. Harbin, Manchuria. Manchurian farmer with cart of bags of soybeans in yard of farmers' inn."

Neg. #46316. "*Soja max.* Soybean. Harbin, Manchuria. Manchurian cart loaded with soybeans in the yard of a farmers' inn.

Page 6622. Neg. #46317. "*Soja max.* Soybean. Harbin, Manchuria. Showing piles of sacks of soybeans in open storage in the storage yard of a Chinese grain merchant."

Neg. #46316. "*Soja max.* Soybean. Harbin, Manchuria. Close-up view of bags of soybeans in open storage in storage yard of a Chinese grain merchant."

Pages 6623-6624. Negs. 46319-46322. Similar to page 6622.

Pages 6625-6626. Negs. 46323-46326. Similar to page 6622.

Pages 6627, 6628, 6629, 6630, 6631, 6632, 6633. Panorama views similar to page 6620-6622.

Page 6649. Neg. #46339. "*Soja max.* Soybean. Harbin, Manchuria. Train load of sacks of soybeans on railroad siding (C.E.R. [Chinese Eastern Railway]).

Neg. #46340. "*Soja max.* Soybean. Harbin, Manchuria. Train load of sacks of soybeans on siding of C.E.Ry. Each car holds 320 sacks of [soy] beans."

Page 6650. Neg. #46341. "*Soja max.* Soybean. Harbin, Manchuria. Train load of sacks of soybeans on siding of C.E.Ry. Each car holds 320 sacks."

Neg. #46342. "*Soja max.* Soybean. Harbin, Manchuria. Train load of sacks of soybeans on railroad siding (C.E.R). Each car holds 320 sacks."

Pages 6651, 6652, 6653, 6654, 6655, 6656. Panorama views similar to page 6649-6650.

Page 6675-6676 (4 Dec. 1930). Kaiyuan, Manchuria. W.J. Morse's notes. "Mr. Kofuka, director of the S.M.Ry. soybean farm, called us by phone shortly after 8:00 a.m. At his office we found that he had collected fourteen native varieties of soybeans in the Kaiyuan district for us.

"We first went with Mr. Kofuka to one of the large storage yards of a Chinese merchant where we found great soybean activity... After being measured the beans were dumped into the Osier bins. Each bin is 18 feet in height and in diameter and holds four carloads of beans. In this yard there are more than seventy-five bins filled with beans and several more in the process of filling. This storage yard receives about one hundred farmers' carts of beans per day during the fall and winter bean season.

"After visiting a few more smaller storage yards we went to the open market place where many of the farmers bring their carts of grain and sell to the storage merchants. About 1,000 farm carts with grain arrive in Kaiyuan daily. There seemed to be considerable rivalry among the merchants for the farmers' grain and often it looked as though a free-for-all fight were taking place."

At 5:55 p.m. we left for Mukden arriving there at 8:20 p.m. We soon got in touch with Dr. Ogha, teacher of botany in the Mukden High School... Three years ago Dr. Ogha called at the office at Washington, DC, with reference to the U.S. soybean industry. We had a rather long conference

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regarding soybeans in Manchuria and especially concerning the wild forms of the species in Manchuria, Siberia, Mongolia and Chosen.

Page 6677. Neg. #46354. "*Soja max.* Soybean. Kaiyuan, Manchuria. Line of Manchurian carts loaded with soybeans on way to Kaiyuan open grain market."

Neg. #46355. "*Soja max.* Soybean. Kaiyuan, Manchuria. Carts of soybeans in the open market place."

Page 6678. Neg. #46356. "*Soja max.* Soybean. Kaiyuan, Manchuria. The starting of an Osier bin which is to be filled with soybean seed. In the storage yard of a Chinese grain merchant."

Neg. #46357. "*Soja max.* Soybean. Kaiyuan, Manchuria. Filling an Osier bin with soybeans in the storage yards of a Chinese grain merchant."

Page 6679. Neg. #46358. "*Soja max.* Soybean. Kaiyuan, Manchuria. Close view showing the filling of an Osier bin with soybean seed in storage yard of a Chinese grain merchant."

Neg. #46359. "*Soja max.* Soybean. Kaiyuan, Manchuria. Fixing the grass cover on an Osier bin filled with soybeans in storage yard of Chinese grain merchant."

Page 6680. Neg. #46360. "*Soja max.* Soybean. Kaiyuan, Manchuria. General view of Osier bins filled with soybeans in the storage yard of a Chinese grain merchant. Each bin holds four carloads of seed. On this date there were 80 bins filled with beans in this yard."

Neg. #46361 "*Soja max.* Soybean. Kaiyuan, Manchuria. View on principal street on Kaiyuan showing farmers with carts of soybean seed on the way to the market place."

Page 6681. Neg. #46362. "*Soja max.* Soybean. Kaiyuan, Manchuria. View of farmers' inn and inn yard on outskirts of Kaiyuan. The farmers bring their carts of beans to the inn where the master of the inn arranges with storage merchants for the purchase of the seed."

Neg. #46363 "*Soja max.* Soybean. Kaiyuan, Manchuria. View of an osier bin about one-half filled with soybean seed in a storage yard."

Page 6682. Neg. #46364. "*Soja max.* Soybean. Kaiyuan, Manchuria. Unloading carts of beans at the warehouse in railway yards. The beans have been brought from Chinese merchants' storage yards."

Pages 6683, 6684, 6685, 6686, 6687, 6688. Panoramic views of the same basic scenes in the photos described above. The handwritten captions are illegible.

Pages 6727, 6728, 6729, 6730, 6735, 6736, 6737, 6738, 6739, 6740, 6741, 6742, 6743 are W.J. Morse's photos of soybeans in Dairen, Manchuria.

Pages 6744-6745 are panoramic views of the same. Address: Agricultural Explorers, USDA, Washington, DC.

339. Dorsett, P.H.; Morse, W.J. 1930. Miso in Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.

• ***Summary:*** Page 6820-6821 (21 Dec. 1930, Kobe, Japan. Mr. Morse's notes). "Mr. Saito at Dairen had advised us that there were many places in Kobe where meat was preserved in soybean miso." Had no difficulty in finding three such places, where "we found the men busy in packing meat in white miso. In the Kobe and Kyoto districts white miso is manufactured quite extensively. Small meat shops are the only establishments putting up the miso-preserved meat. For this product beef is used and white miso. Small slices of beef about the size of the palm of the hand and about ¼ inch thick are placed on a layer of miso (about ¼ inch thick), then a layer of miso and another layer of meat. About 1½ pounds of beef are packed with miso in each tub which sells for two yen. The meat is best after being preserved in miso about 7-10 days and does not keep well after two weeks except in rather cold weather. Miso preserved meat is always boiled. White miso is always used for preserving fish and meat (beef) while red miso is used for preserving vegetables, the red miso being considered too salty for meat. Several meat shops were visited and we always found the same products and same methods of preserving the beef. Apparently this product is very popular in the Kobe district. At one of the shops we were advised that there are some miso-meat preserving places in the Tokyo district." Photo: Small tubs of miso preserved meat displayed in front of a meat shop in Kobe.

Pages 6822-6823 (22 Dec. 1930, Kyoto, Mr. Morse's notes). At the Imperial Agricultural College they met Isawo Namikawa, Professor of Horticulture, who said that Kyoto is noted for several special soy products such as white miso, soy sauce, and natto. Kyoto soy sauce is lighter in color, not so heavy, and not quite as salty as soy sauce made in other parts of Japan. "In looking around Kyoto in our little spare time we saw no places where meat is preserved in miso."

Page 6826 (24 Dec. 1930). Tokyo, Japan. "W.J. Morse's notes:

"In the course of our wanderings we found a small meat shop where beef was cured in white miso. This idea was brought from Kobe and the same method followed. The owner of the shop said there were a few such places about Tokyo."

Page 6847-6848 (27 Dec. 1930). Tokyo, Japan. "W.J. Morse's notes: Two places were visited where beef is preserved in white miso. This method we were told was brought from Kobe and there are only a very few places in Tokyo. The places visited today were rather a combination meat shop and restaurant.

"The beef is cut in this slices and only white miso is used as is done in the Kobe district. Neither of the shops had ever tried red miso as they consider it too salty, nor

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had they tried preserving pork in either red or white miso. It was thought that pork could be preserved as well as beef in white miso. The miso-preserved meat is only broiled. The white miso is used only in preserving different kinds of fish and beef while red miso is used only for preserving vegetables. Meat and fish will not keep more than one month in white miso and vegetables preserved in red miso will keep indefinitely.

The meat is preserved in small wooden tubs with alternate layers of miso and slices of beef. Each tub holds about two pounds of meat. The meat becomes well seasoned through in about one week and is at its best in 7-10 days. In warm weather the meat will hardly keep two weeks.

"In visiting the food department of one of the large department stores we found a special sale was on with miso preserved meat in two-pound tubs and one-pound boxes. The meat was packed in the miso by the meat department of the store. We also found various kinds of fish preserved in white miso. In some cases, as salmon and tuna, slices of fish were used while with small fish as the *tai* (porgy [red seabream]) the entire fish was preserved."

Pages 6931-32 (7 Jan. 1931). Morse went to the Imperial Department of Agriculture in Tokyo and met the director, Mr. A. Manabe, who provided information, statistics, and recent publications on soybean acreage, production, utilization, and industries in Japan, Chosen [Korea], and Taiwan. These are the most complete yet received. Mr. Manabe stated that soybean acreage and production is gradually decreasing in Japan proper. This is due mainly to the increased acreage of more intensive farming, especially truck crops and rice. However the acreage of soybeans for green manuring purposes is increasing rapidly, especially in the southern half of the main Island and Kyushu Island.

Japan proper produces more than 2,500,000 koku of soybeans but uses over 7,500,000 koku; the difference is imported from Chosen and Manchuria. The soybeans imported from Manchuria are "are of much lower quality than beans from Japan proper and Chosen and are used primarily for the manufacture of soy sauce, miso, bean oil and bean cake. The beans from Japan proper and Chosen are utilized primarily for food, such as bean curd (Tofu), confections, flour and green vegetable beans. The following table gives the ratio in percent of soybean utilization in Japan:

Miso 22.7%. Soy sauce 22.7%. Bean oil and bean cake 21.6%. Bean curd [tofu] 15.4%. Green vegetable beans 0.8%. All other food uses 6.0%. Feeding purposes 6.2%. Green manure 2.5%. For planting [seed] 1.6%. Miscellaneous uses (other than food) 0.5%. Note: These figures total 100%. Thus, 22.7% of the soybeans used in Japan are used to make miso, 22.7% are used to make soy sauce, 21.6% are crushed to make soybean oil and cake, etc.

Page 6937 (10 Jan. 1931, Tokyo, Notes by Mr. Morse). Spent most of the day in the Shinjuku district looking up soybean products. "More String Natto in rice straw packages was observed in this section than any we have visited. At the stores we found considerable quantities of fish preserved in white miso and also fish preserved in sake mash. The latter is said to keep much longer than the miso preserved fish and if it keeps long enough might afford a good article of export to the United States, for undoubtedly it would prove far less harmful than some of the products [alcohol] now used in violation of the 18th amendment... Nearly all food stores carried a variety of vegetables preserved in red miso."

Page 6942-6943 (12 Jan. 1931). Kobe, Japan. "Notes by Mr. W.J. Morse: Left on the 8:25 express last night from Tokyo and arrived in Kyoto at 7:25 this morning. We had planned to visit the Imperial Agricultural College [in Tokyo] this morning but learned by phone that Prof. Kamikawa [?] was not in so we left for Kobe to visit the Department of Agriculture of that prefecturate.

"We met the director of the Bureau of Agricultural Products, to whom we had a letter of introduction from Mr. Sato of the South Manchurian Railway, at Dairen, Manchuria. We were told that in the Kobe perfecturate [sic, prefecturate] 11,719,550 kans [kan] of Manchurian oil cakes are imported yearly and of this amount 5,084,204 kans are used for feeding to cattle, hogs and poultry. One hundred and fifty beef cattle are killed yearly in the Kobe district and about one hundred thousand hogs are killed yearly in the same district.

"Although soybean oil cake is fed to both cattle and hogs the farmers hesitate to feed too much as it is said to produce yellow fat which is not preferred by butchers. The market demands a white fat, such as that produced by feeding rice bran and wheat bran... Excellent results have been had in using soybean oil cake for dairy cattle and poultry.

"During the past five years, several small oil mills in Kobe have been crushing Manchurian soy-beans for oil and oil meal. At the present time none [?] of the mills are crushing beans. One of the assistants of the Bureau accompanied us to a large miso meat preserving place. This establishment is a wholesale meat house and in addition packs 5,000 to 6,000 tubs of miso preserved meat yearly.

"The proprietor said that about 3,000,000 tubs are sold yearly. The small tubs, costing 70 sen each, hold about 2 pounds of beef. The meat will keep in cool weather about one month but the meat is cured at its best in about two weeks. It can be used from 7 to 10 days. The proprietor had one of his men pack a small tub so that we could see the method and take pictures. Afterwards he gave use the tub and meat that we might try it.

"The Kobe district is noted for its fine quality of beef." Three photos (p. 6946-47) show these small flat tubs.

Page 6945-46 (13 Jan. 1931). Kyoto, Japan. Visited a large miso factory, where both red and white miso are made. White miso is manufactured quite extensively in the

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Kyoto and Kobe districts; it keeps only about 1 month in the summer, but about 3 months in the winter. A table shows the most famous forms of miso made in Japan: Sendai miso–red. Kanto miso–red. Okazaki miso–black. Country miso–red. Kinzanji miso–red. White miso–white.

Pages 7003-7004 (19 Jan. 1931). Tokyo, Japan. W.J. Morse's notes. "At evening supper we had for dinner beef preserved in white miso. After broiling, the flavor of the meat reminded one of that of the sugar cured hams of the Southern States. The meat had been cured just eight days and was well flavored through."

Page 7116 (29 Jan. 1931). In a letter to Dorsett in Peking, Morse states that the broiled, miso preserved beef was "delicious" and tasted like ham. "I also had some white miso preserved fish. Although it was good, I did not care nearly so much for it as I did the beef." Address: Agricultural Explorers, USDA, Washington, DC.

340. Kobasi, S. 1930. [Studies on mannase of microorganisms]. *Chosen Igaku / Igakkai* (*Korean Medicine*) 20:1221-; 1330-. [Jap]*

341. W.J. Morse and USDA co-workers during the period 1930-1934 (Photographs). 1930.
• ***Summary:*** (1) 1930–W.J. Morse and P.H. Dorsett. (2) 1930–W.J. Morse with Japanese scientific (?) men at the Kung Chuling Experimental Station in Manchuria. Note: Kungchuling, Chilin -> Gongzhuling, Jilin. (3) 1930 Oct.–Morse in Seoul (Keijo) Korea. (4) 1930–Aug. 27–W.J. Morse in a field of soybeans near Pyong Yang [Pyongyang], Korea. Note: P'yongyang (Japanese *Heijo*) is the present (2004) capital of North Korea.

(5) 1933 Aug.–W.J. Morse and Dr. John Gray, agronomist from the Louisiana Experimental Station in Baton Rouge.

(6) 1933 Aug.–Thomas Gilmore and John Gilmore, soybean growers of Sandersville, Georgia.

These digital photos, with captions and dates, were sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

342. Dorsett, P.H.; Morse, W.J. 1931. Sending parcels. Translating soybean documents in Tokyo, Japan (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 7166 (10 Feb. 1931, Tokyo). Morse's notes: "We took parcels numbered 241, 242, 243 and 244 to the Embassy to send by diplomatic pouch on today's boat, President Taft.

"During the day worked with Mr. Suyetake on translations of soybean and data from Japanese publications from Manchuria, Korea and Japan." Address: Agricultural Explorers, USDA, Washington, DC.

343. Morse, W.J. 1931. Re: Sayonara. Outline for part of a "special report" on soybeans in the Orient (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Feb. 16. Unpublished log.
• ***Summary:*** Pages 7231 and 7232. Letter dated 16 Feb. 1931 from Mr. W.J. Morse, c/o American Consulate, Tokyo, to Mr. P.H. Dorsett, c/o Wagons-Lite Hotel [Wagons Lit Hotel, or *Grand Hotel des Wagons-Lits*], Peiping, China.

"Our last night in Japan and this is my 'Sayonara' letter in the Orient. Two years tomorrow or rather day after tomorrow we left Washington, DC, and embarked on agricultural exploration work. After two years I agree with the words I often heard you say:

"It's a great life"–if you don't weaken. Morse quotes the entire poem.

Note: This poem was created by cartoonist Gene Burns and syndicated by the *New York Evening Telegram* from 1915 to 1919; the phrase became a rallying cry for American soldiers during World War I.

"At odd times I have been raking over the accumulation of data collected in Japan, Korea, Hokkaido and Manchuria and written up tentative outlines which I want to revise somewhat going back [to the USA]. I am enclosing a copy of the one on Manchuria which you may glance over to see the kind of data I have been collecting. It is not for the report (quarterly) but merely an outline for separate reports and I thought you might be interested. I may have gotten myself in 'Dutch' [in trouble] getting so detailed information on the soybean in the soybean country of the world (and where they look on America as their soybean enemy), but I secured it here, there and everywhere."

Note 1. The "Agricultural Report on Manchuria" mentioned above was finished by Morse in 1932 and titled "Soybeans–Manchuria." It contains 181 pages (28 cm = 8½ x 11 inches), 174 numbered photos with excellent captions, and 28 tables. Typewritten, but never published, it was attached to the end of this long log. A detailed description is given. This report on Manchuria is probably only a part of the "special report" referred to on pages 3230, 3497, 3555, and 6196 of this main report, since that "special report" promised to contain detailed information on the processes used to make different soyfoods such as miso, shoyu, yuba, and tofu. Morse apparently was never able to find the time or will to write the complete "special report," however this part of it is very detailed, useful, and impressive.

Note 2. Talk with Knowles A. Ryerson. 1983. Aug.

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28. W.J. Morse definitely did not write the entire special soybean report he intended to after returning from his trip to the Orient. Why? He got swept up in the growth of the U.S. soybean production and processing industries and had no one to help him with his work during the Great Depression. He was swamped! Address: Agricultural Explorer, USDA, Washington, DC.

344. Found, N. 1931. A cheap substitute for milk. *China Medical Journal* 45:144-46. Feb.
• ***Summary:*** This review of five articles on soybean milk was originally contributed to the *Mansen no Ikai*, June 15, 1930.

"Only in 1900 was it scientifically studied and found to have a high protein content, reaching 44% in the soy bean flour.

"In Japan it was found that nitrogen from this source was easily absorbed, especially if taken in a mixed dietary.

"John Ruhrah of Baltimore [Maryland] first recommended and used it as a supplementary infant food in 1909.

"Dr. Ernest Tso (Peiping Union Medical College) used soy bean milk as the main diet of an infant six weeks old for eight months and showed that this allowed the occurrence of rickets, which, however, could be cured by adding calcium and cod liver oil to the diet.

"In Peiping in 1928 he made metabolic studies on two such infants and confirmed chemically the lack of calcium, sodium and chlorine as well as vitamines other than A and B. He also showed that the phosphorus content was adequate. The nitrogen absorption is up to 90% of the intake and nitrogen retention is from 17% to 26% of the intake. His conclusion was that soy bean milk proteins are easily digested by a young infant and are capable of producing continuous growth. For best results calcium must be added and cod liver oil fed for vitamines.

"Following this, formulae were made out to correct the deficiencies.

"Dr. VanBuskirk has shown that the mortality rate per 1000 Korean children during the first five years of life are, 180, 127, 102, 59 and 39, which is especially high for the second and third years as compared with most other countries.

"Recently at the Evangelistic Center, Seoul, a practical experiment has been made in feeding large numbers of children with this milk and it is found that the cost per feeding is only about three sen as compared with 10 sen for canned cream.

"The method of preparation used is as follows:

"Soak the beans over night in 8 times their weight of water.

"In the morning remove the shells [hulls] and grind in a mill.

"Boil for five minutes.

"Filter through a sieve.

"For 1000 grams of the filtrate:

"Add 20 grams of starch, previously made into a paste with a little of the filtrate and add 60 grams of sugar.

"Add 1.5 grams of calcium lactate.

"Add 1 gram of salt.

"This gives a mixture with 4.4% protein, 1.8% fat and 1.5% carbohydrate, the pH is 6.8.

"Codliver oil [Cod liver oil] must also be given.

"Drs. Hill and Stuart in Boston [Massachusetts] have also worked out a formula for a dried powder which gives good results in cases where cows milk is not tolerated. They report the main protein in soy bean as *glycinin* and give a detailed chemical analysis." Address: Severance Union Medical College, Seoul, Korea.

345. Dorsett, P.H. 1931. Just finished packing in Peiping, China (Document part). In: P.H. Dorsett and W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 7322 (14 March 1931). Peiping, China. P.H. Dorsett's notes: "It was about noon when we finished packing and every trunk we have is chuck full [chock full] for we are all taking back a lot of equipment and some supplies.

"Our baggage comprises 12 Government trunks and two personal trunks besides a portable typewriter, four cameras, and three hand bags, and it looks as though we still have to get another hand bag. If nothing happens, we get away tomorrow on our long return trip to the United States.

"This is my second exploration trip to the Orient and now the work in the field for me is drawing to a close. At least at my age, 69 the 21st of this coming April, it hardly seems possible, even though I feel fit, that the officials at Washington will want me again to go into the foreign field for them. Would I like to? yes, for there is still much to be done in Japan and the Orient. I believe that a year and perhaps more could be spent to very great advantage in Hokkaido. It impressed me as being a rich field in which to explore for ornamentals. I also believe that a year could be spent to good purpose in Chosen [Korea]. We were very much impressed with the variety and types of soybeans found in the limited area Dorsett and Morse explored, and we feel sure that some additional specimens of ornamental trees and shrubs could be picked up in that region. Far North Manchuria, we feel quite sure is rich in promising forest trees and ornamental flowering shrubs. Japan and China have as yet been hardly touched and they are filled with plant possibilities for introduction into America." Address: Agricultural Explorers, USDA, Washington, DC.

346. United States Department of Agriculture (USDA),

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Office of Information, Press Service. 1931. U.S. plant explorer collects new soybean varieties in Orient (News release). Washington, DC. 2 p. March 28.

• ***Summary:*** "After a two-year search for new varieties of soybeans in Japan, Korea, and Manchuria, Wm. J. Morse of the U.S. Department of Agriculture has returned from the Orient with a collection of about 4,000 lots of seed and more than 300 samples of products made from soybeans.

"Mr. Morse, who is in charge of soybean investigations for the Bureau of Plant Industry, hopes that some of the many varieties represented in his collection will meet the needs of the wide range of industries using soybeans in this country."

Note: This is the earliest document seen (Aug. 2011) stating that W.J. Morse is "in charge of soybean investigations" (or "head of soybean investigations" or "director of soybean investigations") at USDA.

"Oil manufacturers, he says, want soybeans with high oil content, whereas farmers who feed hogs want low oil content. Packers discriminate against hogs fed or pastured on soybeans because of the soft pork which results from the oil. Few varieties of soybean grown on a large scale in this country have an oil content less than 15 per cent or more than 20 per cent. Some of those grown in Manchuria, however, run as high as 22 per cent in oil...

"The manufactured products in Mr. Morse's collection range from high-quality oils to beans specially treated to drive devils away during certain religious festivals [*mame-maki* at *Setsubun*].

"'Next to rice,' he says, 'the soybean is the principal food crop in the Far East, and it is the principal source of protein in the Oriental diet. No one variety is adapted to all parts of the Orient, nor is any one variety suited to all the many uses to which the beans are put. For instance, certain varieties are grown solely for oil, those that thrive in Manchuria being noteworthy for their high oil content. Other varieties are planted with a view to making soy sauce, a condiment already in favor in the United States, bean curd, used by Buddhists as a meat substitute, or miso, a common ingredient of Japanese soups. Some varieties are grown to provide a green vegetable [edamame] that is to the eastern table what green peas are to the western table. Part of the crop in certain sections is roasted for use as a coffee substitute or in confections where it answers the same purpose as peanuts in American candy and cakes.'

"The beans were gathered from a wide territory varying greatly in climate and in cultural conditions. As soon as they reached Washington [DC] they were sent to the experiment farm at Arlington, Virginia, for observation and quarantine. When it has been determined that they harbor no insect pests or plant diseases the beans will be grouped and sent to the department's field stations, each group to the section best suited to its growing requirements, and planted. Recommendations for their ultimate introduction into the United States will depend on the results of these field tests. If they do as well here as in their native fields, Mr. Morse says, some of these new introductions will probably become staple sorts here." Address: Washington, DC.

347. South Manchuria Railway. 1931. Soya beans. *Report on Progress in Manchuria.* Second, to 1930. 307 p. See p. 4, 5, 8, 40, 76, 137, 144, 152, 154-55. (Dairen, Manchuria). [1 ref. Eng]

• ***Summary:*** "The soya bean, to-day commanding a world market, and kaoliang, used as the staple food of the native population and also as cattle fodder, are the most important among agricultural products. The production of soya beans, amounting at present to about 221,000,000 bushels, or 5,300,000 tons, annually, has doubled during the last 14 years... The commercial importance of the soya bean and its products–oil and cake–has made Manchuria famous. They are so predominant that they now constitute more than 60 per cent. in value of the entire export trade of Manchuria. Of 4,721,000 tons of beans and bean products exported in 1929, more than 41% went to Japan, about 44% to Europe, 13% to China, and the rest to the United States and other countries. Next to beans, millet is now the most important crop producing 171,000,000 bushels every year."

"Manchuria is often described as the 'granary of Asia,'... But its agricultural destiny was not generally realized until the South Manchuria Railway Company, running through the valley of the Liao River, brought large supplies of Manchurian [soy] beans to Dairen, whence they were shipped to waiting markets in Europe.

Soya beans (Chapter 94) is one of ten chapters in section VII titled agriculture. "The story of the Manchurian bean is a striking romance in economic history. The Japanese, though naturally regretting the loss of the Liaotung, the 'legitimate fruit' of the Sino-Japanese war, found some compensation in the discovery of the Manchurian bean, which revolutionized the fertilizer industry and became a substitute in the Japanese rice-field for the dry-herring fertilizer then extensively used. Ever since, the Japanese have been the heaviest purchaser of the Manchurian bean. The first trial shipment of this legume was made in 1908 by the Mitsui Firm of Japan, being sent from Dairen to Liverpool, and this was the beginning of a new industry in England, Germany, Denmark and Holland. The major portion of the beans destined for Europe was for the mills at Liverpool and Hull, England; for those at Copenhagen, Denmark, and Rotterdam and Amsterdam, Holland. Germany's consumption subsequently became greater than all, and this, though interrupted during the European war, is recovering. At the time of the universal shortage of food during the great war, the Manchurian bean played a very important part in the world's food supply."

"The influence of the Manchurian bean on national economy is remarkable. Denmark was more than self-supporting in the production of cereals, specially wheat,

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until 30 years ago. But Danish products found themselves unable to compete with American large-scale production, even in the home market. Aided by the Manchurian bean, the Danes turned extensively to stock breeding. The bean is imported, the oil extracted and used for manufacturing margarine (vegetable butter), soap, etc., while the residue of cake is extensively used as feed for live-stock, which totaled as many as 18,524,000 head in 1926, besides many million run of poultry. The consequence was the development of an enormous export trade in animal products, butter, cheese, bacon, ham, eggs, and also live-stock. The value of this great trade is some 1,027 million kroner [krone], or more than 70% of Denmark's total export. Holland, to some extent, is in a similar position."

Total world production of soybeans in 1928-29 was estimated at 353,842,000 bushels, of which Manchuria accounted for 63% (22 bushels/acre), China proper 25% (16 bu/acre), Korea 6% (12 bu/acre), Japan 5% (19 bu/acre), and the USA 1% (16 bu/acre).

Manchurian soya beans are divided into 4 classes according to color–yellow, white eye-brow [yellow with white hilum], green, and black. The chemical composition of these beans, according to analyses made in 1927 by the Central Laboratory at Dairen is: Yellow (18.19% crude fat/39.94% crude protein), black (14.74/41.00), green (18.96/40.12). Thus the green are highest in oil and the black are lowest. The black are highest in protein and the yellow are lowest. Address: Dairen, Manchuria.

348. *Flour & Feed.* 1931. U.S. plant explorer collects soy bean varieties in Orient. 31(12):18, 27. May.

• ***Summary:*** After a two-year search for new varieties of soy beans in Japan, Manchuria and Korea, William J. Morse of the USDA has returned with a collection of about 4,000 lots of seed and more than 300 samples of products made from soy beans. Mr. Morse is in charge of soy bean investigations for the Bureau of Plant Industry.

Manufacturers of soy bean oil want beans with a high oil content whereas those who feed the meal to hogs want low oil beans.

Mentions soy sauce, bean curd [tofu], miso, varieties grown to provide a green vegetable, and those that are roasted for use as a coffee substitute or as an alternative to peanuts. Some soy beans are specifically treated to drive devils away during certain religious festivals.

349. Rosenberger, E.T. 1931. The soy bean milk as a food: Methods for workers. *Missionary Review of the World* 54(5):371-72. May.

• ***Summary:*** "Having received letters from different countries regarding Soy Bean Milk I am giving in these columns a full explanation of the preparation, uses and benefits of it.

"In the first place it is a fact that the diets of Oriental countries are not suited to the proper nutrition of young children because of the lack of milk in them. Milk has been found to be the foundation of all foods for growing children in all countries. However, cow's milk is not available in all of these countries, and it behooves us to find a substitute. This substitute has been found in the Soy Bean Milk which has been perfected by Dr. Ernest Tso of the Peking Union Medical College. It takes its place so highly because it is so very rich in protein which sets off the heavy rice diets of these countries. It is also quite rich in fat and mineral matter, and last, but not least, it is much cheaper. A bottle of cow's milk costs ten sen whereas a bottle of Soy Bean Milk costs two sen.

"It has been used very largely in our work at the Social Evangelistic Center, Seoul, Korea, as a supplementary feeding, and also as an entire food. For the latter it must be modified, and this modification will be given with the recipe at the end of this feeding method. We have even fed one case of marasmus on the Soy Bean Milk.

"The picture of before and after using it will illustrate the success. This baby was brought from an extremely poor home where there were five children–the father totally blind, the mother half blind. It was a case of giving the baby the Bean Milk or letting it starve, so we immediately commenced feeding it and watching it very closely. It gained a pound the first month and the second month likewise. Then for a time during the winter there was a standstill, but the pictures will show the results of this attempt after one year's Bean Milk feeding.

"The Soy Bean as an important food dates back to remote history. It is said that it appears in the Chinese Materia Medica of Shen Nung in the year 2838 B.C. China to this day uses very little dairy or meat products, but they have lived for centuries on a diet remarkably well balanced by the use of the Soy Bean. It is said that Buddhist monks consecrated at birth to the priesthood are carried through the entire period of childhood on the diet of the Soy Bean curd.

"We feel that it is one food which we should encourage to be used for small children in Korea where the mortality rate is high and the children have such an inadequate diet. It is one food that we can safely advocate, make and use because the price is not prohibitive.

"Soy Bean Milk

"1. One part beans well washed

"2. Eight parts of pure tap water

"3. Soak over night

"4. Grind through native mill

"5. Boil whole quantity five minutes.

"6. Put through sieve–the result is milk

"Beans should be half milled and skins removed, if possible.

"Additional note: To each liter of Soy Bean Milk (1000 c.c. or 32 oz.) add 20 grams of starch either from rice or corn. This is cooked in the same way as you would prepare

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cornstarch pudding. Also add 60 grams of sugar and 1½ grams of calcium lactate and one gram of table salt to this mixture. The calcium lactate is best added while the milk is cold or else after the mixture is boiled or it might curdle. It should be first mixed with a little cold milk and then added.

"About the same quantity of this mixture as cow's milk is used to feed the babies–according to their caloric requirements. No child should have more than 1000 or 1100 c.c. a day of this milk. In a little baby it may produce frequent stools, which should be well watched under a doctor's care. Cod liver oil should be part of the feeding from the beginning of the use of Soy Bean Milk–at first 6 to 8 c.c. per day and gradually increased to 15-20 a day."

Photos show: (1) A Korean woman, seated on a chair, holding her child before feeding. (2) Same baby a few months later. Address: Child Welfare Dep., Social Evangelistic Center, Seoul, Korea. Phone: GTUL 841-9811.

350. *USDA Plant Inventory.* 1931. Plant material introduced by the Division of Foreign Plant Introduction, Bureau of Plant Industry, January 1 to March 31, 1930 (Nos. 82600 to 86755). No. 102. 111 p. Sept.

• ***Summary:*** Soybean introductions: *Soja max* (L.) Piper (*Glycine hispida* Maxim.). Fabaceae.

No. 84569-85023. "From Chosen [Korea] and Japan. Seeds collected by P.H. Dorsett and W.J. Morse, agricultural explorers, Bureau of Plant Industry. Received January 20, 1930.

No. 84578-85023.

No. 84578-84904. Collected at the Suigen Agricultural Experiment Station, Dec. 2, 1929.

No. 86002-86154. "From Japan. Seeds obtained by P.H. Dorsett and W.J. Morse, agricultural explorers, Bureau of Plant Industry. Received February 26, 1930."

Note: PI numbers with special significance. "No. 84928. No. 3224. *Kanro.* A medium-sized, nearly round, dull yellow bean, slightly mottled with brown with a pale to dark-brown hilum." The name "Kanro" was continued in the USA.

No. 85666. No. 3085. *Hokkaido Tsurunoko.* Obtained in a grocery store, January 6, 1930. A very large oval yellow bean with a pale hilum. This is one of the largest seeded yellow varieties and is used only for food purposes." Later given the name "Hokkaido."

No. 85053-85673 (p. 56). "From Chosen [Korea] and Japan. Seeds collected by P.H. Dorsett and W.J. Morse, agricultural explorers, Bureau of Plant Industry. Received January 30, 1930.

No. 85053-85671 are all soybeans. 85053-85660 are from the Agricultural Experiment Station, Suigen, Chosen, December 2, 1929.

"No. 86038. No. 3538. *Kurodaizu* ["Black soybean"]. Large, oval, slightly flattened, black." Later renamed "Hiro."

"No. 86129. No. 3684. Toiku Shichigo (Station No. 7). Medium large, nearly round, light yellow, with russet-brown hilum." Later renamed "Toku."

Note: On 22 April 1931 the Office of Foreign Plant Introduction was renamed the Division of Foreign Plant Introduction. This is the 2nd earliest known issue containing soy introductions to reflect that change of names. Actually, No. 101 of June 1931 was the very first. Address: Washington, DC.

351. **Product Name:** La Choy Soy Sauce.
**Manufacturer's Name:** La Choy Food Products.
**Manufacturer's Address:** Detroit, Michigan.
**Date of Introduction:** 1931 November.
**Wt/Vol., Packaging, Price:** Glass bottle.
**New Product–Documentation:** W.L. Burlison and O.L. Whalin. 1932. *Journal of the American Society of Agronomy* Aug. p. 594-609. "The production and utilization of soybeans and soybean products in the United States." See p. 608. "La Choy–soy sauce" is listed as a soybean product produced in the United States.

W.L. Burlison. 1936. *Industrial and Engineering Chemistry* 28(7):772-77. July. "The Soybean: A Plant Immigrant Makes Good." See Table II, p. 775. States that La Choy-Soy sauce was on the market during the latter part of 1931.

Ad in *Soybean Digest.* 1944. Sept. p. 12. "Genuine soy sauce." Soybean Blue Book. 1947. p. 72-73. The 2¼ by 3½ inch display ad is titled: "Genuine Soy Sauce" from "LaChoy Food Products, Archbold, Ohio. Division of Beatrice Foods Company."

Shurtleff & Aoyagi. 1982. History of Soy Sauce. p. 105. "One of the earliest importers and marketers of soy sauce in America was La Choy Food Products. The company was founded to produce mung bean sprouts in Detroit, Michigan, by Mr. Ilhan New (a Korean) and Wally Smith. Soon they were doing a booming business and by 1922 they were importing fermented soy sauce from China in wooden barrels to use as a seasoning in their Asian food products. In the early 1930s they began buying HVP soy sauce from Huron Milling Co. (now Hercules) and A.E. Staley, and selling it in small bottles as La Choy Soy Sauce. In 1942 the company moved to Archbold, Ohio, and the next year was acquired by Beatrice Creamery Co. (now Beatrice Foods) which by 1944 was advertising the soy sauce widely. In 1963 Beatrice/La Choy acquired the Oriental Show-You company and began making and marketing their first fermented soy sauce. In 1981 La Choy was the world's largest Chinese food plant... Their fermented soy sauce, which accounted for 10-15% of their fermented soy sauce sales, was sold under the brand Oriental Soy sauce. In addition to the traditional soybeans, wheat, salt, and water, it also contained HVP, corn syrup, caramel color, and sodium benzoate preservative."

Joe Staudt. 1985. Horizons (Beatrice Grocery Group). Summer. p. 1-7. In 1920 Wally Smith and Ilhan New, two friends from the University of Michigan, founded La Choy

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Foods in Detroit. Their first product was bean sprouts. In 1922 the business was incorporated as La Choy Food Products. The first La Choy-owned plant was built in Detroit in 1937. The Archbold, Ohio plant was built on its present site in 1942. The Company's long association with Beatrice started in 1943, when La Choy was bought by the Chicago-based company and became Beatrice's first non-dairy operation.

Note: This is the earliest known HVP soy sauce sold at retail in the United States. With this product began the long battle (still fierce in 2004) concerning the definition of soy sauce. In our opinion, U.S. regulations should have required that the La Choy product be labeled "imitation soy sauce"–but soy sauce was a minor product in America in the early 1930s, the nation was in the midst of the Great Depression, and nobody cared very much about soy sauce terminology.

352. Morse, W.J. 1931. 6. Utilization of soybeans and soybean products in Oriental countries. *J. of the American Society of Agronomy* 23(12):1067. Dec. Presented as part of Symposium on Soybeans. Leader: W.J. Morse.
• ***Summary:*** Manchuria, the largest soybean-producing country in the world, had a production of more than 5,000,000 tons of which more than 400,000 tons were used for food, 253,000 tons for feed, and 225,000 tons for seed. The remainder, more than 4,000,000 tons, was used in the production of oil and oil meal and for export. Japan in 1929 used over 39,000,000 bushels of soybeans of which only 13,000,000 bushels were grown in Japan proper, the difference being imported from Manchuria and Korea. The following shows the various ways in which this large amount of beans was utilized by the Japanese people: Miso, 22.7%; soy sauce, 22.7%; soybean oil and oil cake, 21.5%; bean curd, 15.4%; confections [roasted whole soy flour], 6.1%; forage, 6.2%; green vegetable beans, 0.8%; green manure, 2.5%; seed, 1.6%; miscellaneous, 0.5%.

Note: This is the earliest document seen (Oct. 2019) that gives industry or market statistics on green vegetable soybeans (edamame) for any geographical region. Address: U.S. Dep. of Agriculture [Washington, DC].

353. Tanaka, T. 1931. Chôsen no jimbun chishi gaku teki kenkyû [Anthropogeographical studies on Korea]. *Chiri Kyoiku* 15:105, 11, 226-30, 346-49. [Jap]*

354. Bruening, Hermann. 1931. Ueber die Verwendung von Soja, inbesondere von Sojamehl in der Kinderpraxis [On the use of the soybean, especially of soybean flour in pediatrics]. *Archiv fuer Kinderheilkunde* (*Stuttgart*) 93:81-91. [20 ref. Ger]
• ***Summary:*** The soybean, according to Bondy, had not yet been introduced into the field of medicine by 1804. In its homeland of East Asia it is mainly used by the Chinese, Japanese and Koreans as a nutrient carrier for the preparation of a wide variety of dishes (bread, dips, cheese, milk, oil) and thus largely replaces meat. Supports the use of soybean milk in infant dietaries. Edelsoja is mentioned on p. 86. Address: University Children's Clinic, Rostock, Germany) Universitaetskinderklinik, Rostock.

355. *USDA Plant Inventory.* 1932. Plant material introduced by the Division of Foreign Plant Introduction, Bureau of Plant Industry, April 1 to June 30, 1930 (Nos. 86756 to 88432). No. 103. 51 p. March.
• ***Summary:*** Soybean introductions: *Soja max* (L.) Piper (*Glycine hispida* Maxim.). Fabaceae.

No. 87523-87636. "From Japan and Chosen [Korea]. Seeds collected by P.H. Dorsett and W.J. Morse, agricultural explorers, Bureau of Plant Industry. Received May 6, 1930.

"No. 87613-87621. From Kankyo Hokudo."

Note: PI number with special significance. "No. 87615. No. 4891. *Shirobana* (large white flower), from Dojogun. A very large, oval, glossy, yellow bean with pale hilum." It was later renamed "Jogun." Address: Washington, DC.

356. Sasaki, Kaneiku. 1932. Daizu no yûki enki-rui ni tsuite [Organic bases of soya bean]. *Nippon Nogeikagaku Kaishi* (*J. of the Agricultural Chemical Society of Japan*) 8(4):417-20. April. (Chem. Abst. 26:4307). [3 ref. Jap]
• ***Summary:*** Korean soya bean (1930) contained 11.2% water, 16.6% crude fat, 7.03% total nitrogen, 6.48% protein nitrogen, 0.55% non-protein nitrogen. 5 kg yielded 1.40 gm adenine (picrate), 0.31 gm guanine, 0.62 gm histidine (dichloride), 9.55 gm arginine (nitrate), 25.36 gm choline (gold salt), 0.33 gm trigonelline (hydrochloride), and 0.80 gm of an unidentified base (from the lysine fraction; melting point 214ºC; platinum salt, melting point 235ºC; picrate, melting point 206-208ºC).

357. *USDA Plant Inventory.* 1932. Plant material introduced by the Division of Foreign Plant Introduction, Bureau of Plant Industry, July 1 to September 30, 1930 (Nos. 88433 to 89210). No. 104. 35 p. April.
• ***Summary:*** Soybean introductions: *Soja max* (L.) Piper (*Glycine hispida* Maxim.). Fabaceae.

No. 89101-89172. "From China, Chosen [Korea], and Manchuria. Seeds collected by P.H. Dorsett and W.J. Morse, agricultural explorers, Bureau of Plant Industry. Received September 12, 1930.

"No. 89127-89172.

"No. 89127-89166 are from the Kankyo Hokudo Prefecture Seed and Nursery Farm, Kyojyo, Chosen [Korea], August 8, 1930.

Note: PI number with special significance. "No. 89126. No. 6108. *Tsurunoko.* Large, very light yellow with pale hilum; used largely for confectionery purposes." Later renamed "Suru." Address: Washington, DC.

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358. South Manchuria Railway. 1932. Soya beans. *Report on Progress in Manchuria.* Third, 1907-32. 235 p. June. See p. 1-5, 35, 117-18, 130, 135-36, 141, 156, 159. (Dairen, Manchuria). [1 ref. Eng]
• ***Summary:*** Subtitle: "The 25th anniversary number containing a survey of the Manchurian Incident and League Council's Proceedings."

Note: The "Manchurian Incident," also called the "Mukden Incident" took place on the night of 18 September 1931. A bomb exploded on the tracks of the Japanese railway north of Mukden. A Japanese Colonel ordered a full-scale attack against the Chinese troops in Mukden, and General Honjô, hearing of the crisis, called out the whole Kwantung Army–which proceeding to take over Manchuria. "By early 1932 the conquest of all Manchuria had been completed. In March 1932 Manchuria was proclaimed an independent state under the last Ch'ing ruler (P'u-yi). The Lytton Commission of the League of Nations visited Manchuria in the spring of 1932 and condemned Japan as an aggressor. The report was adopted by the League of Nations, from which Japan withdrew in protest the following year. By this time the Japanese armies had already moved west from Manchuria to occupy about 5,000 square miles of the Inner Mongolian province of Jehol." (Fairbank, Reischauer, and Craig. 1973. *East Asia: Tradition and Transformation.* p. 707-08). Address: Dairen, Manchuria.

359. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products: Tables 1-19 (Document part). *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec.
• ***Summary:*** Tables show: (1) Value of the soybean crop in Illinois, 1928-31. (2) Soybean production in selected countries, average 1909-13, annual 1920-31 (in tons of 2,000 lb). The countries: Manchuria, Korea, Dutch East Indies, Japan, United States, total for these 5 reporting countries. (3) Soybean production in the United States by geographic divisions, 1929. The greatest production was in the "East North Central" states; 4.977 million bushels comprising 57% of total U.S. production.

(4) Production of gathered soybeans in selected states and in the United States, 1922-1931 (thousand bushels). In 1922 the top six soybean producing states were North Carolina (1,600), Illinois (812), Ohio (465), Indiana (240), Virginia (208), and Missouri (165). Total USA: 4,333. In 1924, Illinois (1,380) passed North Carolina (1,160) to become the leading U.S. producer. In 1931 the top six states were Illinois (6,055), Indiana (3,062), North Carolina (1,498), Missouri (1,080), Iowa (578), and Ohio (560). Total USA: 14,917.

(5) Total equivalent solid acreage of soybeans grown in selected states and in the United States in 1922-1930 (thousands of acres). In 1922 the top 4 states were North Carolina (224), Illinois (169), Tennessee (154), and Indiana and Alabama (113, tie). Total USA: 1,226. In 1923 Illinois passed North Carolina to take first place. In 1930 the top 4 states were Illinois (719), North Carolina (478), Iowa (463), and Indiana (402). Total USA: 3,758. (6) Yield per acre of gathered soybeans in selected states and in the United States, 1922-1931 (bushels per acre). In 1922 the U.S. average was 13.8 bushels. Iowa had the highest: 22 bushels. In 1931 the U.S. average was 15.6 bushels. The top 4 states were Ohio (20), Indiana (17.8), Illinois (17.5), and Iowa (17).

(7) Proportion of soybean acreage gathered for beans, cut for hay, and interplanted with other crops, Illinois, 1922-1931. Gathered for beans rose from 32.1% in 1925 to 55.7% in 1930. Cut for hay rose from 41.4% in 1922 to 54.4% in 1931. Interplanted with other crops dropped from 20.1% in 1922 to 1.3% in 1931. (8) Production of soybeans in twelve leading Illinois counties, with rank by years, 1929-1931. The top four counties were Christian (692,200 bu in 1931), Champaign, Piatt, and Moultrie. (8A) Soybean varieties in Illinois: Varieties gaining favor: Illini, Manchu, Dunfield, Mansoy, Laredo. Holding their own: Ebony, Virginia, Ilsoy, Peking, Black Eyebrow, Wilson V [Wilson-Five], Hurrelbrink. Losing favor: Haberlandt, Mammoth Yellow, Hamilton (Ohio 9035), Ito San, A.K., Midwest.

(9) Varieties of soybean seed offered for sale by growers, in order of frequency of offers printed in Farm-Bureau publications, Illinois, 1921, 1925, and 1931. For each year the varieties are listed under nine crop reporting districts, and also for the entire state. In 1921 for the entire state, in descending order of frequency: Midwest, Ebony, A.K., Peking, Ohio, Ito San. In 1925: Manchu, Midwest, A.K., Ebony, Virginia, Ilsoy, Ohio, Black Eyebrow, Haberlandt, Peking, Wilson, Ito San. In 1931: Illini, Manchu, Virginia, Ilsoy, Ebony, A.K., Mansoy, Dunfield, Peking, Wilson, Midwest, Black Eyebrow, Haberlandt. (10) Average cost of producing soybean in Illinois and Indiana for specified periods, 1921-1930. The highest return above computed cost per acre (profit) is from soybeans gathered for seed using a combine: $9.55/acre. When soybeans are cut for hay, a loss usually results.

(11) Imports of soybean oil, soybean oil meal and cake, and soybeans, United States, 1915-1931. (12) Duties levied on soybean oil, soybean oil meal and cake, and soybeans under recent tariff acts, United States, 1909-1930. In 1909 and 1913 all three commodities were on the "Free list." In 1921 oil the tariff on oil was 20 cents per gallon (2.67 cents per lb); the other two were free. In 1922 the tariff on oil was reduced to 18.75 cents per gallon (2.5 cents per lb), the tariff on soybeans was ½ cent per lb (30 cents per bushel), and meal was free. In 1930 the tariff on oil was increased to 26.25 cents per gallon (3.5 cents per lb, not less than 45% *ad valorem*), the tariff on meal and cake was $6/ton, and the tariff on soybeans was increased fourfold to $1.20/bushel.

(13) Domestic production of soybean oil and other vegetable oils from domestic materials, United States,

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1912-1931 (thousands of pounds). Statistics are given for cottonseed oil (the leader by far during the entire period), peanut oil, olive oil, corn oil, linseed oil, soybean oil, and total vegetable oil. Soybean oil rose from 751,000 lb in 1922 (the first year for which figures are given) to 39,129,000 lb in 1931. The ranking in 1931 was: Cottonseed oil (1,417,226 x 1,000 lb), linseed oil (203,613), corn oil (113,145), soybean oil (39,129), peanut oil (13,730), and olive oil (1,509).

(14) Imports of foreign vegetable oils, oil equivalent being used for oil-bearing materials, United States, 1910-1931 (thousands of pounds). Statistics are given for soybean oil, coconut oil and copra, peanut oil, olive oil (edible), olive oil (inedible, including olive oil foots), palm oil (incl. palm kernel), linseed oil and flaxseed, all other vegetable oils and materials, total vegetable oils and materials. For net soybean oil imports, the earliest figure is 24,784 in 1912; it peaked at 335,439 in 1918, and had fallen to 4,018 in 1931. Total vegetable oils and materials imported increased from 440,412 in 1910 to 1,525,114 in 1931.

(15) Exports of soybean oil and five other leading vegetable oils, United States, 1919-1931 (thousands of pounds). Statistics are given for soybean, cottonseed, coconut, linseed, corn, and peanut. The leading export throughout this period was cottonseed oil. For soybean oil exports, the figure for the last half of 1919 is 27,715 and fir 1920 it is 43,512. Thereafter the amount exported each year is very small, rising from 1,944 in 1921 to 5,448 in 1931.

(16) Total production, imports, exports, and net balance of vegetable oils and animal fats, exclusive of butterfat but inclusive of fish oils, United States, 1912-1931. (17) Use of soybeans, by acreage, United States, 1915, 1929, and 1930 crops. The percentages of the entire crop acreage in 1915 are: Hay 52%, grazed 15%, plowed under 4%, and gathered for beans 29% (of which: Seed 18.2%, human food 0.9%, and feed 9.9%). In 1930: Hay 56%, grazed 14%, plowed under 4%, and gathered for beans (11,975,000 bushels) 30% (of which: Seed 10.5%, crushed or ground 11.5%, and feed 8.0%).

(17A) Commodities in which soybeans or soybean products are used (p. 460): Food products (USA and Canadian), feed products, industrial products. (18) Soybean oil meal produced and imported into the United States, 1922-1930 (tons of 1,000 lb). Domestic production increased from 3,811 tons in 1922 to 110,000 tons in 1930. Imports increased from 15,612 tons in 1922 to 55,107 tons in 1930. Total of domestic production + imports increased from 19,423 tons in 1922 to 165,107 tons in 1930.

(19) Adaptability of soybean oil to use in various products (p. 464): The products are: Drying products (paint, varnish, linoleum and oil cloth, waterproof goods), soap products (hard and soft soaps), edible products (Lard compounds, cooking oils {if odor permanently eliminated}, salad oils, fountain drinks, candy, mayonnaise, margarin), miscellaneous (core oil, printer's ink). Four levels of adaptation and a maximum percentage are given for each use: Probable, inferior, satisfactory, and superior. The two superior adaptations are paint (to prevent yellowing), and soft soaps. Note: "The margarin industry was one of the first to use considerable amounts of soybean oil and at present it absorbs in the United States approximately 750,000 pounds annually."

360. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products: Tables 20-49 (Document part). *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec.
• ***Summary:*** Tables show: (20) Total industrial utilization of soybean oil and percentages used in specified industries, United States, 1916-1931. The total pounds used rose from 143.34 million in 1916 to a peak of 335.44 million in 1918, then fell to a low of 7.53 million in 1924, rising slowly to 35.50 million in 1931. In 1917 (the peak year) soybean oil comprised 10.3% of all oils used in soap industry. In 1918 it comprised 4.6% of all oils used in the lard-substitute industry and 2.6% of all oils used in the margarin industry.

(21) Iodin [iodine] numbers, saponification numbers, acid numbers, and uses of oils and fats (p. 471). Values are given for: Chinese tung or wood oil, coconut oil, corn oil, cottonseed oil, fish oil, linseed oil, palm oil, palm kernel oil, peanut oil, soybean oil, tallow, whale oil. For soybean oil: Iodin number 124-148. Saponification number 189-194. Acid number 2-7. Uses: "Considerable quantities go into paint, varnish, enamel, linoleum, and waterproofing products. Used in soaps. Utilized in a large variety of food products. Used in core oils."

(22) Utilization of soybeans and soybean products by amounts, United States, 1930 crop: Beans (bushels)–Feed, seed, ground (for food {200,000 bu}, for feed), crushed, total (11.975 million bu). Oil (lbs): Edible purposes (Oleomargarine {750,000 lb}, lard substitutes {500,000 lb}, other food products {4,750,000 lb}), paint and other industries (paint and varnish, linoleum and oil cloth, other uses), soap kettle, increased stocks including oil equivalent, total (37.2 million lb). Meal (tons): Feed (commercial feeds, other feeds), food (flour {850 tons}, infant and diabetic foods {50 tons}), other uses including glue, total (110,000 tons).

(23) Estimated distribution of gathered soybeans according to use, Illinois, 1926-1931 crops. The four categories for each year are (with figures for 1931): Used by oil mill and feed manufacturers (50%), used for seed in state (22%), used for seed outside state (13%), used for feed on farm (15%).

(24) Extent to which soybeans came from local sources or were shipped in from outside the locality, and extent to which beans sold went to local purchasers or were shipped out of the locality, 151 identical country elevators and local seed dealers, Illinois, 1930 and 1926 crops. (25) Soybeans purchased by 151 country elevators and local seed dealers,

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Illinois, 1931 crop. Gives figures for 10 crop reporting districts. (26) Proportion of soybean crop leaving growers' hands that was out of their hands by middle of November, December, and January, Illinois, 1922-1932 (crop storage). Typically about 60% (range 30-70%) was out of their hands by Jan. 15.

(27) Estimated proportion of soybean seed shipped out of the locality by wholesale dealers and jobbers before specified dates in January, selected states and United States, 1919-1931 crops. The states are: Illinois, Indiana, Missouri, and North Carolina. For the USA, 38.9% on average had been shipped by Jan. 26. (27A) Soybean varieties marketed in different sections of Illinois, 1926 crop (11 localities) and 1930 crop (13 localities). The leading varieties of soybeans marketed in Illinois are Illini, Manchu, Midwest, A.K., Virginia, and Ebony.

(28) Estimated costs (cents per bushel) of handling soybeans for all purposes by 166 identical country elevators and local seed dealers, Illinois, 1930 and 1931 crops. For 9 crops reporting districts gives the percentage recleaned (23-30%) and the costs of recleaning and other costs. (29) Costs of handling soybeans other than cleaning by identical country elevators and local seed dealers in leading producing counties, Illinois, 1926, 1930, and 1931 crops. Costs 3.2 to 4.4 cents per bushel.

(30) Costs of raw materials and other items of soybean oil production, United States and selected foreign countries, 1923-1924 (per bushel of soybean crushed). The foreign countries are Manchuria (All Manchuria, Dairen only), Japan, Great Britain. The total cost is lowest in all Manchuria (6.26 cents) and highest in the USA (10.21 cents). (31) Estimated cost of handling soybeans used mainly for seed, 151 identical country elevators and local seed dealers, Illinois, 1926 and 1930 crops. (31A) Cost per bushel of moving soybeans from central Illinois on board boat at New Orleans [Louisiana], 1931 crop.

(32) Carloads of soybean federally inspected in leading soybean producing states, 1928-1932. The states are Illinois, Missouri, Indiana, North Carolina, Ohio, and Virginia. The most carloads were inspected in Illinois (in Peoria (2,412) and Chicago (1,284)). (33) Federal grade requirements for yellow, green, brown, black, and mixed soybeans (Grades 1-4 plus sample grade and Extra No. 1).

(34) Digestible nutrients in feed products of soybeans (soybean hay, seed, straw, seed and straw, oil meal; incl. yield per acre and digestible protein). (35) Digestible nutrients in soybean oil meal and other protein feeds (Incl. linseed meal {old process}, cottonseed meal {41%}, gluten meal, wheat middlings, wheat bran, tankage). Only tankage has a higher "feeding value" than soybean meal. (36) Total gross value of products obtained from a bushel of soybeans at different prices of oil and meal. Gives figures when the price of a pound of soybean oil ranges from 2½ cents to 10 cents per pound, and the price of meal ranges from $15 to $40 per ton.

(38) Average farm prices of soybeans by seven selected crop reporting districts, Illinois, January-May, 1925-1931. The average price over the years ranges from $1.70 to $2.07 per bushel. The lowest price in one year was $0.97/bu in 1931 in Champaign. (39) Average monthly farm prices of soybeans in three crop reporting districts important in soybean production, Illinois, October-June, 1925-1930 crops. The price is always lowest in October and highest in June. So storage pays.

(40) Average prices paid to producers for soybeans by 151 identical country elevators and local seed dealers, Illinois, October-July, 1930 and 1926 crops (Dollars per bushel). (41) Average yearly wholesale selling prices of soybean seed, selected markets; quotations given for first five months of the following year, 1919-1931 crops. The places are: Chicago, Illinois; Louisville, Kentucky; Kansas City, Missouri; Minneapolis, Minnesota; and Baltimore, Maryland. The average price of the ten year period at various cities ranged from $2.25 (Baltimore) to $2.80 (Minneapolis). Prices were highest in 1920, lowest in 1932.

(42) Retail selling price of good-quality soybean seed in selected states, March-May, 1926-1932. The states are: Illinois, Indiana, Iowa, Kentucky, Missouri, Ohio, Tennessee. (43) Average prices paid to producers for thresher-run soybeans and average wholesale and retail selling prices, Illinois, 1925-1931 crops. Prices were highest in 1925, lowest in 1930. In 1925 the average price paid to farmers was 63.6% of the retail price, and the average wholesale price was 90.9% of the retail price.

(44) Average advertised price of soybean seed offered for sale by producers, by varieties, Illinois, March-June 1920-1930. The varieties are: Illini, Manchu, A.K., Midwest, Ebony, Virginia, Wilson, Black Eyebrow, Peking, Ito San, Ilsoy, Haberlandt, Ohio, Dunfield, Mansoy.

(45) Exports of soybeans from eight selected exporting countries, 1923-1930. Gives figures (1,000 lb) for total, China, Japan incl. Chosen [Korea], and Netherlands. (46) Imports of soybeans into selected countries 1913, and 1919-1931. Gives figures (1,000 lb) for total, Denmark, Japan incl. Korea, France, Germany, Netherlands, United Kingdom, United States. Figures in footnote for Sweden and Italy. The leading importers are now Germany, Denmark, and United Kingdom.

(47) Imports of soybean oil into seven selected countries, 1913 and 1919-1931. Gives figures (1,000 lb) for total, Denmark, Japan (incl. Chosen), France, Germany, Netherlands, United Kingdom, United States. Gives figures in footnote for Algeria, Austria, and Sweden. (48) Exports of soybean oil from eight selected countries, 1913 and 1919-1931. Gives figures (1,000 lb) for total, China, Denmark, Japan incl. Chosen, France, Germany, Netherlands, United Kingdom, United States. Figures in footnote for Algeria, Sweden, Austria, and Italy.

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(49) Exports of soybean cake from Manchuria as a whole and from the port of Dairen, with destination of bean cake from Dairen, 1926-1931 (tons of 2,000 lb). Exports from Dairen to Japan, Korea, Europe, United States, China, Other destinations.

361. Nakajima, Kenzo. 1932. Studies on the proteins and oil of soy bean. *J. of the Faculty of Agriculture, Hokkaido Imperial Univ.* (*Hokkaido Teikoku Daigaku Nogakubu Kiyo*) 31(3):165-356. (Chem. Abst. 27:2053 {1933}). [88 ref. Eng]
• ***Summary:*** Glycinin is denatured almost completely into a glutelin-like protein, soluble in 0.2% sodium hydroxide, by the oil-extraction process. The rates of digestion of natural and denatured glycinin by enzymes, and the action of papain and castor-seed powder on the oil, were studied. Viscosities of mixtures of the oil with organic solvents were measured.

Thanks to Mr. K. Sugiyama, president of Honen [Hohnen] Oil Co. Address: Hokkaido Imp. Univ., Sapporo, Japan.

362. Tanaka, T. 1932. Chôsen no jimbun chishi gaku teki kenkyû [Anthropogeographical studies on Korea]. *Chiri Kyoiku* (*Geographical Education*) 16:587-92. [Jap]*

363. U.S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce. Foodstuffs Div. 1932. The market in Germany and other European countries for American soya beans. Washington, DC: Foodstuffs Div. 9 p. Mimeographed unpublished manuscript.
• ***Summary:*** This report is a revision of Special Circular #344, published in July 1932. Contents: Introduction. Importance of Hamburg and Germany as a Market for American Soya beans. German and European consumption of soya beans (1930-1931; and Germany 1927-1931). Disposition of United States crop of soya beans. United States exports of soya beans by month (1931-32). Quality standards and sale terms for American soya beans. Lower price for American beans because of bulk shipments. German market for soya bean cake. Other cattle feedstuffs not a serious competitor to soya beans. Increasing imports of soya beans [are taking market share] away from other oilseeds (table, 1913-1931). Capacity of the important European mills. Direct sales to German mills not recommended–Hamburg agents in better position than London to watch experimental shipments to German buyers. Exchange conditions affecting bean purchases. Bank credits more difficult. Speculation in the Hamburg trade. Unilever Group not dominant in the German market. (its affiliated mills consume about 200,000 tons/year). German efforts to cultivate soya beans from American stock not successful: Russia, Sweden, northern France (imports are increasing), United Kingdom (Unilever plays the major role), Denmark, Netherlands. Conditions in the producing areas: China (South Manchuria 2,163,527 tonnes; North Manchuria 2,057,247 tonnes), Chosen [Korea; 1,982,084 acres].

The estimated yearly capacity (in long tons) of major German mills for soybeans in 1931, ranked in descending order of size, is: 1. F. Thörl's Oelfabriken, Harburg-Elbe, 246,000. 2. Hansa Muehle, Hamburg, 197,000. 3. Stettiner Oelwerke A.G., incl. Toepfer's Oelwerke GmbH, 197,000. 4. Noblee & Thörl, Harburg-Elbe, 148,000. 5. Brinckman & Mergell, Harburg-Elbe, 128,000. 6. Henke & cie., C. Thywissen, Norddeutsche Oelwerke A.G., and P.J. Stahlberg, 118,000.

Note 1. This is the earliest document seen (May 2015) that contains the company names "Noblee" or "Noblee & Thörl / Thorl."

Note 2. This is the earliest document seen (May 2016) that mentions "Toepfer's Oelwerke GmbH" or that states it is now a part of Stettiner Oelwerke A.G.

Note 3. This is the earliest document seen (Aug. 2016) that mentions the German soybean crusher Brinckman & Mergell.

In Russia, according to reliable sources, the Soviet Government had a total of 1,088,000 acres of soybeans under cultivation in 1932 in the following areas: Ukraine 717,500 acres, Russian Far East 247,000 acres, Northern Caucasus 123,500 acres. Russia is making increasing use of the Trans-Siberian Railroad in bringing soybeans into Russia for export via the ports of Leningrad and Murmansk. Why? The country is believed to be in great need of foreign exchange. From Jan. 1, to May 15, 1932 rail shipments were about 194,450 tons.

Unilever's affiliated mills consume about 200,000 tons/year of soybeans. "The British demand for soya beans is very largely in the hands of the Unilever organization which, with its Holland affiliations, owns or controls a number of the most important British, German, and Swedish crushing plants. It is known to be the general policy of the Unilever combine to purchase its oilseeds through a central buying committee, which not only contracts for the raw commodity, but also apportions the amount to be crushed by each plant. It is estimated that Unilever, including associated companies, do probably 75 per cent of the oilseed crushing of Europe and the United Kingdom." Address: Washington, DC.

364. Japan Tourist Bureau. 1932. Pocket guide to Japan. Tokyo: Japan Tourist Bureau (Kokusai Kankôkyoku; Tetsudôchô). xi + 153 p. See p. 12. Illust. (some color). Maps (some folded). Index. 19 cm. [160+* ref]
• ***Summary:*** "Mame-maki or 'Bean Scattering Ceremony' (Feb. 4th). In the evening every house practises a traditional and peculiar ceremony of bean scattering. Then people in the house scatter parched beans in and out of the house loudly shouting 'Fortune in, Devils out,' thus calling in the year's fortune and driving out any probably misfortune from the household" (p. 12).

Contents includes: Chosen (Korea). Cities and noted

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places along the S.M. [South Manchurian] railway. Taiwan. Address: Tokyo, Japan.

365. Morse, W.J. 1932. Soybeans–Manchuria (Continued–Document part III). Attached to: Dorsett, P.H.; Morse, W.J. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon (Log of Dorsett-Morse Expedition). 181 p. Illust. 28 cm.

• ***Summary:*** (Continued): The "History" section of this book (p. 30) states: "According to Chinese literature, the soybean was grown as a farm crop in China proper more than 5,000 years ago. The origin of soybean culture in Manchuria is not definitely known but is supposed to have been brought from Central China districts many centuries ago. At first the beans were grown only for food but when they became a source of oil, production gradually increased. The production of soybeans, however, was more or less localized until after the Chinese-Japanese war [first Sino-Japanese war, Jan. 1894 to Jan. 1895] at which time Japan began to import the oil cake for fertilizing purposes, resulting in a sudden expansion of demand for this product. The Japanese-Russian War [Russo-Japanese war, 1904-05] brought about a wider interest in the soybean and its products, successful shipments being made to Europe about 1908, and the soybean soon assumed world-wide attention. Acreage and production increased by leaps and bounds so that the soybean became one of the most important staple crops and exports of Manchuria.

"Importance: The soybean is the most important agricultural crop in Manchuria today and business circles depend to the greatest extent upon the market situation of the soybean and its products oil and oil cakes. Soybeans make up more then one-fourth of the staple crop acreage of Manchuria, the annual production of seed being around 180,000,000 bushels. As the big cash crop of the region providing fully one-half of the farm income in northern Manchuria and more then one-half of the total volume of freight handled by Manchurian railways, the soybean is a dominating factor in the economic life of the country. From two-thirds to three-fourths of the soybean crop is exported."

Maps: Map of Manchuria (p. 2).

Tables: (1) Climatic conditions in the most important regions in Manchuria. These are: Dairen, Mukden, Changchun, Harbin, Tsitsihar. For each region is given: Latitude. Temperature in July and in August. Growing season (days). Rainfall (inches). Warm season rainfall * (percent). * Period from May to August inclusive.

(2) Area, total population, and population per square mile of the Three Northern Provinces. They are: Liaoning (Fengtien), Kirin, and Heilungkiang [Heilongjiang]. The latter has by far the largest area (211,385 square miles), but by far the smallest population (5.134 million), and by far the lowest population density (24 people per square mile).

(3) Total acreage of cultivated and uncultivated land in the Three Northeastern Provinces. Liaoning 19.1% cultivated. Kirin 22.9% cultivated. Heilungkiang 6.9% cultivated.

(4) Percentage of production and cultivated area of ordinary crops in Manchuria, 1930. Source: Manchuria Yearbook, 1932-33. Gives both sets of figures each year from 1924 to 1930 for soybeans, other beans, kaoliang, millet, maize, wheat, and other cereals. In 1926 production of soybeans first passed production of kaoliang to become the leading crop in Manchuria.

(5) Percentage of principal crops by agricultural regions in North Manchuria for 1929 and 1930. The agricultural regions are: South of Harbin, Harbin, East of Harbin. Below Sungari River, Hu-hai, West of Harbin. other places. Soybeans are the leading crop for both years in most of these regions. Data furnished by R. Kadono, Research Office, South Manchuria Railway, Harbin, Manchuria.

(6) Acreage of principal crops by agricultural regions in Manchuria, 1929. Figures are given for 15 regions; most are not the same as those in Table 5.

(7) Agricultural production in Manchuria in 1930. Figures are given for the three provinces, the total of the three, and for the Kwantung Leased Territory & South Manchuria Railway (SMR) Zone. Kirin province is by far the leading soybean producer with 2.364 million metric tons. Total soybean production in this area in 1930 was 5.318 million metric tons.

(8) Estimated production of soybeans by districts in Manchuria, 1931 (in bushels). Manchuria is divided into South Manchuria (where 79.783 million bu were produced) and North Manchuria (where 116.952 million bu were produced). Each of the two parts of Manchuria is divided into about 8 districts. By far the biggest soybean producing district is the Chinese Eastern Railway–eastern section in North Manchuria (41.361 million bushels).

(9) Soybean introductions [to the USA] from China, Japan, Manchuria, and Chosen (Korea) classified according to seed color. Fifteen different seed colors are given. By far the most common seed color (2910 out of 4578 total, or 63.5%) was straw yellow. The total number of introductions from each country were: Chosen (Korea) 3379 (or 73.8% of the total). Japan 577. Manchuria 511. China 111.

(9a, p. 39) Named native varieties of soybeans grown in different sections of Manchuria. Thirty-six names are given, in alphabetical order.

(9b, p. 42), Criteria for soybean plant selection each fall at Kaiyuan Experiment Station. Seven criteria, each of which is record for each selection.

(9c, p. 45). Time of planting soybeans. Ranges from April 25 to May 10 at Changchun to May 15 to May 20 at Laiyang.

(10) Number of labor units expended for staple crops of Manchuria. Gives figures for soybeans, wheat, kaoliang, millet, and corn. For each crop gives: Labor units per acre.

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Value of crops per acre in 1922, 1923, and 1924. Return per "labor unit" in 1922, 1923, and 1924. Soybeans usually gave the highest return per "labor unit"–but sometimes wheat gave the highest return.

(11) Future and spot transactions of the produce exchanges in Manchuria under Japanese supervision. Gives figures for the years 1913, 1918, 1923, 1928, and 1929. For each year gives: Amount of future delivery in silver yen. Amount of spot delivery in silver yen. Total. The total increased from 41.3 million in 1913 to 16,538 million in 1929. Part of this increase was clearly due to inflation.

(12) Soybean inspection grades of the South Manchuria Railway, 1923-1929, inclusive. Figures are given for each year. The three main categories are perfect seed, imperfect seed, and dirt. Under perfect seed, the two subcategories are yellow and colored. Under each of those are Excellent, 1st grade, and 2nd grade. Under imperfect seed, the two subcategories are injured and immature. Under each of those are Excellent, 1st grade, and 2nd grade.

(13) Physical analysis of standard samples from mixed storage soybeans for 1931-32.

(14) Physical analysis of standard samples for 1931-32. There are five classes of soybeans: Special, 1st class, 2nd class, 3rd class, and 4th class. For each class there is a column for yellow beans, green beans, brown beans, black beans, worm-eaten beans, unripe beans, and foreign matters.

(15) Physical analysis of soybeans in mixed storage for the year 1930-31. The five classes and seven columns are the same as for table 14.

(16) Results of physical analysis of Manchurian soybeans during the last ten years. Starts with 1923-24 and ends with 1931-32. The eight columns given for each year are the seven in table 14 plus one for "discolored beans."

(17) Amounts of bean oil and bean cake obtained from 100 kin (132.2 pounds) of soybeans by different milling systems. The 3 systems are round cake system, plate cake system, and [solvent] extraction system.

(18) Composition of bean cake or meal produced by three different milling systems.

(19) Total production of bean cake (pieces) in Manchuria in 6 localities for 1926-1930 inclusive. Source: The Manchuria Yearbook, 1932-33, p. 194.

(20) Location, number, systems, and production of soybean oil mills in 6 localities in Manchuria, 1926.

(21) Bean cake (pieces) producing capacity of oil mills in 6 localities in 24 hours, 1925-1931.

(22) Principal Manchurian exports for 1929, value in Haikwan taels. Soybeans are #1 with 40% of the total value. Ban cake is #2 with 15%. Ban oil is #4 with 5%.

(23) Exports of staple products through Dairen during the first 7 months of 1930, 1931, and 1932. Both quantity (short tons) and value (dollars).

(24) Exports of soybeans, soybean cake, and soybean oil from Manchuria to foreign countries, 1909-1930.

(25) Amount of soybeans of 1929 crop rejected for various reasons by the Chinese Eastern Railway. Eight different reasons are given with the amount rejected in tons for each reason. No. 1 reason is "Mixture of earth," followed by "short weight."

(26) Comparison of bean cake exports from Dairen, Newchwang, and Vladivostok from Oct. 1929 to March 1930, with same previous season. Figures given for the following countries: Japan proper, China proper, Formosa, Chosen (Korea), and other countries.

(27) Bean cake (pieces) exports according to destination (same destinations as in Table 26).

(28) Exports of soybean oil according to destination, 1931 (same destinations as above). Address: USDA, Washington, DC.

366. Ryerson, Knowles A. 1932. Plant explorers bring valuable new species and varieties to U.S. *Yearbook of Agriculture* (*USDA*) p. 297-302. For the year 1930. See p. 298.

• ***Summary:*** "In the spring of 1931, P.H. Dorsett, of the Division of Foreign Plant Introduction, and W.J. Morse of the Division of Forage Crops and Diseases, returned from the Orient after a search of more than two years for new varieties of soybeans. Their travels took them to Japan, including Hokkaido, the northernmost island, the peninsula [sic, island] of Saghalin [Russian: Sakhalin; Japanese: Karafuto; the island belonged to Japan until Aug. 1945], to Manchuria, Chosen (Korea) and China. Almost 3,000 soybean varieties were obtained in these great soy-producing areas.

"Special attention was also paid to other legumes of possible value to American agriculture, and important collections of mung beans, lespedeza, alfalfas, and Melilotus varieties were made. Other valuable field-crop introductions resulting from this expedition include collections of barleys, wheats, and grasses.

"A number of valuable horticultural contributions were also obtained. A special study was made of the oriental persimmon and about 200 introductions were made from Japan, China, and Chosen. In Peiping the expedition discovered the fruit being processed on a large scale to remove astringency, and made a thorough study of the methods used. Investigations of the outdoor storage of this fruit, begun during a previous expedition, were continued." Address: Bureau of Plant Industry, USDA.

367. *Foreign Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1933. The Manchurian soy bean situation. 26(7):184-88. Feb. 13.

• ***Summary:*** "The Manchurian soy bean acreage for 1933 probably will be no larger than that of 1932, according to Assistant Agricultural Commissioner Fred J. Rossiter at Shanghai. Unsettled political conditions are expected to continue to restrict the acreage. A large number of farmers

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have left their homes, while others have lost their work animals and will leave the land uncultivated."

"The amount of soy beans and bean products available for export during the crop year ending September 30, 1933 is considered to be about 30 per cent less than the amount available in 1931-32."

"Review of the 1931-32 season: While the United States disposed of [exported to Europe] over two million bushels of soy beans in Europe during the crop year, which ended September 30, 1932, Manchuria shipped to the same destination fifty-six million bushels of beans and the equivalent of over fifteen million bushels in the form of bean oil."

Tables show: (1) Manchuria: Exports of soy beans, bean cake and bean oil, by countries, year ended September 20, 1932. Includes exports from Dairen, Newchwang, Vladivostok and Manchuli. The exports are to Europe, Leningrad, Japan (incl. Chosen [Korea] and Taiwan), China, East Indies [Indonesia], United States, Others, and Total. Soy bean exports totaled 2,993,923 short tons, with the largest amount going to Europe (1,477,033). Soy bean cake exports totaled 1,503,395 short tons, with the largest amount going to Japan (980,911). Soy bean oil exports totaled 154,418 short tons, with the largest amount going to China (101,784).

(2) Manchuria: Average monthly price of soy beans and soy bean products at Dairen in silver yen and United States currency, 1929-30 to 1932-33.

368. *Foreign Crops and Markets* (*USDA Bureau of Agricultural Economics*). 1933. The world situation in oils and oilseeds. 27(14):352-76. Oct. 2.

• ***Summary:*** German trade in soy beans has increased. Two full page tables show: (1) Netherlands: Imports of fats and oils, 1928-1932 (includes 20,000–54,000 short tons of soybeans and large amounts of soybean oil). (2) Netherlands: Exports of fats and oils, 1928-1932 (includes 231–344 short tons soybeans and 11,000–17,000 short tons of soybean oil).

The section titled "Soy beans" states: (p. 367) "The total production of soy beans last year in the five leading soy bean producing countries: Manchuria, Chosen [Korea] and Dutch East Indies, each shows a substantial increase, Chosen producing 677,326 short tons against 634,506 in 1931 and Dutch East Indies 165,345 short tons compared with 141,602 during the previous year. In the United States, on the other hand, 397,350 short tons were harvested, a reduction of about 13 per cent from that of 1931 but about 8 per cent larger than the quantity harvested in 1930. The amount produced by Japan during the past year is not available at the present time. See table, page 374."

A 3rd table (p. 368) shows the production of oilseeds in terms of oil in major producing countries from 1929-30 to 1932-33. The amount stayed about constant during this period, ranging from 1.24 to 1.37 million pounds.

A 4th table, titled "Soybeans" (p. 368) shows the production of soybeans in major producing countries in 1909-1913 (average), 1921-1925 (average), and yearly from 1929-30 to 1932-33 (estimate). The amounts in 1931-32 were (in short tons): Manchuria 3,289,657. Chosen [Korea]: 634,506. USA 458,130. Japan 381,551. Dutch East Indies (today's Indonesia): 141,602.

369. *Foreign Crops and Markets* (*USDA Bureau of Agricultural Relations*). 1933. Oils and oilseeds: Manchuria has larger soy bean crop. 27(14):348-50. Oct. 2.

• ***Summary:*** "Since mid-July the movement of [soy] beans to Europe has been unusually small in view of the German restrictions on imports of the bean and its products."

Tables show: (1) "Manchuria: Exports of soy beans and bean products, by quarters, seasons 1931-32 and 1932-33." Shows [soy] beans, bean cake, bean oil, and total. These exports are from Dairen, Newchwang, Vladivostok, and Manchouli [W.-G. Man-chou-li, Manzhouli]. Note: Manzhouli is an inland port in Nei Monggol {Inner Mongolia}, northern China, near the border with Russia. As of Jan. 2008 Manzhouli is China's busiest land port of entry, and is responsible for 60% of all imports from and exports to Russia and Eastern Europe. They apparently travel by rail on an east-west axis.

(2) "Manchuria: Exports of soy beans and bean products by countries of destination, Oct. to June, 1931-32 and 1932-33." The countries are Japan [incl. Korea and Formosa], Europe [incl. exports via Manchouli to Leningrad], China, America [USA], Malaysia, and Others. Europe buys the most whole soy beans, Japan the most bean cake, and China the most bean oil.

370. *USDA Plant Inventory.* 1933. Plant material introduced by the Division of Foreign Plant Introduction, Bureau of Plant Industry, January 1 to March 31, 1932 (Nos. 95552 to 98256). No. 110. 96 p. Nov.

• ***Summary:*** Soybean introductions: *Soja max* (L.) Piper (*Glycine hispida* Maxim.). Fabaceae.

No. 95706-96383. "From Chosen [Korea]. Seeds arranged for by the Dorsett and Morse expedition and sent through the American consulate at Tokyo, Japan. Received January 26, 1932. A collection of soybeans presented by the Seisen Shijo (western branch) of the Agricultural Experiment Station of the Chosen Government, Shariin, October 24, 1931. 95706-9578. From the Zenra-Nando Prefecture." For example, the first accession: "95706. No. 7971. Station no. 1. Medium size, straw-yellow with dark-brown hilum; heavily mottles with brown.

No. 95719-95740. From the Zenra Hokudo Prefecture.

Note: PI numbers of special significance: "No. 95727. No. 7992. Station no. 22. Large size, straw- to olive-yellow with pale hilum; slightly mottled with brown." Later renamed "Nanda," which means "What's that?" in Japanese.

No. 95741-95776. From the Keisho-Nando Prefecture.

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No. 95777-95828. "From the Keisho-Hokudo Prefecture."

No. 95829-95866. "From the Chusei-Nando Prefecture."

No. 95867-95899. "From the Chusei-Hokudo Prefecture."

No. 95900-95944. "From the Keikido Prefecture."

No. 95945-96000. "From the Kogendo Prefecture."

No. 96001-96004. "From the Kokaido Prefecture."

No. 96005-96044. From various numbered stations in Chosen.

No. 96045-96094. "From the Heian-Nando Prefecture."

No. 96095-96126. "From the Heian-Hokudo Prefecture."

No. 96127-96156. "From the Kankyo-Nando Prefecture."

No. 96157-96187. "From the Kankyo-Hokudo Prefecture."

No. 96188-96202. "From the Chinese Eastern Railway Agricultural Experiment Station, Echo, Manchuria."

No. 96203-96383. "From the Kankyo-Hokudo Prefecture." Address: Washington, DC.

371. Tanaka, T. 1933. Chôsen no jimbun chishi gaku teki kenkyû [Anthropogeographical studies on Korea]. *Chiri Kyoiku* (*Geographical Education*) 17:40-45, 256-63, 376-82. [Jap]*

372. *Japan Times Year Book.* 1933. Serial/periodical. Published by The Japan Times, Tokyo. 27 cm. [Eng]

• ***Summary:*** Merged with: Japan Year Book (Tokyo, Japan: 1905), to form: Japan-Manchoukuo Year Book. This book has a larger format than the Japan Year Book. On the title page is printed "(Third Edition). Near the front are nine maps (black and white): Japan (incl. Chosen [Korea] and Manchokuo) [sic] with each of Japan's provinces numbered and named, Karafuto (southern half), Hokkaido, Northern Hondo [Honshu], Central Hondo, Western Hondo, Kyushu, Taiwan, and Chosen [Korea].

Facing p. 72 is Appendix XII: Japanese weights and measures. 1 koku = 1.80391 hectolitres.

Page 140. A table shows the "Principal agricultural crops" of Japan and the quantity and value produced in 1928-30. For "soya beans":

5.370 million hl [hectoliters] in 1928

4.789 million hectoliters in 1929

5.473 million hectoliters in 1930.

Production of "azuki beans" was 24.6% that of soya beans in 1928.

Another table (p, 141) shows cultivated area, production, and value for soya beans, azuki beans, and foxtail millet in 1929 and 1930. For soya beans:

4.789 million hectoliters in 1929

5.478 million hectoliters in 1930

Page 213. In the section on the foreign trade of Japan in 1931, important items include "Beans" (worth 37.677 million yen compared with 49.734 million yen in 1930, a decrease of 12.1%) and "Bean cakes" (worth 44.179 million yen compared with 66.417 million yen in 1930, a decrease of 22.2%).

Page 221. About agriculture in Chosen [Korea]. "Soya beans are exported chiefly to Japan for manufacturing soy [sauce], the export amounting to 4.490 million koku valued at 17.554 million yen in 1930.

Page 301. Chapter 43 is titled "Kwantung Leased Territory and Railway Zone." Japan believes that it now (since 1931) controls these two parts of Manchuria. The latter is officially known as the "South Manchuria Railway Zone."

Page 307. Contains a table that lists the principal agricultural products in the Kwantung and the Railway Zone. They are (in descending order of total production in both areas): peanuts (1.032 million koku), maize (921,071 koku), kaoliang (270,529 koku), millet (216,644 koku), soya beans (156,895 koku). Note that soya beans are much less important than they were 20 years ago.

Page 308. "The most important Manchurian industry is the [soya] bean oil industry, and in this field, the Kwantung territory occupies a very important position. The capacity of bean oil produced at Dairen is nearly 70 percent of the entire bean oil producing capacity of Manchuria." A table gives the number of oil mills at Dairen (1924-1931), their capacity in terms of [soy] bean cakes, and the percentage of the total Manchurian capacity controlled by Dairen. The number of mills increased from 82 in 1924 to a peak of 84 in 1926, then decreased to 53 in 1931. The capacity in bean cakes increased from 285,000 cakes in 1924 to a peak of 297,400 cakes in 1931. The percentage of total capacity increased from 55% in 1924 to 69% in 1931.

A second table [which makes no sense] gives the actual production of cakes in Dairen mills from 1924 to 1931: It increased from 27.087 million cakes in 1924 to a peak of 40.939 million cakes in 1926, then decreased to 22.980 million in 1930.

373. Morse, W.J. 1933. Soybeans now a major crop in United States; Few grown before 1898. *Yearbook of Agriculture* (*USDA*) p. 198-205. For the year 1933.

• ***Summary:*** Contents: Variety adaptation. Variety utilization (incl. bean curd, bean milk, soy sauce, miso (bean paste), bean sprouts, green vegetable beans, bean flour, roasted beans, bean confections [made using roasted whole soy flour], beverages, oil and meal, special fermented bean products). Soybean oil and meal industry. Soybean meal. Soybean oil. Soybeans for human food. Soybeans as an export crop.

"Variety adaptation: The Virginia, Laredo, Manchu, and Biloxi have a greater range than most other varieties. The Virginia, Mansoy, and Harbinsoy varieties excel on the less

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productive types of soil, while on better soils the Mansoy and Harbinsoy give inferior results.

"Since the Department of Agriculture began to introduce soybean varieties more than 7,000 samples of beans have been collected from Japan, Chosen [Korea], Manchuria, China, Taiwan (Formosa), Java [in today's Indonesia], Sumatra, and India. There are more than 2,000 distinct types in this large collection, ranging from 75 to more than 200 days in reaching maturity. At present about 40 varieties are generally grown in the United States."

"In Japan, where the soybean is used extensively as a green vegetable, more than 60 varieties, ranging in maturity from 75 to 160 days and differing in flavor, are grown solely for this purpose. The soybean in used in the United States primarily as forage, being preserved either as hay or silage, or cut and fed green as soilage, and is also pastured extensively with hogs and sheep."

"Soybeans for human food: In Asiatic countries the soybean is grown primarily for the beans, which are used largely in the manufacture of numerous food products that supply the principal source of protein in the Asiatic diet as that in the diet of western people is furnished chiefly by meat and dairy products. "Oriental people use very few dairy and meat products, yet for many centuries they have lived on an apparently well-balanced diet of which the protein is derived largely from the soybean.

"The most commonly used soybean foods in the Orient are soy sauce, miso or bean paste, bean curd, bean milk, bean flour, roasted-bean confections, green-vegetable beans, bean sprouts, roasted bean flour, boiled beans (with rice, millet, or sorghum), coffee substitute, and health drinks made from roasted soybeans.

"In the United States the soybean and its products have attracted attention as an article of food at various times, but only within the last three or four years have there been any extensive investigations along this line by commercial interests. Soybean flour, made by grinding either the whole bean (preferably yellow-seed varieties) or the press cake after the oil has been removed from the beans, is finding increasing favor in the manufacture of various products, such as malted milk, macaroni, vermicelli, spaghetti, noodles, crackers, cookies, ice-cream cones, breakfast foods, health foods, diabetic foods, and infant foods. Within the last year several large baking companies have began using 15 to 20 per cent of soybean flour in making bread and cakes." Address: Bureau of Plant Industry, Washington, DC.

374. Terry, Thomas Philip. 1933. Terry's guide to the Japanese Empire, including Chôsen (Korea) and Taiwan (Formosa), with chapters on Manchuria, the Trans-Siberian railway, and the chief ocean routes to Japan: a handbook for travelers, with 8 specially drawn maps and 23 plans. Revised and augmented ed. Boston and New York: Houghton Mifflin Company; London, Geografia, Ltd. [etc., etc.]. cclxxxlv + 799 p. Maps (some folded). Index. 17 cm. With 85 unnumbered pages of ads at the end and 9 at front of book. • ***Summary:*** A digital version of this book is available on HathiTrust.

In the section on "Japanese Inns" we read (p. xxxvi): "Later the traveler may learn that the place enjoys fame for some savory specialty–eels boiled in soy,..."

In the same section we read (p. xl): "... the other of beans, bean-curd or something of that nature. Salt is not provided unless asked for. Many of the dishes are cooked in soy, a tiny dish of which is supplied for dipping bits into before eating them."

In the section on "Japanese Food" we read (p. xlii): "Sukiyaki restaurants are features of many cities." "Some of it is delicious, and the more the foreigner eats of it the more he likes it. Those dishes which are mawkish to the American palate can sometimes be rendered appetizing by the addition of the excellent shoyu sauce (which is quite salty), grated cheese, etc."

In the same section (p. xliii): "The soy-bean (*daizu; ômame*) ranks first in extent, variety of use, and value among the pulse of Japan, and in point of nutriment is quite near to meat. It contains nearly two fifths of its weight in legumin, nearly one sixth in fat, and is rich in nitrogen. It is to the Nipponese what frijoles are to Mexicans and garbanzos (chick-peas) to Spaniards. Of the numerous varieties some are made into curd [tofu], and into the widely celebrated bean-sauce (the Worcestershire of Asia) called *shoyu* (*sho,* soy; *yu,* oil), and which is almost as indispensable as rice. It forms the daily relish of the rich man and the beggar, and is in as general use as tea and tobacco."

In the same section (p. xlv): *Teriyaki:* fish in a sauce of soy, mirin, and sugar. "*Sashimi:* raw fish cut in thin slices and eaten after being dipped in *shoyu.–Kabayaki:* fish which is first steamed then dipped into soy and roasted (or eels cut open on the dorsal line, covered with soy mixed with sugar, and roasted)." "*Hachi-zakana:* a large fish salted and broiled, or boiled in soy.–*Uman:* picked-up fish or fowl boiled (with lotus-roots and potatoes) in soy and flavored with mirin... *Iri-tamago:* eggs stirred, then boiled in shoyu."

In the same section under "Rice" (p. xlvi): "*Azuki-meshi:* rice and red pea-beans mixed (boiled). *Mochi:* small dough-cakes made of rice and sold throughout Japan.–*Sushi:* a general name for food of boiled rice and fish, eggs, vegetables, etc., seasoned with vinegar and soy. As an affix [suffix] the form is changed into *zushi... Inari-zushi:* fried tôfu stuffed with *chirashi-zushi...* A differentiation of this popular food is the *Kombumaki:* baked or roasted fish wrapped in *kombu,* then tied, and boiled in sugar and soy... *Tsukudani:* small fish boiled in soy and used as a relish or condiment (named for Tsukudajima, a place in Tokyo famous for its preparation)... *Oden:* a stew (greatly enjoyed by the proletariat) of fried bean-curd, lotus-roots, potatoes, etc."

In the same section (p. xlvii): "Soup (*shiru*). *Tôfu-jiru:*

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bean-curd soup.–*Miso-shiru:* bean soup with vegetables."

In the section on Yokohama (p. 24) is a long quotation from Commodore Matthew Perry's *Narrative* (Vol. 1, p. 357): There was an exchange of gifts: "'The return gifts from the Emperor and the princes included beautiful specimens of gold lacquer; bronze; silver; porcelain; many rolls of fine silk brocade and pongee; many lacquered articles of rare merit; a number of rolls of fine crape; figured matting; jars of soy; coral and silver ornaments;...'"

In the section on Tokyo (p. 113): "*Sukiyaki* (pronounced skee-yah'-key) customarily is prepared by the host, who, with his guests, squat round a small electric brazier brought to a private room floored with soft matting and bright with flowers. Slices of red meat (beef), onions, leeks, bamboo-shoots, mushrooms, bean-curd and various seasoning vegetables, along with shoyu sauce are placed in the hot dish where a good soup stock is already sizzling. When all is cooked (a question of a few minutes) it is served with a raw egg, in a dainty lacquered bowl, and eaten with chopsticks (*o-hashi*–spoons are available)... To eat sukiyaki once is always to want it. It is filling and satisfying. Many Sukiyaki restaurants are found throughout Japan. Every city has one or more."

In the section on "Kyoto–Inari Shrine" (p. 438): At the *Inari-matsuri,* which falls on June 5, "the people eat *Inari-zushi,* or fried *tôfu* stuffed with boiled rice, since *tôfu* is the favorite food of the fox popularly believed to be the messenger of Inari (and by extension, the God of Rice)."

In the section on Kyoto to Koya-san (p. 515): At the inns on Koya-san, a mountain above and to the west of Kyoto, vegetarian [sic, vegan] Buddhist priests prepare the meals: "Meals are served in one's apartment; the food is purely vegetable, and after the second day distressfully unpalatable. Fish, flesh, fowl, butter, cheese, eggs, milk bread, coffee, and other necessaries of life are absent, and are replaced by seaweed, greens, bamboo-shoots, cabbage, daikon in various unappetizing forms, and other garden-truck which one eats as a novelty the first meal and rejects with an involuntary tightening of the throat when it is offered at the second and third. In addition there are flabby mushrooms boiled in very thin water without seasoning; the omnipresent boiled rice without sugar, milk, or salt; a bean-curd (tofu) for which one acquires a liking only after much patient effort; a yellow substance (known as yuba) made of the skin of bean-curd, and looking and tasting like thin-sheet rubber; and insipid sugarless tea. Hot sake can be had when called for."

In the section on "Korean agriculture" (p. 699): "Agriculture is the national industry and it gives occupation to six or seven millions of the people. The native methods are so primitive that ere long the production will be trebled by the modern system introduced by the Japanese... The chief crops are rice, beans, pease, millet, wheat, barley, tobacco, cotton, castor-oil, potatoes, melons, and peppers. The people are inordinately fond of lettuce, and nearly every yard has a plot of it. Besides teaching the Koreans methods for the development of the land on scientific lines, the Japanese have established model farms, miniature cotton and tobacco plantations; horticultural, forestry, and seedling stations, and besides stocking the country with fresh seeds and new agricultural tools, they have taught the people how to breed and care for live-stock, and have quadrupled the yearly output of Korean silk. The country has been referred to as a 'natural orchard,' and experts are supplanting certain of the poorly developed fruits with American pears, grapes, apples, etc."

In the section on "The Korean Pony" (p. 737): "The Korean Pony (prototype of the Japanese pony) is one of the most salient features of Korea. The breed is peculiar to it. The animals used for burdens are all stallions, from 10 to 12 hands high, well formed, and singularly strong, carrying from 160 to 200 lbs. 30 M. [miles] a day, week after week, on sorry food..." "They are fed three times a day on brown slush as hot as they can drink it, composed of [soy] beans, chopped millet-stalks, rice-husks, and bran, with the water in which they have been boiled. Every attempt at friendliness is resented with teeth and heels."

In the section on "Korean characteristics" (p. 725): "The very poor only take two meals a day, but those who can afford it take three and four. Among the dishes dear to the native heart are pounded capsicum, bean curd [tofu], various sauces of abominable odors, a species of sour kraut (*kimshi* [*kimchi*]), seaweed, salt fish, and salted seaweed fried in batter. 'Hot dog' in the literal sense is the piece de resistance of the Korean menu. There are no harder or more constant drinkers than the Koreans, and the vice is common to all classes."

In the section on Manchuria (p. 756): "From Heijo the rly. [railway] continues N.W. near the sea. Beyond 209 M. Shin-anshu, we cross the Seiseiko, then the Daineiko. The junks which here spread their broad sails to catch the breeze which blows above the tree-tops, come and go laden with timber from the Upper Yalu, wild silk cocoons, furs, soya-beancake, rice and kindred products."

375. Hepburn, Joseph Samuel; Sohn, K.S.; Devlin, L.P. 1934. Biochemical studies of soy bean milk and chicken protein. *J. of the Franklin Institute* 217(2):213-21. Feb. (Chem. Abst. 28:2042). [5 ref]

• ***Summary:*** "In Korea, soy beans are used extensively as a foodstuff. They serve as the basis of two foods, Doo Pu [known as Do Fu in Chinese] and soy bean milk... The Korean people passed immediately from a primitive condition to the status of an agricultural community without the intervention of a pastoral age. For this reason, soy bean milk was the only milk used by the Koreans as an accessory food until the introduction of cows in comparatively recent times. Even at the present time, soy bean milk is much used as a food and beverage especially during the summer

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months."

"Soy bean milk" gives results of feeding tests on albino rats, showing that soybean milk had about the same protein content as cow's milk, and that other nutrient compounds were present to a lesser extent. Values given for soybean milk and cow's milk (in parentheses) are: Protein 3.5% (3-4%); carbohydrate 0.61% (4.6-5.0%); fat 2.35% (3-6%); calcium 0.034% (0.120%); phosphorus pentoxide 0.091% (0.23%). It curdled at a lower acidity than cow's milk, and in feeding, the ration containing soybean milk produced gain in weight less rapidly and with less efficiency than that containing cow's milk. Chicken protein is a less efficient protein than caseinogen in the diet of young rats. Address: John Clifford English Laboratories of Physics and Chemistry, Hahnemann Medical College and Hospital of Philadelphia.

376. South Manchuria Railway. 1934. Soya beans. *Report on Progress in Manchuria.* Fourth, to 1934. 294 p. June. See p. 22, 33-34, 194, 196, 200-01, 203, 205-06, 216, 219-21. (Dairen, Manchuria).
• ***Summary:*** The average soybean yield is 20 bushels/acre in Manchuria, 16 bu/acre in Japan, 15 in China, and 10 in Korea. Address: Dairen, Manchuria.

377. Takahashi, Noboru. 1934. Daizu ni okeru yôkei inshi to ikkyo ryûsû inshi to no rensa kankei [Linkage relation between the genes for the form of leaves and the number of seeds per pod of soybeans]. *Idengaku Zasshi* (*Japanese J. of Genetics*) 9(4):208-25. Aug. [12 ref. Jap; eng]
• ***Summary:*** "Résumé: The object of this paper is to present new evidences of the linkage relation between the genes for the form of leaves and the number of seeds per pod of soybeans. The varieties used are 'Wearucong' and 'Yanta', the former having broad leaves and two-seeded pods and the latter narrow leaves, and three-seeded pods. The results obtained in crossing experiments on the characteristics concerned are summarized as follows:

"1. The narrow leaf (r) is a simple recessive to the broad leaf (R) and in F2 the ratio of the latter to the former is about 3:1. This relation holds true for the two characteristics with regard to the number of seeds per pod, i.e., the two-seeded (F) is dominant over the three-seeded (f), segregating in F2 in an average ratio 3:1.

"2. There is a linkage relation between R and F, the crossing over value being about 10 per cent.

"3. The action of the gene for leaf form interferes to some extent with the action of the gene for seed number per pod, and a number of genes other than the leaf form gene seem also to interfere with the action of the gene for seed number per pod." Address: Chosen Sotokufu Noji Shikensho Nishi Sen Shijo (Sariin), Korea.

378. Kankito, ? 1934. [Hygienic investigation of mustard miso]. *Chosen Yakugaku* (*Korean Pharmacology*) 131:46-. [Jap]*

379. Moegling, O. 1934. Die deutsch Oelbohne (*Phaseolus hispidus germanicus*) [The German oilbean (soybean)]. *Tropenpflanzer* (*Der*) (*Berlin*) 37(1):12-17. [Ger]*
• ***Summary:*** A description of the cultivation of the soy bean in Korea, It is not clear why the name Phaseolus hispidus germanicus is used instead of the usual name, Soja hispida or Glycine Soja.

380. Park, Y.R. 1934. [Bacteriological studies on Korean doenjang and kochojang]. *Chiba Igakukai Zasshi* (*J. of the Chiba Medical Society*) 13:2671-2708. [Jap]*

381. Inahara, K. ed. 1934. Japan Year Book. Tokyo: The Foreign Affairs Association of Japan. 29 + 1356 p. See p. 1083, 1168, 1172.
• ***Summary:*** Page 454: "Leguminous plants:... During the past decade area has been pursuing a slow, downward movement, while a sharp reduction was experienced by production. More than 72% of the total area and 67% of the total production were occupied by soy-beans and red beans."

Soy-beans were planted on 341,752 ha which produced 4,351,806 hectoliters worth 31,724,890 yen.

Red [azuki] beans were planted on 119,101 ha which produced 1,002,988 hectoliters worth 9,752,490 yen.

Page 1083: The section on Chosen [Korean] agriculture [Korea is a Japanese colony] states that rice and barley plus wheat are the two most important crops. "Third in importance comes the soy bean. In earlier times it was far from being an important produce owing to ignorance on the part of Korean farmers of the proper method of preparation, such as drying and assorting. It is now, however, in high esteem on the Japanese market where there is a demand for it not only as food, but for chemical industrial purposes, and thus the amount exported to Japan is yearly on the increase. In 1930 the total area under cultivation was 803,000 cho and the amount produced reached 4,410,000 koku, which was an increase of more than six times, compared with the year 1910.

"Millet is for most Koreans what rice is for the Japanese people. They depend more upon it than upon rice on account of its cheapness in price. The Korean farmers sell their rice, but use their millet crops for their daily diet,..." Note: Do they voluntarily sell their rice?

Page 1168: The section on Manchoutikuo [sic] agriculture states that the great majority of exports go to Japan, with China a close second. The principal export commodities include soy beans (worth 143.899 million Haikwan taels in 1932; #1 in value), bean cakes (66.311 million HT; #2 in value), and soy bean oil (24.511 million HT; #4 in value after coal).

Page 1172: A large table shows "Export of agricultural crops, 1929-1931" from Manchuria. For each is given the

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quantity in piculs (1 picul = 133.33 lb) and value in yen. For soya beans:

46.012 million piculs in 1929
33,536 million piculs in 1930
46.897 million piculs in 1931

The first section below this table states: "Soy beans: Manchoutikuo produces about three-fifths of the total production of soy beans in the world. The beans contain about 10 per cent. of oil, and the cake which is obtained in pressing the beans is exported as fertilizers. The latest figure for production of soy beans in Manchoutikuo was 4,430,000 tons and its total plantation area 3,878,000 hectares. The average crop [yield] per hectare was 1,122 kg.

Kaoliang comes next in importance after soy beans. "It serves as the diet of the people. Its production is 3,722,000 tons a year..."

382. Japan-Manchoukuo Year Book. 1934. Tokyo, Japan: Japan-Manchoukuo Year Book Co. 26 cm. First annual issue. [Eng]

• ***Summary:*** Each year book is divided into two main parts: Japan, and Manchoukuo. The Preface begins: "The far reaching political and economic changes which have taken place in the Far East within recent years have created the need for a year book covering the Japanese Empire and Manchoukuo [pronounced mahn-CHO-ku]. Especially to be noted is the growing relationship between Japan and Manchoukuo; hence any volume which discusses one, without consideration of the other, would be incomplete."

A table near the front gives "Weights, measures, and moneys." 1.80391 hectoliters = 1 koku = 5.11902 dry bushels (USA). 1 yen = $0.4984 dollars (USA) = 2.583 French francs = 2.0924 German marks.

A large color map (2-page spread) shows Japan, Manchoukuo, Chosen [Korea], Karafuto, and Taiwan–as well as the railways in each country.

Page 360: A large table shows the yield (in koku per tan) of 15 major Japanese crops, from 1904-08 to 1931–including rice, barley, naked barley, wheat, soya beans, red beans, etc. The yield of soya beans increased from 0.77 in 1904-08 to 0.86 in 1930.

Page 364: A table shows the production (in hectoliters) of beans, potatoes, and sweet potatoes in Japan from 1927 to 1931. For soya beans:

5.886 million hectoliters in 1927
5.370 million hectoliters in 1928
4.780 million hectoliters in 1929
5.473 million hectoliters in 1930
4.481 million hectoliters in 1931.

Production of red [azuki] beans in 1931 was 25.2% of soya beans.

Pages 626-34: The chapter on Agriculture in Manchoukuo begins: Widely different views are entertained as to the possibilities of Manchoukuo as a field of agricultural enterprises. Undoubtedly, they are immensely greater than those of mountainous Japan or Korea, but to liken them to those of the great agricultural regions found in North and South America seems to have no ground. The soil is not in general so rich, and in many places has been much exhausted, nor is the area of arable land so extensive, nor the climate so moderate. One great advantage it has had over most other countries in Eastern Asia is the comparative thinness of its population, but this advantage is fast being diminished by the constant influx of Chinese immigrants from the South. Taking all these things into consideration, Manchoukuo is yet the most favored spot for agriculture in the Far East, and its opportunities may well be termed 'immense,' which epithet is often met with in Japanese publications on that country.

"The great mass of level land, extending over the whole of Central Manchuria and comprising the basins of the Liao, Sungari, Nonni, and Hulan, the productiveness of which can compare favorably with any part of Japan or Korea, is by itself as large as the whole of the Chosen Peninsula or of the mainland of Japan,..." The forecast for soya bean production in Manchoukuo in 1933 is 5.216 million metric tons. Manchuria is divided into north and south. About half of the total crop production is grown in each area.

Page 627: A table shows "Production of crops in Manchoukuo, 1931." For soya beans:

1.175 million metric tons in Mukden.
2.414 million metric tons in Kirin.
1.637 million metric tons in Heilungkiang.
5.227 million metric tons total.

Soya beans had the largest production of any crop in the country in 1931, followed by kaoliang (4.497 mmt) then millet (2.960 mmt).

Page 628: A large table gives "Crop output in Manchoukuo," 1922-1931. For soya beans:

3.088 million metric tons in 1922.
3.088 million metric tons in 1923.
3.448 million metric tons in 1924.
4.173 million metric tons in 1925.
4.775 million metric tons in 1926.
4.816 million metric tons in 1927.
4.834 million metric tons in 1928.
4.849 million metric tons in 1929
5.297 million metric tons in 1930.
5.227 million metric tons in 1931.

Page 629: A large table shows "Cultivated area in Manchoukuo classified by crops, 1931. (Hectares)." For Soya beans:

Mukden 960,030
Kirin 1,902,210
Heilungkiang 1,338,350
Total: 4,200,590 ha

Previous year 4,118,450. "In one of the publications of the Chinese Maritime Customs" [*The Soya Bean of*

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*Manchuria,* 1911, p. 6] we read: "But when the Manchurian farmer pulls out the whole plant by the roots, or, having cut the crop with his sickle, proceeds to cut up the roots with a mattock for fuel, he is preventing the work of the bacillus radicicola from bearing its fruit and depriving his land of the provision made for it by nature. Thus, the soil in South-west Manchuria, where agriculture has been carried on for 400 years, has been bereft of all vegetable and organic matter and no longer bears harvests. The wonderful natural loaminess of the soil in the newer regions further north–for instance, at Shwangchengpu, where it is said that no manure is or ever has been used by the farmers in the 40 years since the land has been cultivated–this loaminess will assure good harvests for many years to come; but in the course of time even the richest soil will become exhausted, and to prevent such a disaster steps should be taken to inform the ignorance of the peasants who are at present deriving such great profits from their crops. If they could be shown the value of the process of 'turning under' the green bean plants after the harvest, the fertility of the land might be preserved."

Page 630: In this chapter on Agriculture, a section on "Soya beans" appears on pages 630-34. Contents: Introduction. Cultivation of soya beans. Different species. Uses of the soya bean. Bean oil. Bean cake. Near the start of the Introduction we read: It was the soya bean that introduced Manchuria into world trade, "and it is still the soya bean that makes Manchuria famous. So predominant is the position of the soya bean and its products, bean oil and bean cake, in the trade of Manchoukuo, that these three articles now constitute nearly one-half the value of the entire exports of the country. Sir Alexander Hosie called them, 'the Wealth of Manchuria.' They are indeed the wealth of the country, which has been growing ever since the time of Sir Alexander, and is still growing. Without the 'three articles,' by which term [soya] beans, bean cake, and bean oil are collectively called by the Japanese, the trade of Manchoukuo would, at a stroke, shrink to one-half its present amount, not only in export but most probably in import also, for experience has shown that Manchoukuo seldom buys more than it sells."

A large table (p. 630) titled "Soya bean output in Manchoukuo: Classified according to districts" is divided into South and North Manchuria. It shows how many metric tons were produced in each district in 1931 and 1932.

On page 634 is a long, interesting discussion of: "Kaoliang: Apart from its trade value, kaoliang or tall millet may be considered even more important than soya beans, in that it is the staple food of the native population, and the principal grain food of the numerous animals engaged in the farm-work and in the immense carrying trade of the three provinces.

"Before soya beans attained their present importance, half the total area of the cultivated land in Manchuria was devoted to kaoliang, and a large amount of it was exported to the provinces of China. Of late, however, the cultivation of kaoliang has given place to that of [soya] beans in many places, so that at present, in the northern part of South Manchuria, where beans are cultivated most extensively, about 50 per cent. of the whole cultivated area is devoted to beans, and only 20 to 30 per cent. to kaoliang. It is said that 8 pounds of seed suffice to sow an acre of land, producing in good years 10 to 12 cwt. [hundredweight] of grain. In a bad year or on poor soil, only a third of this quantity will be harvested. The crop is easily affected by climatic and soil conditions, and for this reason its cultivation is confined chiefly to Mukden Province, and in that province, too, it does not grow well in the Liaotung Peninsula or in the mountainous south-east.

"Kaoliang is not only used as a food-stuff for man and beast in Manchoukuo, but the native spirit is also made out of it. Nor are the grains the only useful part of it; the stalks play a very important role in Manchoukuo. The outer leaf layers, are woven into mats, so much required in the trade of the country, for roofing ricks and packing loads of grain and beans, and for numerous other purposes. The stalks are also utilized for fencing, bridging, and housebuilding, and where wood and coal are unobtainable or dear they are used for fuel.

"Kaoliang spirit, extensively used in both Manchoukuo and Mongolia, is colorless and transparent, and possesses a strong flavor, which peculiarly appeals to the taste of the natives.

"Kaoliang used to be an article of home consumption, and its market outside Manchuria was at most confined to China proper, but after the outbreak of the European War a trial shipment was made to Europe as grain food for horses, and being successful it has since continued to be exported. It is also exported to Japan, and the demand for it there is constantly increasing."

383. *Manchoukuo Year Book* (*The*). 1934. 1934. xxix + 852 p. See p. 234-35, 256-59, 267-79, 350-51, 396-97, 399-409, 466. Published by Minami Manshu Tetsudo Kabushiki Kaisha, Toa-Keizai Chosakyoku (South Manchuria Railway Co., East-Asiatic Economic Investigation Bureau), Tokyo. [Eng]

• ***Summary:*** Chapter 10, "Agriculture," discusses soya beans in detail. Some 34% of the "value of the manufacturing products represent the products of bean oil mills using soya beans as raw material" (p. 234).

Table 1 shows that agricultural products occupy about 50% (of the value in Haikwan taels) of total exports from Manchuria during 1929, 1930, and 1931. Of the manufactured products, [soy] beancake, [soy] bean oil and bran, which are directly produced from agricultural raw materials, constitute 80% of the total (p. 235).

The South Manchuria Railway (S.M.R.) has played a leading role in developing Manchurian agriculture

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(especially [soy] bean production) and expanding exports. A table (p. 256) shows the SMR's revenues from passengers and freight for selected years from 1907-1931. Freight revenues are, overall, about seven times as large as passenger revenues. The main source of freight revenues is coal, followed by [soy] beans and beancake (Source: SMRC Business Report). "The export of soya beans, beancake, and bean oil has increased three to four times in the past twenty years." The SMRC as established an Agricultural Experiment Station where crops (such as beans) and animals have been improved, bringing much benefit to Manchurian farmers. SMRC's work has contributed both directly and indirectly to the agricultural development of Manchuria by Han Chinese and by Korean settlers (p. 256).

Before the Manchurian incident, Japanese farmers were oppressed by the Northeastern military leaders and found it practically impossible to farm outside the South Manchuria Railway zone. Thus, before the Manchurian incident, only 730 Japanese households were engaged in agriculture in Manchuria. "The contribution made by Koreans to the development of agriculture in Manchuria cannot be overlooked... their entrance into the interior of Manchuria began only after the Russo-Japanese War" [1904-05]. A table (p. 257) shows the number of Japanese settlers and Korean settlers in Manchuria from 1908 to 1930. The number of Japanese settlers increased from 56,433 in 1908 to 288,784 in 1930. The number of Korean settlers increased from 51,070 in 1910 to 607,119 in 1930.

The Wanpaoshan incident happened just before the Manchurian incident (p. 257). Note: The Wanpaoshan Incident (Jap: *Manpozan jiken*) was a minor dispute between Chinese and Korean farmers which occurred on 1 July 1931, prior to the Mukden Incident [best known in Japan as the Manchurian Incident]. Although the issue was trivial, it was highly sensationalized in the Japanese and Korean press, and used with considerable propaganda effect to increase anti-Chinese sentiment in the Empire of Japan prior to the invasion of Manchuria [in Sept. 1931] (Source: Wikipedia, May 2009). As of May 2009 Mukden is known as Shenyang.

"The agricultural development in Mongolia was suddenly brought about after the Russo-Japanese War, and particularly after the establishment of the Republic of China [on 1 Jan. 1912], as the former policy of protecting the ancient kings of Manchuria was abolished, and the settlement of the Han [Chinese] race was encouraged. The Mongolians were more and more oppressed and obliged to retreat gradually to the inner desert districts, and the barren fields of Mongolia came to be rapidly cultivate by the Han settlers.

"Manchuria was made a great agricultural country by the joint efforts of the Hans, Japanese, Koreans, and Russians, with the Hans as the main factor; Manchuria came to have intimate relations with the world economy through its export agricultural products."

Agricultural products in the three provinces of Fengtien, Kirin, and Heilungkiang: Among the legumes are soya beans, Indian beans, and green peas. Table 13 shows the cultivated area (hectares) and production (metric tons) of these crops: (1) In the three provinces: Soya beans: 4,102,990 ha and 5,124,760 metric tons. Other legumes: 353,190 ha and 54,467 metric tons. (2) In the Kwantung Leased Territory and South Manchuria Railway Zone: Soya beans: 31,923 ha and 17,595 metric tons. Other legumes: 54,467 ha and 160,193 metric tons. Statistics are also given in Table 13 for Kaoliang (#2 crop after soya beans in area and production), millet (#3), maize (#4), wheat (#5), etc. Soya beans account for nearly 30% of the total acreage (p. 258-59).

Table 22 (p. 267) shows that area and production of soya beans in 1933 was larger Northern Manchuria than in Southern Manchuria. A long section titled "Soya beans" (p. 267-70) gives details about all aspects of soya beans, bean oil, and beancake, including exports.

Table 23 (p. 278), titled "Exports of principal agricultural products," gives statistics from 1922 to 1931 for quantity exported and value (in H.K. Taels) for 9 major products. The leading every year is either soya beans or beancake; bean oil is also important.

A section titled "Export of soya beans, beancake, and bean oil in recent years" (p. 279) includes Table 24, "Export of soya beans, beancake, and bean oil through the four ports of Dairen, Yingkow, Antung, and Vladivostok," total tons and relative index from 1926-27 to 1932-33.

The Dairen Agricultural Company, established in 1929, brings Japanese immigrants to Manchuria and helps them to become land-owning farmers; it does not operate any farms directly (p. 300).

The origin of Japanese administration on the Liaotung peninsula, the southern end of Manchuria, started in 1905 during the Russo-Japanese War. In Nov. 1906 Japanese first began to administer agricultural programs in Manchuria by issuing the regulations for the Kwantung Government Agricultural Experiment Station, and the establishment of the agricultural experiment station at Dairen. This station is now located at Chinchow (Chin-chou, or Jinzhou, in Liaoning province, as of 2009) (p. 300-01). On p. 302 is a full page of references to Japanese documents that served as the sources for the tables in this chapter on agriculture in Manchuria. Almost all were compiled and published by the South Manchuria Railway Co. (SMRC).

Chapter 14, "Industry," begins with a "General outline" (p. 350-51). Although Manchuria is rich in natural resources, modern industry did not develop until about 30 years ago. Before that, small enterprises supplied the needs of immediate neighborhoods. With the eastern advance of Russian influence and the establishment of Russian administration in Manchuria near the end of the 19th century, several modern industries appeared. "Before any general industrial development could take place, however, the

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Russo-Japanese War (1904-05) broke out, and as the result of the war, Japan came to administer the Kwantung Leased Territory and the railway zone. Since that time modern industry has developed in Manchuria"–including oil milling. Industry in North Manchuria [where Harbin is located] is inferior to that in South Manchuria in capital and equipment. Discusses the North Manchuria Railway.

A section on "Chemical industry" (p. 396-409) discusses oil milling in great detail.

Page 466 shows miso and soy sauce production in Manchuria. The 17 Japanese-run plants make 2,800 tonnes of miso and 4,550 tonnes of soy sauce. The 44 Manchurian-run plants make no miso and 1,381 tonnes of soy sauce. The number of factories in each major city and the capital assets of the companies are listed. Dairen is the main center of Japanese miso and soy sauce production, followed by Mukden, then Port Arthur. Hsinking is the main center of Manchurian soy sauce production.

Note: This Year Book was published from 1931 to 1941 by Japanese interests (SMRC) to justify the Japanese occupation and development of Manchuria after the "Manchurian incident."

384. Mukai, Seizo. 1934. Manshû daizu oyobi sono seihin [The soybean of Manchuria and its products]. Tokyo: Iwamatsudo Shoten. xvii + 340 p. Illust. 28 cm. [Jap]
• ***Summary:*** Contents: Preface. Part I: Introduction. The position of soybeans in the world and in Manchuria. Soybeans in Manchuria and Japan.

Part II: Soybeans: Outline, varieties, cultivation, character, quality and appraisal, usage of soybeans, packaging and shipping, demand of the production and foreign trade (Manchuria, Japan, Korea, Taiwan, China, South Pacific Ocean, Europe and USA), the custom of selling and buying.

Part III: Soybean cake/meal and soybean oil. Outline, varieties, method of production, quality and appraisal, usage (Cake: Fertilizer, fodder, raw material for foods, for drugs, and for the chemical industry. Table of soybean cake usage. Oil: Table of soybean oil use), packaging and shipping (pulp and oil), production, consumption, and trade (supply and demand in Manchuria, Japan, Korea, Taiwan, China, South Pacific and India, Europe and USA), the custom of selling and buying.

Part IV: Remarks. Bibliography.

Appendix: Table of equivalents in Manchuria, money system, rate of exchanging money, about the money the Central bank makes in Manchuria, money exchange, amount of exporting, soybean and soybean cake/meal related exchange rate table, important Japanese & Manchurian market weight and volume exchange rates, general or Manchurian abbreviation of words.

Photos, charts & graphs: 21 such items are described. Address: Manchuria.

385. Woodhead, Henry George Wandesforde. ed. 1934. China year book. Shanghai, China: North China Daily News & Herald. xxvi + 854 p. Vol. 16. Index. 22 cm.
• ***Summary:*** In Chinese, the title of this book is *Chung-hua nien-chien.* In chapter III, "Soy-beans and bean products are discussed on pages 41-42.

A table (p. 55) shows exports of vegetable oils from China in 1931. In descending order of weight (thousand piculs) they are: [Soy] bean oil 1,463. Wood oil 865. Groundnut oil 814. Unclassified 36. Tea [seed] oil 21. Castor oil 14. Sesamum seed oil 3.

The three most valuable oils in descending order of value (1,000 H. Taels) are: Wood oil 20,416. [Soy] bean oil 16,991. Groundnut oil 12,734.

In Chapter 5, a multi-paged table titled "Principal exports, 1932 and 1933," shows (p. 129): Exports of yellow [soy] beans to Egypt (incl. Anglo-Egyptian Sudan), Formosa, Germany, Great Britain, Hongkong, Italy, Japan, Korea, Netherlands, Netherlands India [Dutch East Indies; Dutch: *Nederlands-Indië*], Philippine Islands, Straits Settlements and F.M.S. [Federated Malay States], U.S.S.R. [USSR] (Russia) Asiatic Routes, Other countries. The five leading importers of yellow [soy] beans, in descending order of weight imported (in million piculs), are: U.S.S.R. [USSR] (Russia) 4.479. Japan 3.331. Germany 3.222. Korea 0.759. Netherlands India 0.555. Total: 17.269.

On the same page are exports of beancake to Japan, Korea, Norway, USA, U.S.S.R. (Russia) Asiatic Routes, Other countries. The three leading importers, in descending order of weight imported (in million piculs) are: Japan 5.854. U.S.S.R. (Russia) 2.119. Other countries 1.979.

Note: This is the 2nd earliest English-language document seen (May 2020) that contains the term "U.S.S.R." in connection with soybeans–even though the Soviet Union was formed on 30 Dec. 1922.

In Chapter 7, a table (p. 153) shows the foreign and domestic trade at seven major Manchurian ports: Aigun, Harbin, Hunchun, Lung-Chingtsun, Antung, Dairen, Newchwang. Dairen does by far the largest volume of trade, followed by Harbin, then Newchwang.

On page 153 a table shows the quantity (piculs) of [soya] beans, bean oil, and beancake exported from (1) China including Manchuria, and (2) Manchuria alone. For each of the three products and two categories the amount sent to Japan, Europe, and Other countries is given. Europe imports almost all of the bean oil. Other countries get the largest amount of the beans and the beancake.

Also discusses Mongolia: Religious organization (Chapter 4, p. 70-71), including Lamaist Buddhism and "Living Buddhas." Also discusses Tibet (Chapter 4, p. 88-91). This section begins: "Geography: Tibet, sometimes called the 'Roof of the World,' consists of (1) the Lama kingdom of Tibet with its provinces and dependencies; (2)

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the semi-independent native states of Kam, under Chinese protection; and (3) the Kokonor [Koko-nor / Koko Nur] Territory, under the control of the Chinese Amban [a Manchu word meaning "high official"] residing at Hsi Ling, in Kansu. Note: Wikipedia states (June 2008): "The Qing Emperor appointed the amban in Tibet, who represented Qing suzerainty over the Buddhist theocracy of Tibet, and commanded over 2,000 troops stationed in Lhasa. The chief amban was aided by an assistant amban (Bangbàn Dàchén) and both of them reported to the Qing Court of Colonial Affairs. Their duties included acting as intermediary between China and the Hindu kingdom of Nepal (Ghorkhas Country); a secretary (Yíqíng zhangjing) dealt with native affairs. Three Chinese commissioners (liángtái), of the class of sub-prefects, were stationed at Lhasa, Tashilumbo and Ngari.

"The Qing imperial resident in Tibet was introduced in 1727 and most ambasa [high officials; A Manchu word, plural of amban] were appointed from the Manchu Eight Banners, a few were Han Chinese or Mongol. The Emperors used ambasa to influence Tibetan politics, and the Qianlong, Jiaqing and Daoguang Emperors each decreed that the Dalai Lama and Panchen Lama were bound to follow the leadership or guidance of the ambasa in carrying out the administration of Tibet."

A brief biography of Li Yu-ying (Courtesy name: Shih-tseng) appears on p. 693. Address: 1. B.A., formerly editor of the "North-China Daily News"; 2. M.J.I., Editor of the "Peking and Tientsin Times".

386. Gray, George Douglas. 1935. The soya bean in international trade. *Foreign Affairs* 13(2):340-42. Jan.
• ***Summary:*** This article begins: "The soya bean has been described as unquestionably the most important food plant in the world." The soya bean is Manchuria's principal crop. "Under Japanese management [in part, since shortly after 1905], its culture has been developed and its uses extended. It has had a dominant part in drawing 30,000,000 Chinese to Manchuria, and it has aided them in building there a prosperous community. "The profit from its transport and sale has in large measure supported the Japanese adventures on the mainland of Asia."

Table 1 gives "World soya bean production." Manchuria, with 10,184,928 acres under cultivation produces 208,298,428 bushels or 20.4 bushels/acre, which is 59.3% of world production. China proper, with 5,635,000 acres under cultivation produces 89,340,000 bushels or 15.8 bushels/acre, which is 25.4% of world production. Japan, with 913,836 acres under cultivation produces 15,238,873 bushels or 16.6 bushels/acre, which is 4.3% of world production. Korea (a province of Japan since 1910), with 1,942,922 acres under cultivation produces 20,431,754 bushels or 10.5 bushels/acre, which is 5.8% of world production. The U.S.A., with 1,373,000 acres under cultivation produces 18,146,000 bushels or 13.2 bushels/acre, which is 5.2% of world production. The world, with a total of 20,049,686 acres under cultivation produces 351,355,046 bushels of soybeans.

Note: This is the earliest document seen (Jan. 2005) that gives detailed total soybean production or area statistics worldwide.

Table 2, "Trade of Manchuria (in millions of Haikwan taels)" shows Manchuria's imports, exports, total trade, and balance of trade for the years 1907, 1917, and 1927-1932. In 1907 Manchuria had a negative balance (-8.6). In 1917 the balance began to be positive (+2.5), but by 1927 the balance was strongly positive (+139.0) rising to +255.0 in 1931.

Table 3, "Exports of Manchuria (in millions of Haikwan taels)" shows Manchuria's 5 main exports (both value and percentage of total) from 1927 to 1932. In descending order of value in 1932 they are soya beans, coal, kaoliang, millet, and pig iron. In 1927 soya beans, with a value of 219.5 accounted for 54.5% of exports. In 1932 soya beans, with a value of 234.6 accounted for 60.8% of exports.

Table 4, "Imports of soya bean and soya bean oil" [from Manchuria] shows the imports of each, in tons, in 1930 and 1932, by the following countries: United Kingdom, United States, France, Holland, Denmark, Germany, Italy, Belgium, and Japan. In 1932 the world's top 4 importers of soya beans were Germany (1,168,300), Japan (481,600), Denmark (288,864), and the UK (159,938). In 1932 the world's top 4 importers of soya bean oil were Japan (72,240), UK (27,343), Belgium (5,600), and Germany (3,739).

387. Gay, H. 1935. La culture et les usages du soja [The cultivation and uses of the soybean]. *Revue de Botanique Appliquee & d'Agriculture Tropicale* 15(165):309-24. May; 15(166):447-53. June. [15 ref. Fre]
• ***Summary:*** Contents: Introduction. Geographical area and climatic requirements. The plant and its varieties: Taxonomy, anatomy, physiology. Soybean cultivation: Place in the crop rotation, preparation of the soil, manure and fertilizer, sowing (the seeds, time of sowing, details of sowing), vegetation and the points of [crop] maintenance / management, harvest (of seeds, of forage), grain storage, yields (of seeds in kg/ha {3,500 in Manchuria, 2,700 in China, 1,700 in France, 1,200 in Japan}, of forage in quintals/ha {in America they range from 163 to 168}), enemies. Note: 1 quintal = 100 kg.

Technology of soya: Soymilk (production, properties, uses), soy cheeses (*Fromages de soja*, called "tofu" in Asia), soy oil and cake, soy flour and products made from it (bread, rusks {*biscottes*}, cakes, and pancakes {*galettes*}). Soya as livestock feed: Soya forage, soya hay, soymilk for calves, soybeans seeds and cake.

Economic data: Hectares planted to soya in 1929-30: Northern China and Manchuria (11,800,000), USA (500,000), Japan and Korea (400,000), Russia (300,000), Sunda or Soenda Isles (100,000 ha);

Note: The *Iles de la Sonde* are the islands of the Malay

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Archipelago divided into two groups: (1) Greater Sunda Islands, comprising Java, Sumatra, Borneo, Celebes, and adjacent islands; (2) Lesser Sunda Islands, comprising the chain of islands east of Bali to and including Alor and Timor, but not Wetar.

Exports of soya from China in 1929-30 (in tons): To Japan 1,700,000, to Europe 1,500,000, to southern China 600,000, to the Netherlands Indies [Indonesia] 100,000, to other countries 100,000. Address: France.

388. Bailey, L.H.; Capen, R.G.; LeClerc, J.A. 1935. The composition and characteristics of soybeans, soybean flour, and soybean bread. *Cereal Chemistry* 12(5):441-472. Sept. Reprinted in Proceedings of the American Soybean Association. 1935. Aug, p. 39-43. Condensed in Soybean Digest. Dec. 1940. p. 4-5. [75 ref]

• ***Summary:*** Contents: Introduction. Acreage, production, and price of soybeans in the United States (Table II shows production in Manchukuo, Chosen [Korea], Japan, and the Dutch East Indies from 1929-1934). Uses for soybeans (incl. in ice cream, ice cream cones, candies, puddings, salad dressings, sausage filler). Chemical composition of soybeans. Processes for the removal of the bitter taste from soybeans. Extraction of soybean oil (by hydraulic pressure, Anderson expeller, or new European solvent process). Yield of oil and meal from soybeans. The method of analysis of soybean flour. Chemical composition of soybean flours: Soybean flour output in the United States, minerals, carbohydrates, quality of the protein, vitamins, lecithin and fats in soybean flour. Soybean flour in the diet: Cost of protein and fat, calcium, and carbohydrates in soybean flour. The use of soybean flour in baking. Effect of enzymes of soy flour on bread: Digestibility of soybean bread, increased absorption claimed for soybean flour, cost of soybean bread. Conclusions.

"The most expensive food constituents are minerals, vitamins, proteins, and fats. Soybeans flour is rich in all of these food constituents and yet relatively cheap. The moderate cost of soybean flour makes it possible for people of small incomes to obtain the maximum of these essential nutritional constituents required by the body which in the form of other foods might be beyond their reach."

"The first successful attempt to prepare a soybean flour which would be free from the disagreeable beany taste, which would remain fresh almost indefinitely (that is, not develop rancidity), and which would retain, practically unchanged, the original composition of the bean is described in the Berczeller patent (1924). This process consists in subjecting the cleaned soybeans to the action of saturated steam for 10 to 15 minutes. The beans are then dried, cracked in order to remove the hulls, and ground into flour. Such flour has a sweet, pleasant, nut-like taste (a characteristic of most flours obtained from soybeans which have been subjected to a special beany-taste removing treatment) and may be kept for many months without spoilage due to the development of rancidity. A later patent (1932) issued to this inventor consisted in subjecting soybeans (dry or soaked) to steam distillation (see also Berczeller, 1933). In making soybean flour by this process in this country, the beans used, generally the yellow variety, are first treated to destroy insects and insect eggs. The beans are then cleaned or freed from impurities, washed to remove the dirt, and subjected to the patented process. The beans are then dried and passed through cutting machines and the hulls are removed by aspirators and bolting machines. The cut beans are then aerated with warm air and ground in a special air-cooled mill, the fine flour being bolted through a special bolting machine" (p. 446).

Soybean oil mills in ten U.S. states now have a total annual crushing capacity of about 10 million bushels (p. 448).

Tables show: (1) Acreage, production, and average price per bushel of soybeans (1932-33, for 10 leading states and the USA total). (2) Annual soybean production, in bushels, in 5 countries (USA, Manchukuo, Chosen [Korea], Japan, Dutch East Indies, 1929-34). (3) Chemical composition of soybeans (minimum, maximum, and average). (4) Fat and protein content of soybeans grown in 15 different U.S. localities. (5) Mineral content of various legumes and grains (air-dry basis). (6) Composition of the component parts of soybeans (cotyledons, embryo, seed coat). (7) Composition of many soybean flours. (8) Composition of high fat, press cake, and solvent-extracted soybean flours. (9) Composition of solvent-extracted soybean flour and other legume flours (bean, pea, lentil). (10) Mineral content of selected foods, incl. soybean flour. (11) Composition of the mineral portion of grains and other seeds. (12) The composition and the mineral and vitamin content of selected foods. (13) Composition of selected foodstuffs. (14) Retail cost of foods and their components [soybean flour is by far the least expensive source of protein and calcium]. Formula and method for making soybean bread (using 20% soybean flour). Formula and method for making whole wheat bread. (15) Composition of representative flours. (16) Composition of representative types of bread. (17) Correlation of loaf volume and urease content of soybean flour used in making bread. Address: Food Research Div., Bureau of Chemistry and Soils, USDA.

389. Webber, Perry A. 1935. Soybeans: The wonder food. *Health* (*Mountain View, California*) 2(9):16-17, 31. Sept. [3 ref]

• ***Summary:*** This article begins: "The soybean is a plant of early cultivation in China, and for more than four thousand years has been used largely by the Chinese and other Oriental nations as human food. It is first mentioned in the "Ben Tsao Gang Mu" [Bencao Gangmu], an ancient Chinese materia medica, written in the year 2838 B.C.

"The Occident has been under the false impression

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that the Oriental lives almost wholly on rice. Rice is used extensively, but if we are to correct our traditional view of the rice diet, we can amend our statement by saying that it is the soybean which is probably the most universal article in the Oriental dietary. Especially is this true of the more than six hundred million dwelling in eastern Asia. During the centuries the use of the soybean has spread from its original home in Shantung [Shandong province] and Manchuria throughout China, Korea, Japan, the Philippines, the Dutch East Indies [today's Indonesia], and to a limited extent to India itself.

"The Chinese make practically no use of dairy products, and the majority of the people consume a very meager amount of meat; yet, in spite of this, they have lived for centuries on what appears to be a remarkably well-balanced diet by the use of the soybean." Address: PhD, Chief of Chemistry Dep., Nashville Agricultural Inst. [Madison College, Madison], Tennessee.

390. *New York Times.* 1935. Soy bean exports start. Cargo leaves Chicago in new rivalry with Orient. Oct. 27. p. 30.
• ***Summary:*** "The steamship Barrie cleared for Montreal yesterday with 47,000 bushels of soy beans–the first export shipment of that crop from Chicago in three years... The shipment, officials said, signalized the development of a new export field. Heretofore European markets have purchased soy beans from Manchukuo, Korea or Japan... American producers are making a bid for European business on the basis of quality, consignors of the first cargo said."

391. Boots, J.L. 1935-1937. A preliminary study of the diet and customs of the Korean people, with relation to their oral conditions. *J. of Severance Union Medical College* (*Seoul, Korea*) 3:35-62. [71 ref]
• ***Summary:*** Page 1: "Article No. 141, Research Department, Severance Union Medical College." Submitted in partial fulfillment of the requirements of Northwestern University Dental School for the degree Master of Science."

Page 37: Under "Articles and preparation of food." Bean sauce is often added to kimchi.

"Soy beans are boiled, mashed, and made into cakes. These are dried and stored some months and allowed to mold and ferment. When ripe they are broken and soaked in salted water, then strained. The liquid is boiled to the right concentration and used as a condiment in many foods in every Korean home.

"Bean and pea curd, precipitated soft proteins, are used with soup and eggs or served with bean sauce and an oil prepared from sesame seed.

"Sprouted beans are common, both beans and sprouts being boiled and served with sauce." Address: D.D.S., M.S., F.A.C.D., Dental Dep., Severance Union Medical College, Seoul, Korea.

392. Japan-Manchoukuo Year Book. 1935. Tokyo, Japan: Japan-Manchoukuo Year Book Co. Index. 26 cm. Second annual issue. [Eng]
• ***Summary:*** Each year book is divided into two main parts: Japan, and Manchoukuo. On the title page, just below the title but in small letters we read: "Cyclopedia of General Information on the Empires of Japan and Manchoukuo." Below that is a small map showing the Japanese empire, circled, as part of East Asia–under which is printed: "Neither is Understandable Without the Other." Below that are listed the cities and names of 15 agents worldwide. This book was published in mid-December 1934.

In the Japan and Manchoukuo parts of the book, soya beans are most widely discussed in the respective chapters on Agriculture (p. 353 and 713). In each case, information given the previous year is updated one year: See p. 359, 363 (Soybean production in Japan in 1932 was 4,351,814 hectolitres).

Page 716: Soybean production in Manchoukuo in 1933 was 4.601 million metric tons on 3.747 million hectares.

Page 717: Export of soya beans in 1932 was 42.536 million piculs [1 picul = 133.33 lb weight Avdp] worth 144.304 million Hk. Tl. [Haikwan taels]. Export of soya beans in 1933 was 39.111 million piculs worth 169.095 My [Manchoukuo yen?].

A large table (p. 717) shows "Staple exports as classified by destinations in 1932 (in piculs). Soya beans were exported to the following countries–in descending order of amount exported:

Germany 10.474 million piculs
Soviet Russia 7.520 million piculs
China 7.246 million piculs
Egypt 6.997 million piculs
Japan 5.568 million piculs
Great Britain 1.348 million piculs
Chosen [Korea] 0.905 million piculs.
Netherlands India [today's Indonesia] 0.849 million piculs
Netherlands 0.369 million piculs
Hongkong 0.355 million piculs
Denmark 0.340 million piculs
Italy 0.212 million piculs
Belgium 0.145 million piculs
Central America 0.125 million piculs
France 0.030 million piculs
Straits Settlements 0.022 million piculs
Philippines 0.0088 million piculs
Norway 0.0082 million piculs
British India 0.0028 million piculs
Sweden 0.0024 million piculs
United States 0.0012 million piculs
Siam [today's Thailand] 0.00028 million piculs.

Other major export crops were kaoliang, maize, millet, groundnuts, wheat and buckwheat.

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Page 714 is all about "Soya beans" which are the most important staple product of the country and has been grown for many years before the opening of Newchwang while some had been exported to the ports of South China. At the time of the Russo-Japanese war (1904-05) the Japanese became aware of the value of the bean, especially of the bean cake for use as fertilizer, but the article did not enter upon its career as an important factor in international trade until 1910 when the Mitsui Bussan Co. made a trial shipment of 100 tons to England. Since then, mainly through the continued experiments of the Central Laboratory, maintained in Dairen by the S.M.R. [South Manchuria Railway], many new uses, have been found for soya bean until today the articles manufactured either wholly or partially from beans, bean oil and bean cake include more than thirty items, among which the following may be mentioned: soy [sauce], sauces, soups, condensed milk, casein, cheese, salad oil, crackers, macaroni, flour [probably roasted], confectionary, glycerine, explosives, enamels, varnishes butter and lard substitutes, edible oils, salad oils, water-proof material, linoleum; paints, soap, celluloid, rubber substitutes, printing-ink, lighting and lubricating oils, etc. Bean cake is also used extensively for fodder and as fertilizer.

"The S.M.R. Agricultural Experiment Station at Kunchuling [Kungchuling] and elsewhere have through continuous experiments and distribution of superior seeds to Manchurian farmers increased the crops by 10 to 20 percent 'while the oil content of such improved beans have been increased by more than ten percent. The use of these improvements is being advocated by means of poster campaigns and other forms of propaganda, while demonstrations are being carried out to instruct the farmers in new methods. At the same time a new industry of manufacturing beans into oil and cakes has sprung up, the modern methods rapidly replacing the old-fashioned presses.

"Soya bean output in 1934 is as follows:

A large table (p. 718) titled "Output of soya bean" [in Manchoukuo, according to districts] is divided into South and North Manchuria. It shows the following for each district in 1934: Cultivated area (hectares). Output per hectare (kgs.). Output in 1934 (metric tons). Actual output in 1933 (metric tons). Increase or decrease (metric tons). Rate of increase (1933 = 100).

393. Lunden, J.C. 1936. Om dyrkning af soyaboenner [On the cultivation of soybeans]. *Statens Forsogsvirksomhed i Plantekultur, Meddelelse* 41:668-70. [Dan]

• ***Summary:*** Translation of the periodical: Danish Governmental Research in Agriculture Report 246. January 1936. B. Guidelines.

Translation of the text:

Every several years, the question of soybean growing in Denmark is put forward, but with the previously-conducted agricultural tests there has yet to be any significant harvest.

At the government's research stations, the growing of soybeans has been attempted repeatedly. In statements on this topic from 1912, government adviser K. Hansen stated that for approximately 20 years (the first time in 1881) he conducted cultivation trials with many different soybean varieties, but on only one single occasion was able to obtain a few mature seeds. In 1912, samples of Manchurian soybeans were sown at all of the research stations. The researchers all stated that the varieties of soybeans they tried ripened much too slowly. At some locations, flowering began in August and there were a few pods, but in most locations the soybeans did not flower or form pods, and in none of the locations were there any mature seeds as growth was stopped by frost which appeared in September or early October, at the latest. Moreover, as a stall-feed crop soybeans could also not compare with commonly used crops like peas, fava beans, alfalfa or turnips, since soybeans grow too slowly and provide too small of a yield.

Soybeans are particularly at home in a continental climate and are an old agricultural plant in Asia, where they are widely grown in northeastern China (Manchuria), as well as in Korea and Japan, i.e. at the same latitude as Spain and Italy, since soybeans require high temperatures.

To illustrate soybean crops from 1930-1933, the following average numbers were reported, according to information from the Department of Statistics (note: hkg = 100 kg): The greater part of the world's production is grown in Manchuria, which has a distinct continental climate favorable for soybeans. The average soybean yield for 1930-1933 for Manchuria is indicated to be more than 12 hkg per ha, for Japan and the US approximately 10 hkg, for Korea approximately 7 and for Russia approximately 5 hkg per ha. Manchuria has had higher yields of soybeans than of wheat, Korea and the US nearly similar average yields of wheat, while Japan and Russia have had significantly higher yields of wheat than of soybeans. Denmark has had 2-6 times as great a yield of wheat, at 28.4 hkg per ha, as the aforementioned countries have had of soybeans.

Since soybeans have a very nutritious seed, which combines a high content of nitrogen-containing substances with a very high fat content, there has been work in many locations over the last decades to expand the area of soybean growing. For this purpose, it has primarily been North America, Russia and several Central European countries that have fortunately gotten into work improvements with soybeans.

At the request of Aarhus Oliefabrik A/S, test growing was conducted at Als, Aero and Lolland in 1933, with earlier varieties of soybeans, under the leadership of the secretary at that time, R. Kampp, and in the hot summer mature seeds were grown. No precise yield calculation was done, but for some varieties the yield was 12-21 hkg per ha (Report from the Agricultural Commission from 1931).

Additionally, in 1934 and 1935 a number of soybean

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varieties were grown at government research stations at Lyngby, Tystofte, Abed, Spangsbjerg and Studsgaard, including Manchurian and German varieties from the test plantings arranged by Aarhus Oliefabrik A/S, and earlier varieties received directly from the US, Canada, Central Europe and Russia, and finally a sample from the College of Agriculture.

During the germination study of the samples at the National Seed Research Center, it was discovered that the sprouts were often attacked by bacteria, which just like with garden peas, can greatly damage the sprout. The soybeans were generally sown in the first half of May, and the seed was inoculated with nitrogen [fixing bacteria] beforehand. Approximately 30 kg of seeds of ha were planted. The row distance was 50 cm and the plant distance approximately 10 cm. The nice summers of 1934 and 1935 had above normal heat and sunshine. The soybeans grew slowly, however. The earliest varieties began to flower in late July, and in 1934 these were mature in late September, while in 1935 not until into October and for both years the crop had to be dried artificially.

At Tystofte and Lyngby, the best varieties yielded 5-8 hkg of seed per ha in 1934, and somewhat less in 1935, while from spring corn normally 35-40 hkg of kernels is obtained. At the other research locations the soybean yield was not determined, but in 1934 is was estimated to be about one quarter of a normal corn crop at Abed, and at Spangsbjerg a slightly mature seed was also harvested. In 1935, the soybeans were ruined by frost in May at Abed and by wind at Spangsbjerg. At Studsgaard, no usable seed was grown.

Therefore, in the studies conducted during the last three warm and sunny summers, even the best of the tested soybean varieties gave a much smaller yield than spring corn, and in cooler summers with more rain the yield was even less, or the crop failed altogether.

Since the price of soybeans adopted in Denmark in recent years has been 13-15 ore per kg, according to the present results the growing of soybeans is not economically viable here in Denmark.

Translated by Thor Truelson.

Note 1. This is the earliest document seen (April 2016) concerning the cultivation of soybeans in Denmark. This document contains the earliest date seen for soybeans in Denmark, or the cultivation of soybeans in Denmark (1881). The source of these soybeans is unknown.

Note 2. This is the earliest document seen (Jan. 2017) concerning Aarhus Oliefabrik A/S, the Danish oilseed crusher, and soybeans. Address: Denmark.

394. Jogun: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1936. Seed color: Yellow (straw), hilum pale/colorless.

• ***Summary:*** Sources: Morse, W.J. 1936. *Soybean introductions named in January 1936.* Washington, DC: USDA, Bureau of Plant Industry, Div. of Forage Crops and Diseases. 2 p. April 7. See p. 2. F.P.I. No. 87615. Name: Jogun. Seed color: Straw yellow. Maturity: 115 days. Use: Green vegetable or dry edible bean. States grown: North Central.

Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (*USDA*). p. 1154-89. For the year 1937. See p. 1163. "In Japan, certain varieties of soybeans were found that were used solely as green shelled beans... The vegetable soybean offers an excellent food of high nutritional value, especially in the fall when other green beans are lacking... As a result of selection, cooking tests, and adaptation studies, eight green vegetable varieties... have been introduced in various sections of the country." One of these is Jogun.

Lloyd, J.W.; Burlison, W.L. 1939. "Eighteen varieties of edible soybeans: Their adaptability, acceptability, culture and characteristics." *Illinois Agric. Exp. Station, Bulletin* No. 453. p. 385-439. March. See p. 394-97, 413, 423.

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Jogun is in the USDA Germplasm Collection. Maturity group: III. Year named or released: 1936. Developer or sponsor: USDA. Literature: 07, 11. Source and other information: 'Shirobana' from Dojogun, Hamgyeong Bug Do, North Korea in 1930. Prior designation: PI 87615. Address: USA.

395. Kanro: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1936. Seed color: Yellow (straw), hilum pale to brown.

• ***Summary:*** Sources: Horvath, A.A. 1926. "The soybean as human food." *Chinese Economic Monthly* 3(9):392-400. Sept. See p. 397. In the section titled "Composition of some Japanese soybeans and of the common American varieties," table V (p. 397) gives the composition of four leading Hokkaido soybeans: Tsuru-no-Ko, Kanro, Yoshi-Oka, and Oh-Ya-Gi. The composition of Kanro is: water 18.59%, protein 36.86% (the highest), fat 18.98%, ashy substance 4.71%.

Morse, W.J. 1936. *Soybean introductions named in January 1936.* Washington, DC: USDA, Bureau of Plant Industry, Div. of Forage Crops and Diseases. 2 p. April 7. See p. 2. F.P.I. No. 84928. Name: Kanro. Seed color: Straw yellow. Maturity: 110 days. Use: Green vegetable or dry edible bean. States grown: North and North Central.

Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (*USDA*). p. 1154-89. For the year 1937. See p. 1163. "In Japan, certain varieties of soybeans were found that were used solely as green shelled beans... The vegetable soybean offers an excellent food of high nutritional value, especially in the fall when other green beans are lacking... As a result of selection, cooking tests, and adaptation studies, eight green vegetable varieties... have

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been introduced in various sections of the country." One of these is Kanro.

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Kanro is in the USDA Germplasm Collection. Maturity group: II. Year named or released: 1936. Developer or sponsor: USDA. Literature: 07, 11. Source and other information: 'Kanro' from Pyongyang [P'yongyang], North Korea, in 1930. Prior designation: PI 84928. Address: USA.

396. Nanda: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1936. Seed color: Yellow (straw), hilum pale.

• ***Summary:*** Sources: Morse, W.J. 1936. *Soybean introductions named in January 1936.* Washington, DC: USDA, Bureau of Plant Industry, Div. of Forage Crops and Diseases. 2 p. April 7. See p. 2. F.P.I. No. 95727. Name: Nanda. Seed color: Olive yellow. Maturity: 145 days. Use: Green vegetable. States grown: Southern.

Morse, W.J. 1938. "Edible varieties of soybeans." *Proceedings of the American Soybean Assoc.* p. 30-33. A table (p. 32) shows: F.P.I. No.: 95727. Days to ripen: 145. Seed color: Straw yellow. Hilum: Pale. Seeds per lb: 1,952. Oil and protein content (moisture-free basis): 17.35% and 46.22%. Use: Dry edible or green vegetable.

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 14-15. Nanda is in the USDA Germplasm Collection. Maturity group: VIII. Year named or released: 1936. Developer or sponsor: USDA. Literature: 07, 11. Source and other information: From the AES (Agric. Exp. Station), Sariwon, Hwanghae Bug Do, North Korea, in 1932. Prior designation: PI 95727. Address: USA.

397. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Latin America (Document part). *Monthly Bulletin of Science and Practical Agriculture* (*International Institute of Agriculture, Rome*) 27(5):184T-87T. May.

• ***Summary:*** "7. Colombia. Soya is a crop for temperate countries, but may be acclimatised to the hot regions of Colombia as demonstrated at the Agricultural Experiment Stations of Valle Cauca and Tolima and in various regions of the Administration of Choco. It is probable that certain varieties from England and North Canada might be adapted to the cool soils of the country. Important trials in acclimatisation are now in progress in all the agricultural experiment stations in Colombia: Palmira, Armero (Tohima), and *Tulio Ospina,* in the government of Antioquia... The varieties which have given the best results are: Brazilian Yellow, Manchu, Lexington and Biloxi...

"Generally speaking the varieties which have given the best results in Colombia are as follows: Biloxi, Otootan, Brazilian, Mammoth Yellow, Hahto, Laredo, Lexington, Taikozan (black), Midwest or Mongol, Hollybrook, Easycook, Manchu, Korea (light brownish colour), Virginia, Wilson Five. The growth period varies from 75 to 100 days for the early varieties and 100 to 170 days for the late varieties. In respect of yield in seed, the Agricultural Experiment Station of Valle has obtained the following results:–*Biloxi:* 1,500 to 2,000 kg. *Otootan:* 1,600 to 2,200 kg. *Mammoth Yellow:* 1,000 to 1,500 kg. *Hollybrook:* 1,400 to 1,800 kg. *Laredo:* 1,500 to 2,200 kg. Farmers in Colombia wishing to obtain soya seed can apply to the Agricultural Experiment Station of Palmira and the Farmers' Society of Antioquia.

"8. Costa Rica. A certain number of tests have been made in this country with soya with both good and bad results. The crops suffered either from attacks by nematodes which infest the roots or from the excessive humidity of the region. For this reason the enthusiasm which was shown at one time for this crop has diminished greatly and at present different varieties of haricot beans are preferred for consumption. On the other hand, owing to the limited area of the country, commercial cultivation of soya for industrial purposes does not offer sufficiently advantageous prospects. Note: This is the earliest document seen (March 2021) concerning soybeans in Costa Rica, or the cultivation of soybeans in Costa Rica.

"9. Cuba. Soya grows in all the provinces of Cuba, chiefly in Havana, Pinar del Rio and Santa Clara. Trials with this crop are carried out by the Secretariat for Agriculture and the Agricultural Experiment Station of Santiago de las Vegas.

"In Cuba no native varieties are cultivated. The varieties introduced are as follows: Soya S.P.I. 40.125, Wilson Five, Bocket, Biloxi, Arlington, Mammoth Yellow, Columbia, Peking, Otootan, Ito San, Dixie, Midwest, Haberlandt, Chiquita, Illini, Dunfield, Tokio, Virginia, Early Brown, George Washington, Tarheel Black, Lexington, Harbinsoy, Hispida, Mansoy. The variety Otootan has given the best results in the deep, dry soils of the region of Havana. It yields abundant leaf material and a large harvest of seed.

"10. Dominican Republic. The Department of Agriculture carried out numerous trials with soya several years ago and came to the conclusion that, even when the soil was treated with materials specially imported for this purpose, the trials were unsatisfactory. Consequently, this plant has never been cultivated in this country except for experimental purposes. Note: This is the earliest document seen (March 2021) concerning soybeans in the Dominican Republic, or the cultivation of soybeans in the Dominican Republic. This document contains the earliest date seen for soybeans in the Dominican Republic, or the cultivation of soybeans in the Dominican Republic (several years before 1936). The source of these soybeans is unknown.

"11. Equator [Ecuador]. The Direction of Agriculture

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has recently imported a few varieties of soya with a view to encouraging the introduction of this crop. Trials with these varieties are now in progress. Note: This is the 2nd earliest document seen (March 2021) concerning soybeans in Ecuador, or the cultivation of soybeans in Ecuador. This document contains the 2nd earliest date seen for soybeans in Ecuador, or the cultivation of soybeans in Ecuador (1936). The source of these soybeans is unknown.

"12. Guadeloupe. Soya cultivation has been tried in this country. The Service of Agriculture (*le Service de l'Agriculture*) has recently introduced a certain number of varieties, which have been distributed to planters and grown in gardens." A summary of the observations made by Mr. Hazael-Massieux on 5 varieties cultivated in the Botanical Garden is given.

"13. Guatemala. The cultivation of soya, restricted to a limited area, is beginning to give good results. Setbacks were experienced at first owing to the fact that the necessary nitrogen is not used in cultivation. On the other hand, this leguminous plant did not find markets easily as the native population were unappreciative. At the present time this situation is reversed as the natives now consume soya and large quantities of soya are being sown in the regions of Pinula and Salama. It is also grown in Alta Verapaz." Note: This is the 2nd earliest document seen (March 2021) concerning soybeans in Guatemala, or the cultivation of soybeans in Guatemala. This document contains the earliest date seen for soybeans in Guatemala, or the cultivation of soybeans in Guatemala (1926). The source of these soybeans is unknown. Address: Rome, Italy.

398. Sasaki, Shûiku. 1936. Studies on some constituents of soybean seeds and their transformations during germination. *J. of the Department of Agriculture, Kyushu Imperial University, Fukuoka* 5(2):51-116. Aug. 3 (Chem. Abst. 31:4697). [99 ref. Eng]

• ***Summary:*** Contents: Introduction. Methods of germination of soy-bean seeds. General analysis of nitrogenous compounds of the seeds and the seedlings by general analysis. Quantitative determination of amino-acids in the proteins of the seeds and the seedlings by the Van Slyke method. Amino-acids isolated from the hydrolysate of the protein of the seeds. Organic bases of the seeds. Monoamino-acids and acid-amide in the juice of the etiolated seedlings. Organic bases in the juice of the etiolated seedlings. Transformation of carbohydrates during germination. Starch produced during germination. Transformation of oil during germination.

Sasaki investigated the changes in composition occurring in Japanese and Korean soybean varieties during germination up to 12 days. There was no change in total nitrogen at the end of 5 and 10 days. However after 5 days, a decrease of 21% in protein nitrogen and a corresponding increase in non-protein nitrogen was observed. After 12 days of germination, 5% of the starting soybean weight was isolated as asparagine; this is in agreement with the results obtained by Dunn et al. (1948).

The total carbohydrates increased from 22.6% in the seed to 25.8% by the 5th day, based on the starting weight of the seed, and then decreased slightly to 25.1% by the 10th day. Stachyose and sucrose were used up during the first 5 days, at which time reducing sugars reached a maximum of 4.7% and then decreased. Starch and dextrin increased steadily from 0.4to 9.0%, based on the starting seed weight, during the first 10 days of germination. Petroleum ether extractables [fat] had decreased 17.0% by the 5th day and 37.0% by the 8th day of germination. From this study it appears that during the first 5 days of germination the loss in oil weight is equivalent to the gain in carbohydrate weight. Address: Dep. of Agriculture, Kyushu Imperial Univ., Japan.

399. *Times of India* (*The*) (*Bombay*). 1936. Use of soya milk suggested. Sept. 8. p. 15.

• ***Summary:*** Dr. K.D. Dadachanji, who practices medicine in Bombay, has strongly urged the "adoption of vegetable soya milk as a substitute for cow's or buffalo milk." He says that it can be made for less than a pice [192 pice = 1 rupee] per seer if prepared at home–and for still less if made in a modern factory.

He says that soya milk is widely used by the people of China, Korea, and Japan to good advantage. If the Municipal Corporation of Bombay were to start a soya milk factory in that city, he says, the problem of pure milk supply could be solved.

Note: This is the earliest of 117 articles or ads seen (Sept. 2010) in *The Times of India* that contains the term "soya milk," or that mentions soya milk (regardless of how it is spelled) in connection with India.

400. Morse, W.J. 1936. Soybeans in the United States: In relation to world production and trade. *Proceedings of the American Soybean Association* p. 55-64. 16th annual meeting. Held 14-16 Sept. in Iowa. [2 ref]

• ***Summary:*** The slow advance of soybean "cultivation in Western Countries was undoubtedly due to the lack of adapted varieties for various soil and climatic conditions. Increase of acreage and production in the United States is closely correlated with the introduction of varieties from the Orient. In less than thirty years the acreage of soybeans in the United States has increased a hundred fold–from about 50,000 acres in 1907 to nearly 5½ million acres in 1935. During this period the United States Department of Agriculture has brought about 10,000 introductions of soybeans from the soybean regions of the Far East and the culture of the crop has spread from a few states in the early days to twenty-seven states at the present time.

"In Manchuria, often called 'the land of beans,' the soybean is grown to a greater extent than in any other

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country. It occupies about 25 per cent of the cultivated area and is relied on by the Manchurian farmer as a cash crop. With its rise as an international trade commodity, it is truly the 'Wealth of Manchuria.' Chosen [Korea] and Japan are large producers and southward from China the soybean is cultivated to some extent in India, Siam [later renamed Thailand], the Philippines, Cochin China, and during the past decade the production has nearly doubled in the Dutch East Indies. In Siberia extensive experiments have been under way to extend the cultivation of the crop but progress has been slow and Siberian beans have not yet been a factor in international trade.

"The production of soybeans in the Western World is concentrated largely in the Corn Belt States of the United States. Beginning with the experiments of Haberlandt in Austria in 1877, the soybean has been grown experimentally in most of the European countries but in general the climatic conditions are not well suited to its culture with the possible exception of certain regions, such as the Ukraine in the U.S.S.R. Varying degrees of success have been obtained in different regions of Africa, especially South Africa where yields of 25 to 35 bushels per acre have been obtained. Experiments in nearly all South American countries and Mexico have shown some successful results [as] in Argentina and Cuba but acreage is not extensive. In Canada, considerable interest had been shown in the crop but its culture–about 15,000 acres–is confined chiefly at present to the Province of Ontario. The future trend of the crop for commercial purposes undoubtedly will be concentrated largely in the United States, Canada, and certain regions of the U.S.S.R."

A table (p. 56) shows the increase in production of soybeans (in million bushels) during the 10-year period from 1925 to 1935 in the world's top five producing countries: Manchuria 92.67 -> 140.4. United States 5.190 -> 39.64. Chosen (Korea) 18.72 -> 21.96. Japan 18.31 -> 13.31 (1933). Netherland India [later Indonesia] 3.536 -> 6.676 (1934).

"Bean trade was an ancient and flourishing institution when the ports of China were first opened to the commerce of the Western World. In 1835, Newchwang (Yingkow, Yingkou), in South Manchuria, was an important port of shipment for the great coastal trade in beans, bean cake, and bean oil to the ports of southern Chinese provinces and other oriental regions. Manchuria is still the chief source of world trade in soybeans and from here the beans and bean products oil and cake move principally to other provinces of China, Japan, the Philippines, the East Indies, and to other countries of Northwest Europe. In 1908, about 7,000,000 bushels of beans were shipped out through the port of Dairen, chiefly to Chinese and Japanese ports. For the period 1925-1929, the average annual shipments to China, Japan, and European countries were 62,353,566 bushels. The first successful shipment from Manchuria to Europe was made to an English oil mill in 1907, and as an important source of vegetable oil and animal feed the beans soon found a market not only in English oil mills but in other European countries and America. Since 1931, when American-grown soybeans were first exported to European markets, chiefly to the oil mills of Germany, there has been an open European market to the American farmer. With economical methods of production and high quality beans, America is in a position to compete for the 50,000,000-bushel trade in European markets."

Two tables (p. 58) show international imports and exports of soybeans by major trading countries for an average 5-year period (1925-29) and for 1934. The leading importers in 1934 (preliminary, with imports in million bushels) are: Germany 33.57. Japan 20.29. Denmark 9.910. United Kingdom 6.615. Netherlands 4.695. Sweden 3.426. Italy 0.739. United States 0.006. The leading exporters in 1934 are: Manchuria 44.21 (down from 62.35 in 1925-29). Japan 0.025. Netherlands 0.0009.

"In recent years, the oil milling industry of Manchuria has declined quite markedly. During the height of processing beans for oil and cake, more than 90 mills were in operation, while late in 1930 not more than 25 mills were crushing beans. The decline in this industry has been due chiefly to a decreased demand for bean cake as fertilizer, the low price of silver, and almost the entire suspension of bean oil export due to the development of the oil extraction industry in Europe. In European countries it has become more profitable to import soybeans than to import bean oil."

Two tables (p. 59) show international imports and exports of soybean oil by major trading countries for an average 5-year period (1925-29) and for 1934. The leading importers in 1934 (preliminary, with imports in million lb) are: Netherlands 44.00. Belgium 27.60. United Kingdom 24.13. Austria 22.07. Morocco 20.28. Sweden 12.55. Also listed are: Norway 8.701. Algeria 0.004. The leading exporters of soybeans in 1934 (preliminary, with imports in million lb) are: Manchuria 122.6. Denmark 41.80. Netherlands 26.05. Germany 24.99. Sweden 8.98. Japan 7.95 United States 2.040.

"Practically all exports of soybean cake and meal have originated in Manchuria and average about 1,375,000 tons for the five-year period 1926-31. About 70 per cent of this exportation went mainly to Japan, Chosen, and China. Cake and meal shipments to European countries went chiefly to Germany, although considerable quantities were exported to Denmark, Sweden, the Netherlands, and Finland. The average importation of soybean meal and cake into the United States for the five-year period 1930-1935 was 31,726 tons."

"The rise of the soybean to a crop of special importance in the world's commerce and in the industry of the United States is one of the most remarkable agricultural developments of recent times." Address: Bureau of Plant Industry, USDA, Washington, DC.

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401. LeClerc, J.A. 1936. The soy bean is becoming Americanized. *Bakers Weekly* 76(13):56. Dec. 24.
• ***Summary:*** Contents: Introduction. Important food. What it contains. Raises food value.

"When consumed in the body the bean yields an alkaline ash, which is one more point in favor of this good food product." Foods discussed include: Soy bean milk. Cheese [tofu]. Soy bean flour ("In this country soy beans are being utilized for food purposes chiefly in the form of flour. The flour is produced mainly in one of two ways, viz., either by grinding and bolting the pressed cake after the bulk of the oil has been extracted [removed] from the bean or by grinding and bolting the specially treated (steamed) whole bean"). Roasted soybeans. Soy sauce. Soy bean oil.

The article ends: "New uses are being continually found for soy bean flour. For example, it may be mixed with cocoa; it may be used as a part substitute in the making of confectionery chocolate, macaroni, ice cream and mayonnaise; it may be used in soda water drinks just as malted milk is now being used. The specially treated soy bean may be roasted and in that form consumed as are peanuts. The hydrolyzed soy bean protein forms the chief ingredient of soy sauce. The soy bean shares with egg yolk as the chief source of lecithin. Soy bean oil is finding a ready market because of the various industrial and food uses to which it may be put."

An oval portrait photo shows J.A. Le Clerc. Address: Bureau of Chemistry and Soils, United States Dep. of Agriculture.

402. Sadaoka, Sueichi. 1936. [On the ancient cereals and beans discovered in the old capital ruins, Fuyo, of Kudara, one of the ancient nations in the Korean peninsula]. *Nogyo Oyobi Engei* (*Agriculture and Horticulture*) 11:2437-3443. [2 ref. Jap]
• ***Summary:*** Introduction: Our ancestors had been taking leaves, roots and fruits of wild plants as their own food in very ancient times. Nevertheless, in the time before Jimmu, who was the first emperor of Japan, people had already utilized five principal plants as crops–rice in paddy field, pearl millet, barnyard millet, wheats (including barley) and beans in upland field.

In the time after the first emperor, Jimmu, many descriptions of rice can be found in some historical documents, but we can find only quite limited descriptions of the silkworm, mulberry tree, hemp, and some edible fruits. As for wheats, we have the following historical description: sericulture and wheat crops in Sinki 1150 [A.D. 490] were very productive..., and 1000 [?] of wheat seeds were given to the king of Kudara from the 29th year of emperor Kinmei's era. As for pearl millet, we can read the following historical record issued by the emperor's government in Sinki 1360 year [A.D. 700]; pearl millet is as important a crop as rice. so it should be preserved as much as the total volume of the seed could support people's food sufficiency for about 9 years' use...

It will be a very interesting problem to confirm what kinds of cereals and legumes were grown in ancient times. Ancient cereals and legumes can be occasionally discovered in burn condition at shell mounds and the remains of houses in ancient times. Burnt rice grains have already been discovered at Kinkai, Kinkai-gun, Keisho Nando (in Korea), Naka, Tsukushi-gun, Fukuoka-ken, and Nagamine, Yame-Gun in Fukuoka-ken. They were considered to be products of more than 1900 years ago according to the investigations of Katô.

The very place where the author discovered many burnt cereals and legumes this time is considered to be the ruins of old food storehouses for supply to Kudara troops. These cereals might have been burnt when Kudara was conquered by some neighboring enemies. If so, they are the products of about 1,300 years ago and, in other words, the products of about 600 years later than the time that the burnt rice grains mentioned previously were produced. The author has a very strong interest in these cereals because many kinds of cereals were discovered there.

The next section (1) is on the history of Fuyo. It was the fifth capital of the Kudara kingdom. The very intimate relationship between Kudara and Japan lasted for 100 years plus several decades from emperor Kimmei's era until emperor Tenchi's era.

The next section (2) is: On the position in the soil profile where ancient cereals and beans were found. Kudara perished about 1300 years ago. The author conducted archaeological investigations in 1926 and 1927 [when Korea was part of Japan]. Eventually he found rice, wheat, mung beans, hulled barley, rye and azuki beans–in descending order of the numbers of each obtained. In addition he had a chance to look at burnt soybeans (at the Fuyo county government office) previously dug out from this place. Afterwards, Saburô Sugi discovered burnt soybeans at another place near the ruins and showed them to the author. Therefore the author considered that soybeans were possibly preserved in the storehouses at the time Kudara was thriving.

The next section (3) is: Some comparisons between ancient burnt rice, wheats and beans, and present varieties of these crops. Address: Chusei Nando Agric. Exp. Station [Japan].

403. Becker, Joseph A.; Froehlich, Paul; Jackson, D.; et al. comps. 1936. Agricultural statistics 1936. Washington, DC: U.S. Government Printing Office. 486 p. Index. 24 cm. For soybeans and soy products see p. 181-84, 218-221.
• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

Page 181: Table 257. Soybeans: Acreage, yield, production, and season average price per bushel received by

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producers, by States, average 1928-32, and annual 1934 and 1935.

Page 181: Table 258. Soybeans: Production in specified countries, 1924-25 to 1935-36 (in 1,000 bushels). The countries are: United States, Manchuria, Chosen (Korea), Japan, Netherland India (later Indonesia). Note: Manchuria produces about 97% of the soybeans production of China. Production figures for China are not available.

Page 182: Table 259. Soybeans: Average price per bushel received by producers, United States, 1926-27 to 1935-36. The weighted average price ranged from a low of $0.61 in 1931-32 to a high of $2.00 in 1926-27.

Page 182: Table 260. Soybeans for seed: Average wholesale selling price per bushel at Baltimore [Maryland] and St. Louis, Missouri, 1926-1925. The price ranged from a low of $0.94 in 1933 to a high of $2.99 in 1929.

Page 182: Table 261. Soybeans crushed and crude oil produced, 1925-26 to 1934-35 (in 1,000 pounds). The total soybeans crushed increased from 21.04 million lb in 1925-26 to 545.50 million lb in 1934-35. The total soybean oil produced rose from 2.638 million lb in 1925-26 to 78.033 million lb in 1934-35.

Page 183: Table 262 (full page). Soybeans and soybean oil: International trade, average 1925-29, annual 1932-34.

Page 184: Table 263. Soybean oil, domestic, crude: Average price per pound, in barrels, New York, by months, 1929-30 to 1935-36.

Page 218: Table 290. Soybeans: Acreage, yield, production, and season average price per bushel received by farmers, by States, averages, and annual 1935 and 1936 (preliminary). In 1935 the top 5 soybean producing states were Illinois (24.012 million bu), Indiana (6.970), Iowa (6.600), Ohio (2.604) and North Carolina (1.282 million bu).

Page 218: Table 291. Soybeans: Production in specified countries, 1924-36. The countries are: United States (#2 in 1935), Manchuria (#1 by far), Chosen (Korea), Japan, Netherland India. Soybean production in the United States increased from 4.947 million bu in 1924 to a peak of 44.378 million bu in 1935, falling to 29.616 million bu in 1936.

Page 219: Table 292. Soybeans: Average price received by farmers, United States, 1926-27, 1936-37.

219: Table 293. Soybeans for seed: Average selling price per bushel at Baltimore (Maryland) and St. Louis (Missouri), by months, 1927-1936.

Page 220: Table 294. Soybeans crushed and crude oil produced, by quarters 1926-27 to 1935-36.

Page 220: Table 295. Soybean oil, domestic, crude: Average price per pound, in drums. New York, by months, 1929-30 to 1936-37.

Page 221: Table 296 (full page). Soybeans and soybean oil: International trade (principal importing and exporting countries), average 1925-29, annual 1933-35. For soybeans: The main exporting countries are China and Manchuria. The main importing countries in 1935 are Japan and Germany. For soybean oil: The main exporting countries are Manchuria, Denmark, and Germany. The main importing countries are The Netherlands and the United Kingdom. One source is the International Yearbook of Agricultural Statistics. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

404. Inahara, K. ed. 1936. Japan Year Book. Tokyo: The Foreign Affairs Association of Japan. 1389 p. See p. 464-65, 478, 1081, 1178-79, 1182.

• ***Summary:*** Page 464: In 1934 in Japan soy-beans were grown on 336,378.84 ha and produced 3,902,774 hectoliters of beans worth 29,185,101 yen. In 1934 azuki beans were grown on 119,491.24 ha and produced 1,126,554 hectoliters worth 10,391,920 yen. Thus, azuki bean production was 28.9% as much as soy-bean production.

Page 1081. The section on Chosen [Korean] agriculture states that the soy bean is one of the most important crops, after rice, barley, wheat and rye. “In 1934 the total the total area under cultivation was 795,000 cho and the amount produced reached 3,813,000 koku, which was an increase of more than five times compared with the year 1910.”

Pages 1178-79. The pages on “Foreign trade” show that in 1933 imports to Manchoukuo first surpassed exports, and this new trend has continued until the most recent year, 1935, when imports were valued at 604 million Haikwan taels, compared with exports of only 421 million.

Page 1182. A large table gives production of major crops in Manchoukuo, 1929-1935 in metric tons. For soy beans:

4.849 million metric tons in 1929.
5.298 million metric tons in 1930.
5.227 million metric tons in 1931.
4.268 million metric tons in 1932.
5,205 million metric tons in 1933.
3.841 million metric tons in 1934.
3.822 million metric tons in 1935.

Other crops in the table are other legumes, kaoliang, millet, maize, wheat paddy-field rice, upland rice, and other cereals.

In 1935 soy beans were grown on 3.249 million ha with a yield of 1,180 kg/ha.

The country now has an abundance of food to feed the roughly 30 million inhabitants. The surplus crops are exported every year.

A large table shows “Exports of agricultural products, 1931-1935.” Exports of soy beans in 1935 were 29.203 piculs worth 130.053 million yen.

At the end is a large, colored fold-out map of the Japanese empire. There are many ads on unnumbered pages.

405. Institut International d’Agriculture (International Institute of Agriculture). 1936. Le soja dans le monde [The soybean in various countries of the world]. Rome, Italy: Imprimerie de la Chambre des Deputes, Charles Colombo.

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viii + 282 p. Bibliography, p. 276-82. No index. 25 cm. [90 ref. Fre]

• ***Summary:*** A superb early work, containing extensive original information, looking at developments with soybeans and soyfoods country by country, worldwide.

Contents. Preface (p. 1). A. Cultivation of soy (*soja;* p. 4): 1. Botanical description, selection, classification of the varieties. 2. Cultivation properly said. 3. Enemies and illnesses.

4. Cultivation in the various countries: 4a. The Americas (p. 38): Antigua, Argentina, Bermuda, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, USA (gives details on all varieties grown, and describes production, history, varieties, and cultural practices in North Carolina, Illinois, Indiana, Iowa, Maryland, Massachusetts, Mississippi, Missouri, New York, Ohio, West Virginia, Wisconsin, Conclusion), Guadeloupe, Guatemala, British Guiana, Dutch Guiana, British Honduras [Belize], Jamaica, Barbados, Martinique, Mexico, Montserrat, Peru, Puerto Rico, El Salvador, Trinidad and Tobago, Uruguay.

4b. Europe (p. 101): Germany, the Danubian countries, Austria, Spain, France, Great Britain, Hungary, Italy, Netherlands, Poland, Romania, Switzerland, Czechoslovakia, Turkey, USSR.

4c. Asia (p. 128): Ceylon, China and Manchuria, Cyprus, Federated States of Malaysia, British India (incl. Punjab, Bihar and Orissa, Burma, Berar, Madras Presidency, Bombay Presidency, Bengal (incl. Nepal, Bhutan, Sikkim, and the district of Darjeeling), Assam, North-West Frontier Province, United Provinces), Netherlands Indies, Indochina (incl. Tonkin, Annam, Laos, Cambodia, and Cochinchine), Japan, Palestine, Siam.

4d. Africa (p. 146): French West Africa, Algeria, Belgian Congo, Cyrenaica, Egypt, Eritrea, Madagascar, Morocco, Mauritius (Ile Maurice), Reunion (Réunion), Rhodesia, Anglo-Egyptian Sudan, Tripolitania, Tunisia, Union of South Africa.

4e. Oceania (p. 153): Australia, Fiji Islands, Hawaii, New Caledonia, New Zealand, Philippines.

B. Utilization of soya (p. 158): 1. The soybean in human nutrition and in industry: Whole soybeans, chart of the uses of whole soybeans, use of soya in the green state (green vegetable soybeans), soy sauce (*dau-tuong* of the Annamites, or *toyo,* named shoyu by the Japanese, or *chau-yau* or *chiang yoo* by the Chinese), condiments and sauces based on soya in the Netherlands Indies (*tempe, ontjom, tempemori* and *tempe kedele* [various types of tempeh and onchom, p. 168-70]), *tao tjo* [Indonesian-style miso], *tao dji* [fermented black soybeans], *ketjap, ketiap benteng* [Indonesian-style soy sauce], soymilk (*le lait de soja*), yuba (*crème de lait de soja*), tofu (*le fromage de soja*) and fermented tofu (*des fromages fermentés,* made by Li Yu-ying near Paris), soymilk casein (*caséine du lait de soja,* for industrial use, including vegetable albumin, or galalithe [galalith]" [isolated soy protein], and artificial wool), soy lecithin (*lécithine de soja*), soy flour (*la farine de soja,* incl. soy bread, soy pastries, and soy cocoa).

Note 1. This is the earliest document seen (Sept. 2010) that uses the term *benteng* or *ketiap benteng* to refer to an Indonesian-style soy sauce.

2. Soy oil (p. 194): Food uses, industrial uses (including soaps, products resembling petroleum, paints, varnishes, linoleum, and artificial rubber), extraction, directory of U.S. manufacturers of materials and equipment for soybean processing, directory of U.S. and Canadian manufacturers of food products based on soya (*produits alimentaires à base de soja,* p. 205-06), directory of U.S. manufacturers of industrial soy products (p. 206-07).

3. Soybean in the feeding of domestic animals (p. 207): Forage, hay, silage, pasture, soybean seeds, the minerals in soybeans, soya as a feed for dairy cows, cattle, buffaloes, sheep, hogs, horses and mules, poultry.

4. Use of soya as fertilizer (p. 257). C. The trade of soya and of its by-products (p. 363): Production of soybeans in the principal countries, economic importance of soybean cultivation in the USA, soybean trade/commerce including tables of the major importers and exporters, and amounts traded annually in 1931-1934, price of soybeans, cost of production.

List by region and country of people and organizations that responded to a questionnaire sent by IIA (p. 273-76). Bibliography of main publications consulted, listed by region and country of publication.

Reunion (*Ile de la Réunion*)*:* "The soybean (Le Soja) is only cultivated as an experimental crop, on a few square meters at the agronomic station" (p. 148).

Fiji (*Iles Fidji*)*:* Soybean cultivation is not yet practiced in this colony; however soybean seeds are currently being imported in order to conduct a trial.

New Caledonia: In 1928 soybean cultivation was introduced to New Caledonia.

Note 2. This is the earliest document seen (Dec. 2007) concerning soybeans in Bhutan, Costa Rica, Dominican Republic, El Salvador, Guatemala, Israel, Jamaica, Madagascar, Morocco, New Caledonia, Palestine, Peru, or Réunion, or the cultivation of soybeans in Bhutan, Costa Rica, Dominican Republic, El Salvador, Guatemala, Israel, Jamaica, Madagascar, Mexico, the Middle East. Morocco, New Caledonia, Palestine, Peru, or Réunion. It is also the earliest document seen (Dec. 2007) concerning soybeans in connection with (but not yet in) Cyprus; it is stated that soybeans are not grown on the island of Cyprus. Soybean cultivation is not practiced in the Italian colonies of Eritrea (Erythrée, now part of Ethiopia) or Cyrenaica (Cyrénaïque, now part of Libya).

Note 3. This document contains the earliest date seen for soybeans in Bhutan, New Caledonia, or Réunion, or the cultivation of soybeans in New Caledonia (1928), or Bhutan

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or Réunion (1936) (One of two documents).

Note 4. This is the earliest French-language document seen (March 2020) that mentions tempeh, which it calls "tempe" (p. 168). It notes that, in general, the indigenous people of the Netherlands Indies use soybeans mainly to make *tempe*, a product which, throughout central and eastern Java, takes the place reserved for *ontjom* in western Java. Tempeh is found in two forms: either in large flat cakes which are cut at the time of sale into small square morsels, or wrapped in folded banana leaves. A detailed description of the preparation of each of these two types of tempeh is given as well as another type of tempe, called *tempemori*, which is made with soybeans and coconut presscake.

Soybean cultivation is not known to be practiced in the following countries or colonies: Antigua, Barbados, British Honduras (renamed Belize in about 1975), Trinidad and Tobago.

Note 5. The name "Georges Ray" is mentioned in this book on an unnumbered page. Address: Rome, Italy.

406. Japan-Manchoukuo Year Book. 1936. Tokyo, Japan: Japan-Manchoukuo Year Book Co. xii + 1258 p. Index. 26 cm. Third annual issue. [Eng]

• ***Summary:*** Each year book is divided into two main parts: Japan, and Manchoukuo. On the title page, just below the title but in small letters we read: "Cyclopedia of General Information on the Empires of Japan and Manchoukuo. Appendices: Who's Who Business Directory." Below that is a small map showing the Japanese empire, circled, as part of East Asia–under which is printed: "Neither is Understandable Without the Other." Below that are listed the cities and names of 18 agents worldwide. This book was published in late-December 1935.

In the Japan and Manchoukuo parts of the book, soya beans are most widely discussed in the respective chapters on Agriculture. In each case, information given the previous year is updated one year.

Page 359: A large table gives the yield of rice and other cereals in koku per tan from 1904-08 to 1933. For soya beans the yield in 1933 was 0.86.

Page 364: Table 29 shows production of "Beans, potatoes and sweet potatoes" in hectolitres from 1929 to 1933. 1.80391 hectolitres = 1 koku = 5.11902 dry bushels (USA). For soya beans:

4.789 million hectoliters in 1929
5.473 million hectoliters in 1930
4.481 million hectoliters in 1931.
4.352 million hectoliters in 1932.
5.053 million hectoliters in 1933.

Page 767: A large table shows "Crop output" (metric tons) in Manchoukuo yearly from 1922 to 1935* (* = estimate). For soya beans:

3.088 million metric tons in 1922
3.262 million metric tons in 1923
3.448 million metric tons in 1924
4.174 million metric tons in 1925
4.776 million metric tons in 1926
4.817 million metric tons in 1927
4.834 million metric tons in 1928
4.849 million metric tons in 1929
5.298 million metric tons in 1930
5.227 million metric tons in 1931
4.268 million metric tons in 1932
5.205 million metric tons in 1933
3.500 million metric tons in 1934
3.995 million metric tons in 1935

The other principal crops shown in the table are other beans, kaoliang, millet, maize, wheat, rice, and other crops (incl. groundnuts).

Page 788: A large table gives a crop forecast for 1935. Production of soya beans is expected to increase 17%.

On p. 788-89 is a long section of text on "Soya beans" identical to that in the 1935 Year Book. Soybean production in Manchoukuo in 1933 was 4.601 million metric tons on 3.747 million hectares.

Page 717: Export of soya beans in 1932 was 42.536 million piculs [1 picul = 133.33 lb weight Avdp] worth 144.304 million Hk. Tl. [Haikwan taels]. Export of soya beans in 1933 was 39.111 million piculs worth 169.095 My [Million yen? / Manchoukuo yen?].

A large table (p. 717) shows "Staple exports as classified by destinations in 1932 (in piculs). Soya beans were exported to the following countries–in descending order of amount exported:

Germany 10.474 million piculs
Soviet Russia 7.520 million piculs
China 7.246 million piculs
Egypt 6.997 million piculs
Japan 5.568 million piculs
Great Britain 1.348 million piculs
Chosen [Korea] 0.905 million piculs.
Netherlands India [today's Indonesia] 0.849 million piculs
Netherlands 0.369 million piculs
Hongkong 0.355 million piculs
Denmark 0.340 million piculs
Italy 0.212 million piculs
Belgium 0.145 million piculs
Central America 0.125 million piculs
France 0.030 million piculs
Straits Settlements 0.022 million piculs
Philippines 0.0088 million piculs
Norway 0.0082 million piculs
British India 0.0028 million piculs
Sweden 0.0024 million piculs
United States 0.0012 million piculs
Siam [today's Thailand] 0.00028 million piculs.

Other major export crops were kaoliang, maize, millet,

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groundnuts, wheat and buckwheat.

Page 714 is all about "Soya beans" which are the most important staple product of the country and has been grown for many years before the opening of Newchwang while some had been exported to the ports of South China. At the time of the Russo-Japanese war (1904-05) the Japanese became aware of the value of the bean, especially of the bean cake for use as fertilizer, but the article did not enter upon its career as an important factor in international trade until 1910 when the Mitsui Bussan Co. made a trial shipment of 100 tons to England. Since then, mainly through the continued experiments of the Central Laboratory, maintained in Dairen by the S.M.R. [South Manchuria Railway], many new uses, have been found for soya bean until today the articles manufactured either wholly or partially from beans, bean oil and bean cake include more than thirty items, among which the following may be mentioned: soy [sauce], sauces, soups, condensed milk, casein, cheese, salad oil, crackers, macaroni, flour [probably roasted], confectionary, glycerine, explosives, enamels, varnishes butter and lard substitutes, edible oils, salad oils, water-proof material, linoleum; paints, soap, celluloid, rubber substitutes, printing-ink, lighting and lubricating oils, etc. Bean cake is also used extensively for fodder and as fertilizer.

"The S.M.R. Agricultural Experiment Station at Kunchuling [Kungchuling] and elsewhere have through continuous experiments and distribution of superior seeds to Manchurian farmers increased the crops by 10 to 20 percent 'while the oil content of such improved beans have been increased by more than ten percent. The use of these improvements is being advocated by means of poster campaigns and other forms of propaganda, while demonstrations are being carried out to instruct the farmers in new methods. At the same time a new industry of manufacturing beans into oil and cakes has sprung up, the modern methods rapidly replacing the old-fashioned presses.

"Soya bean output in 1934 is as follows:

A large table (p. 718) titled "Output of soya bean" [in Manchoukuo, according to districts] is divided into South and North Manchuria. It shows the following for each district in 1934: Cultivated area (hectares). Output per hectare (kgs.). Output in 1934 (metric tons). Actual output in 1933 (metric tons). Increase or decrease (metric tons). Rate of increase (1933 = 100).

407. *Revista de Agricultura* (*Cuba*). 1937. El frijol que se ha hecho famoso [The bean that has become famous]. 20(4-5):30-36. April/May. [Spa]

• ***Summary:*** Describes the soybean, its history in the United States, the advantages of planting it, its uses as oil and vegetable milk, its use in industry, and prospects for the future. Contains eight photos: (1) William Morse of the USDA standing in front of many floor-to-ceiling shelves filled with food products made from soybeans. (2) Green vegetable soybeans in their opened pods. (3) Horse-drawn carts with sacks of soybeans and silos filled with soybeans in Manchuria. (4) William Morse pouring whole soybeans into his left hand from a can held in his right hand. On a nearby wooden box, apparently containing the same type of soybeans, is written in Japanese (from right to left) *"Hakka mamé,"* which means "peppermint soybeans." (5) Two farmers in a field of shocked soybeans. (6) A Korean girl pounding soybeans in a tall wooden mortar. (7) A Chinese courtyard filled with vats of fermenting soy sauce, each covered with a conical braided bamboo lid. (8) Two farmers wearing straw hats inspecting soybeans in a field.

408. Morse, W.J. 1937. Soybean variety studies of the United States Department of Agriculture. *Proceedings of the American Soybean Association* p. 16-18. 17th annual meeting. Held 14-16 Sept. at Urbana, Illinois.

• ***Summary:*** "One of the outstanding results of soybean improvement work in the United States has been, the realization of the importance of varietal adaptation... Varietal adaptation is obviously the reason why practically every locality in the soybean regions of the Orient has its own local varieties... Of the large number of introductions obtained from Asia, the same variety rarely has been secured a second time unless introduced from the same locality... Before numerous introductions were made by the Department, beginning in 1898, there were not more than eight varieties of soybeans grown in this country, and the culture of these varieties was confined to limited areas in a few states... Seed samples were obtained through consuls, missionaries, seedsmen, government agencies, and foreign explorers until by 1909 we had 175 varieties; by 1913, 427 varieties; by 1919, 629 varieties, by 1925, 1133 varieties, and at the present time more than 2,500 distinct types. Since 1989 the Department of Agriculture has made more than 10,000 introductions of soybeans from China, Manchuria, Japan, Chosen [Korea], Java, Sumatra, Siberia, and India. This large collection, ranging in time of maturity from 75 to 200 or more days, has show wide differences in adaptation to soil and climatic conditions..."

After preliminary testing at Arlington Farm, Virginia, the introductions are sent to various experiment stations for cooperative studies...

"The soybean has been used chiefly as a forage crop in the United States and for many years breeding work tended largely toward the development of varieties for hay, silage, and pasture. With the rapid development during the past few years of the soybean for oil, food and industrial purposes, acreage for bean production has increased greatly. The improvement and development of varieties adapted to a wide range of conditions and uses undoubtedly has been one of the most important factors in increased acreage and seed production."

"Extensive cooperative investigations with more

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than 3,000 introductions and selections of soybeans have been carried on during the last three or four years with experiment stations and special cooperators in 44 states and the insular possessions, Hawaii and Puerto Rico. Many of these selections gave outstanding results when compared with standard varieties in different sections and are being increased for more extensive field tests. Several of the varieties in different sections were found especially suitable for use as green shelled beans, dry edible beans, or beans of high oil and protein content, as commercial beans.

"In 1936, more than 5,000 individual soybean plant selections from introductions and natural hybrids were under test at Arlington Farm. Although improvement work at Arlington has been largely plant selection, some hybridization work has been started, especially with the wild soybean and the most promising cultivated types. Oil and protein studies have been conducted along with the breeding work, analyses being made of introductions grown in the same and under different environmental conditions. An extensive series of varieties, introductions and selections at Arlington Farm ranged from 12 to 26 per cent oil and from 28 to 50 per cent protein... In view of the interest in soybean oil for paint purposes, studies were conducted to show the range in iodine number. The results of these investigations showed a range from 118 to 143 for domestic varieties and 155 for the wild soybean.

"The increasing use of soybeans for food has resulted in a demand for varieties especially suited for various food purposes. Extensive cooperative cooking experiments with the Bureau of Home Economics of the Department of Agriculture and with several state experiment stations have shown considerable variation in flavor and cooking quality in both the green and dry beans of edible varieties from the Orient. The most promising of these have been named and distributed to special cooperators by several state experiment stations. Some of these varieties are especially valuable as green shelled beans, flour, dry edible beans, roasted salted beans [soynuts], bean curd, bean milk, and bean sprouts." Address: Bureau of Plant Industry, USDA, Washington, DC.

409. *Foreign Crops and Markets* (*USDA Foreign Agricultural Service*). 1937. Bumper crops in Chosen [Korea] forecast. 35(21):319-20. Nov. 20.
• ***Summary:*** "Record or near record harvests of most major crops in Chosen this year have been forecast, according to a report received from Vice Consul Ralph Cory at Seoul." Production of "soybeans is only slightly below that of record years."

A table titled "Chosen: Production of specified crops, 1935-1937," gives estimates for rice, cotton, millet and "soybean" for these three years. For soybean: 1935 final estimate–22,401,000 bushels. 1936 final estimate–19,375,000 bushels. 1937 first estimate–22,606,000 bushels.

410. Arksoy: New U.S. domestic soybean variety. 1937. Seed color: Yellow (straw), hilum brown.
• ***Summary:*** Sources: Morse, W.J.; Cartter, J.L. 1937. "Improvement in soybeans." *Yearbook of Agriculture* (USDA). p. 1154-89. For the year 1937. See p. 1187. Origin: Introduction, Chosen [Korea]. Year: 1914. Days to mature: 140. Flower color: Purple. Pubescence color: Gray. Seed coat color: Straw yellow. Germ color: Yellow. Hilum color: Brown. Seeds per pod: 2-3. Seeds per pound: 2,136. Use: Forage, grain.

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 8-9. Arksoy is in the USDA Germplasm Collection. Maturity group: VI. Year named or released: 1937. Developer or sponsor: C.K. McClelland, Arkansas AES (Agric. Exp. Station) and USDA. Literature: 08, 11. Source and other information: From Pyongtang, North Korea, in 1914. Prior designation: PI 37335. Address: USA.

411. Becker, Joseph A.; Froehlich, Paul; Hendrickson, Roy F.; et al. comps. 1937. Agricultural statistics 1937. Washington, DC: U.S. Government Printing Office. 486 p. Index. 24 cm. For soybeans and soy products see p. 218-220.
• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

Page 218: Table 290. Soybeans: Acreage, yield, production, and season average price per bushel received by producers, by States, average 1928-32, and annual 1935 and 1936.

Page 218: Table 291. Soybeans: Production in specified countries, 1924-25 to 1935-36 (in 1,000 bushels). The countries are: United States, Manchuria, Chosen (Korea), Japan, Netherland India (later Indonesia). Note: Data from Manchuria are reports from the South Manchuria Railway and do not include the large production of China proper. Manchuria is by far the biggest soybean producer in 1936, with 155.424 million bu produced. U.S. production increased from 4.947 million bu in 1924 to 44.378 million bu in 1935.

Page 219: Table 291. Soybeans: Average price per bushel received by producers, United States, 1926-27 to 1936-37. The weighted average price ranged from a low of $0.48 in 1931-32 to a high of $2.00 in 1926-27.

Page 219: Table 203. Soybeans for seed: Average wholesale selling price per bushel at Baltimore [Maryland] and St. Louis, Missouri, 1926-1925. The price in St. Louis ranged from a low of $0.94 in 1933 to a high of $2.66 in 1929.

Page 220: Table 294. Soybeans crushed and crude oil produced by quarters, 1926-27 to 1935-36 (in 1,000 pounds). The total soybeans crushed increased from 335,000 bu in 1926-27 to 25,181,000 bu in 1935-36. The total soybean oil produced rose from 2.650 million lb in 1926-27 to 208.964

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million lb in 1935-36.

Page 220: Table 295. Soybean oil, domestic crude: Average price per pound, in drums, New York, by months, 1929-30 to 1936-37.

Page 221: Table 296. Soybeans and Soybeans and soybean oil: International trade (principal importing and exporting countries), average 1925-29, annual 1933-35.

Page 225: Table 394. Hay, tame by kinds: Acreage and production, United States, 1919-1936. Note: Soybean, cowpea, and peanut vine hay are grouped together. Their total acreage rose from 2.332 million acres in 1929 to a peak of 8.027 million acres in 1934, falling to 6.829 million acres in 1936. Their total production rose from 2.078 million short tons (1 short ton = 2,000 lb) in 1929 to a peak of 7.788 million short tons in 1935, falling to 5.411 million short tons in 1936 (preliminary).

Page 265: Table 471. Imports of principal agricultural products into the United States by countries, 1928-29 to 1935-36. Soybeans were imported from China, Japan, Kwantung, Germany, other countries, and total. The total decreased (because of the Smoot-Hawley Tariff Act of 1930) from 76,366 tons in 1928-29 to 18,277 tons in 1935-36.

Page 368: Table 471 continued. Soybean oil was imported from Kwantung, China, Japan, other countries, and total. The total decreased from 17.172 million lb in 1928-29 to 11.284 million pounds in 1935-36 (because of Smoot-Hawley).

Page 371. Table 472. Oil cake and oil-cake meal: International trade, average 1925-29, annual 1933-35. The main cakes are from cottonseed, flaxseed, peanuts, corn, etc. Soybean cake is not included in this table. The principal exporting countries in 1925-29 were the USA, USSR, and British India. The principal importing country in 1925-29 was Germany (by far).

Page 372: Table 473. Vegetable oils: Exports from the United States, 1909-10 to 1935-36. The main vegetable oil exported (by far) in 1909-10 was cottonseed oil at 223 million lb. but by 1935-26 it had been reduced to a trickle, 3.5 million lb. Soybean oil was first exported in 1919-20 when 67.7 million lb were exported. This decreased to 4.4 million lb in 1935-36.

Page 372: Table 474. Vegetable oils: imports into the United States, 1909-10 to 1935-36. Statistics for soybean oil imports started in 1911-12 with 28.021 million lb, increasing to a peak for 336.825 million lb in 1917-18 (during World War I), then decreasing to 11.284 million lb in 1935-26.

Soybeans are also mentioned on pages 378 (farm business and related statistics. Crop and livestock summary: Acreage, production, numbers and value, average 1928-32, and annual 1935 and 1936), 381 (total acreage an total farm value of principal crops, by States, 1935 and 1936. Note: Soybeans are not separated out from the many crops grown, Illinois and Iowa have the largest farm value in 1936: 368 and 363 million dollars respectively). 382 (gross income from farm production, USA, by commodities, 1934 and 1935). Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

412. Descartes de Garcia Paula, Ruben. 1937. A soja como materia prima para industria [The soybean as a raw material for industry]. Rio de Janeiro, Brazil: Instituto Nacional de Technologia (Ministerio do Trabalho, Industria e Commercio). 21 p. 24 cm. [4 ref. Por; fre]

• ***Summary:*** Contents: Introduction. Names of the soybean in different languages. Table showing production of soybeans in leading countries: Manchuria, China, Japan and Korea, United States, Russia, Netherlands Indies. Chemical composition of soybeans in China and Japan, Russia, Hungary, England, and USA (tables {p. 9-11} showing chemical composition, based on research in USA and Brazil); for each variety is given the percentage composition of water, oil, protein (*proteinas*), carbohydrates, cellulose, and ash. Analyses of 7 soybean varieties (made in the USA by USDA): Austin, Ito San, Kingston, Mammoth, Guelph, Medium Yellow, Samarow. Analysis of 11 varieties grown in Sao Paulo, Brazil: Peking, Wilson Five, Minsoy, Dunfield, Mandarin, Haberlandt, Virginia, Habaro, Dixie, Mammoth Yellow. Analysis of 6 varieties grown in Parana (Aksarben, Edano, Hermann, Mammoth Yellow, Mammoth Brown).

Brief studies of the chief soybean products: oil (*oleo*), cake (*torta, residuo proveniente da extracçao do oleo*), flour (*farinha de soja*), lecithin (*lecithina*), and casein (*caseina de soja*). List of potential industrial products. List of food products. French summary.

Highlights the importance of the soybean in the general economy and especially as a raw material for industry. The possibilities of the crop for Brazil are considered.

Note 1. This is the earliest Portuguese-language document seen (Sept. 2016) that mentions soy oil, which it calls *oleo*.

Note 2. This is the earliest Portuguese-language document seen (Dec. 2020) that uses the term *caseina de soja* or the word *proteinas* to refer to protein in connection with soybeans.

Note 3. This is the earliest Portuguese-language document seen (Feb. 2016) that mentions lecithin in connection with soybeans.

Note 4. This is the earliest Portuguese-language document seen (Sept. 2016) that uses the word *torta* to refer to soybean cake. Address: Rio de Janeiro, Brazil.

413. Hill, Albert F. 1937. Economic botany; a textbook of useful plants and plant products. New York, NY: McGraw-Hill Book Company, Inc. x + 592 p. Illust. (many photos). Index. 24 cm [157* ref]

• ***Summary:*** Chapter 9, “Fatty oils and waxes,” has two sections (p. 211, 216-17) on “Soybean oil” which is a semidrying oil. It notes that the soybean, “indigenous to

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Eastern Asia, and a food plant of paramount importance in that region, also yields a valuable oil which is extracted from the seeds (Fig. 89, B).” “In recent years soybeans have become a crop (Fig. 92) of major importance in American agriculture.”

The next oil mentioned is sesame oil.

Chapter 9, “Fatty oils and waxes” contains a table (p. 227) titled “1935 imports of important fatty oils, waxes and saponins.” These imports are apparently to the USA. It is divided into five sections:

(1) “Oil seeds and other raw materials”: raw materials” in descending order of amount (million pounds): Flax 983.3. Copra 454.1. Sesame 146.3... Soybean 0.248.

(2) “Inedible expressed oils” (million pounds): Coconut 353.4. Palm nut 297.5. Tung 120.0... Soybean 14.24

(3) Edible expressed oils: Cottonseed 166.6. Peanut 80.72. Olive 70.78. Sunflower 37.05.

(4) “Oil cake”: Soybean 107.4. Copra 103.7. Cottonseed 59.7... Peanut 6.57. Thus, the main imports of soybeans are in the form of cake.

Chapter 13, “The history and nature of food plants” has a 6-part table showing Alphonse de Candolle’s understanding of the antiquity of plants. The oldest plants are listed in table (A) “Old World species cultivated for over 4,000 years.” These include the soybean and 28 other plants.

The section on the “Origin and distribution of food plants” states (p. 301) that the soybean originated in “Southeastern Asia.” Note: Since the 1970s it has generally been believed that the soybean originated in the eastern half of North China (Hymowitz 1970).

Chapter 16, “Legumes and nuts” has a section on “Soybeans” (p. 357) which states:

“The soybean is a native of Southeastern Asia, where over 1,000 varieties are grown.” Manchuria [now under Japanese control] is the leader in commercial production, followed by Korea, Japan, and the Dutch East Indies [today’s Indonesia]. The soybean is by far the most important legume in the “Far East, where soybeans are used everywhere in the daily diet of the natives to supplement rice.” Also mentioned are soybean sauce, the flour, soybean milk, soybean sprouts and soybean oil, “an important drying oil.” Soybean production in the USA in 1935 was 43.63 million bu, of which 50% were grown in Illinois; the total is double the production of 1934.

An appendix, “Systematic list of species discussed” includes under Leguminosae (p. 540): *Glycine Soja* (L.) Sieb. & Zucc. *Glycine Max* (L.) Merr. *Soja Max* (L.) Piper–Soybean.

Note: The author is a bit confused about the correct scientific name (Latin binomial) of the soybean. Address: Research Asst. in Economic Botany, Harvard Univ.

414. Inahara, K. ed. 1937. Japan Year Book. Tokyo: The Foreign Affairs Association of Japan. 1240 + 32 p. See p. 474-76, 625, 987, 1071-72, 1076-78.

• ***Summary:*** The Preface indicates that this book was published in about Sept. 1937.

Pages 475-76. “Leguminous plants:... During the past decade area planted has been pursuing a slow, downward movement, while a sharp reduction experienced by production was more than made good by the increase of 1933. Soya beans and azuki (red) beans are predominant both in area and production.

Soy-beans were planted on 335,345 cho which produced 2.261 million koku worth 34,333,000 yen.

Azuki beans were planted on 109,389 cho which produced 5.333 million koku worth 10,620,000 yen.

Note: It is surprising that Japan produced a much larger volume of azuki beans than of soy-beans. Perhaps azuki bean production should be 0.533 million koku.

Page 625. A large table shows production of vegetable oils in Japan (in yen) from 1936 to 1935. In 1926 rapeseed oil was the most valuable oil in Japan (13.474 million yen) followed closely by soya bean oil (13.386 million yen). The same general relationship existed in 1935; rapeseed oil was still the most valuable oil in Japan (20.019 million yen) followed by soya bean oil (15.329 million yen).

Next in value in 1935 were perilla oil (10.494 million yen), cottonseed oil (7.129 million yen), other oils (6.743 million yen), copra oil (5.376 million yen), sesameseed oil (2.835 million yen), linseed oil (3.691 million yen), groundnut oil (0.595 million yen), camellia oil (0.439 million yen), and paulownia oil (0.227 million yen).

A second table shows production of animal oils and tallow (in yen) from 1926 to 1935. These were much less important than vegetable oils, being worth only about one-sixth as much in total. Beef tallow and cod oil were the two most important animal oils in 1935.

Page 987. The section on Chosen [Korean] agriculture states that the soy bean is one of the most important crops, after rice, barley, wheat and rye. “In 1935 the total the total area under cultivation was 791,857 cho and the amount produced reached 4,375,278 koku, which was an increase of more than five times compared with the year 1910.”

Page 1071. A large table shows “Values of principal articles exported abroad (in Manchoukuo yuan),” in 1935 and 1936. The export item of greatest value was soy beans, which increased from 130.053 million yuan in 1935 to 216.474 million yuan in 1936.

The item of 2nd greatest value was [soya] beancake, which increased from 51.370 million yuan in 1935 to 53.126 million yuan in 1936.

The export item of 4th greatest value (after coal) was [soya] bean oil, which increased from 20.132 million yuan in 1935 to 21.282 million yuan in 1936.

Page 1072. A large table on “Quantities of principal articles exported abroad” (from Manchoukuo in piculs; 1 picul = 133.33 lb) are: The export item of greatest weight

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was soy beans, which increased from 9.203 million piculs in 1935 to 32.539 million piculs in 1936.

The item of 2nd greatest weight was [soya] beancake, which decreased from 16,925 million piculs in 1935 to 14,026 million piculs in 1936.

Another important export item was [soya] bean oil, which decreased from 1.479 million piculs in 1935 to 1,109 million piculs in 1936.

Page 1076. Two large tables show "Cultivated area and production of cereals" (in hectares and metric tons), 1929-1935. For soy beans:

3.822 million metric tons in 1935–grown on 3.249 million ha.

Other crops in the table are other legumes, kaoliang, millet, maize, wheat paddy-field rice, upland rice, and other cereals.

Page 1077 gives "Crop forecast by provinces (metric tons)." Soy beans is the first crop on the list. The provinces are:

Pinkiang 1,083,886 metric tons
Fengtien 985,362 metric tons
Kirin 980,789 metric tons
Lungkiang 464,940 metric tons
Sankiang 260,592 metric tons
Antung 154,664 metric tons
Chinchow 151,108 metric tons
Chientao 91,383 metric tons
Heiho 2,729 metric tons
Total 4,175,453 metric tons.

Also on p. 1077 a table shows "Exports of agricultural products, 1933-1935." (Quantity in piculs, value in yen). Soy beans was by far the leading export:

39.111 million piculs in 1933
41.308 million piculs in 1934
29.230 million piculs in 1935

Page 1078. "Soy Beans: Manchoukuo produces about 60 per cent of the total production of soy beans in the world. The beans contain about 10 per cent of oil, and the cake which is obtained in pressing the beans is exported as fertilizer. The latest figure for production of soy beans in Manchoukuo was 3,820,000 metric tons and its total plantation [planted] area 3,249,000 hectares. The average crop per hectare was 1,180 kg."

415. Japan-Manchoukuo Year Book. 1937. Tokyo, Japan: Japan-Manchoukuo Year Book Co. 32 + xiii + 1304 p. Index. 26 cm. Fourth annual issue. [Eng]

• ***Summary:*** Each year book is divided into two main parts: Japan, and Manchoukuo. On the title page, just below the title but in small letters we read: "Cyclopedia of General Information on the Empires of Japan and Manchoukuo. Appendices: Who's Who Business Directory." Below that is a small map showing the Japanese empire, circled, as part of East Asia–under which is printed: "Neither is Understandable Without the Other." Below that are listed the cities and names of 18 agents worldwide. This book was published in mid-November 1936.

In the Japan and Manchoukuo parts of the book, soya beans are most widely discussed in the respective chapters on Agriculture. In each case, information given the previous year is updated one year.

Page 359: A large table gives the yield of rice and other cereals in koku per tan from 1904-08 to 1935. For soya beans the yield in 1935 was 0.67.

Page 369: Table 27 shows production of "Beans, potatoes and sweet potatoes" in hectolitres from 1929 to 1934. 1.80391 hectolitres = 1 koku = 5.11902 dry bushels (USA). For soya beans:

3.902 million hectoliters in 1934

Page 846: Two large tables show "Area under various crops (in hectares)" and "Amount of crops (metric tons)" in Manchoukuo yearly from 1924 to 1935. For soya beans: 3.822 million metric tons in 1935

The other principal crops shown in the tables are other beans, kaoliang, millet, maize, wheat, rice, upland rice, and other cereals.

Page 847: The section on "Soya beans" has a new paragraph on the end: "Soya beans are exported to Japan, China, Europe, the South Seas and almost all other countries of the world. Their exports for the last few years are given below:

2.207 million metric tons in 1930
2.834 million metric tons in 1931
2.562 million metric tons in 1932
2.523 million metric tons in 1933
1.976 million metric tons in 1934
1.892 million metric tons in 1935

Page 915: A pie chart shows principal exports from Manchoukuo in 1935. In descending order of importance they are: Soya beans 30.9%. [Soya] bean cake 12.2%. Coal 9.6%. [Soya] bean oil 4.8%. Groundnuts 3.6%. Other beans 3.1%, etc.

Page 893 is all about soya beans in Industry in Manchoukuo. In recent years, exports of bean cakes have "been hard hit by the world-wide economic depression and the growth of the sulphate of ammonia [ammonium sulfate fertilizer] industry.

"There are more than 3,000 bean oil mills throughout Manchoukuo, but those with worthy equipment are 402 in number as may be seen from the following table (as shown by the returns of the Dairen Bean Oil Association).

The large table, titled "Bean oil mills" shows the number of mills in each locality for each for the following localities: Dairen 50, Yinkow 20, Antung 23, Harbin 43, South Manchuria 238, North Manchuria 28. Total: 402. Also given for each locality are the number of pressing machines (hydraulic or screwing [screw presses]) and the production capacity per day of beancake (pieces) and bean oil (kin).

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A small table (p. 893) shows the "Output of bean-cake and oil" in 1932. Bean cake was worth 72.1 million yen whereas bean oil was worth 31.6 million yen.

Four large tables (p. 893-94) show "Exports of bean oil and bean-cake by countries, 1932-1935. About 70% of the soya bean oil (by weight) is exported to China, whereas about 48% of the bean-cake is exported to Japan & Chosen [Korea] and about 34% is exported to China.

Page 897: A long section titled "Soy" [sauce] states: "In sympathy with the rapidly increasing number of Japanese residents since the foundation of the country [Manchoukuo], the soy industry has made marked developments. The output of soy in Kwantung Province, which was as limited as 14,500 koku in 1931, increased to 22,000 koku in 1932, to 25,000 koku in 1933 and to 27,000 koku in 1934. It is observed that 30 per cent. of the output is exported to Manchoukuo and 10 per cent. to China. The shipments to the former have of late begun to shrink in contradistinction to the increase in the local consumption. This is due to the growing development of soy brewing in Manchoukuo. Prior to the 1931 incident there was almost no production of soy in Manchuria, but at present it is produced to the extent of about 30 per cent. of the output of Kwantung Province. Thus, the Manchoukuoan soy is gradually invading the market along the S.M.R. line hitherto monopolized by the Kwantung brewers. The import of soy from Japan is reckoned at 10,000 koku a year. In 1935 the Kwantung Province Soy Brewing Association was composed of fifteen members. Principal soy breweries in whole Manchoukuo are the Dairen Soy Co., the Ikeda Shoten and the Shimaki Shoten, Dairen, and the Mukden Shoten and the Iyokoku Shoten, Mukden the Manshu Shoyu, Hsinking; and the Okada Shoten, Liaoyang.

"According to the Manchurian Industrial Statistics, in 1932 there were 79 soy breweries, which were responsible for the production of 105,778 hectolitres, valued at ¥1,599,548."

416. Kale, F.S. 1937. Soya bean: Its value in dietetics, cultivation and uses. With 300 recipes. 2nd ed. Baroda State, India: Baroda State Press. xxx + 375 p. Illust. (35 leaves of plates, described in a separate record). Index. 22 cm. 2nd ed. 1937. [66 ref]

• ***Summary:*** Contents: 1. Deficiencies in the Indian diet and soya bean as a means to rectify them. 2. History of the origin and growth of soya bean: Derivation of the word soya bean, origin of soya bean, literature, primitive man and soya bean, name of the plant, home of soya bean and its expansion, varieties of soya bean, the culture of soya bean is very remote (It "has been the chief article of diet in China for over 7,000 years."), reference of soya bean in old Chinese records, how and when soya bean became known to Europeans, soya bean in England (from 1890; J.L. North and Henry Ford), soya bean in France (from 1739), soya bean in Italy, soya bean in other countries of Europe, soya bean in United States of America, India and soya bean.

3. The use of soya bean: Importance of soya bean, dietetic importance, industrial importance, agricultural importance (Russia, Mussolini in Italy), medical importance, soya bean is alkalising in its effect ("Soya bean milk as well as its flour is used in foods for invalids and infants, like Nestle's food"), longevity and soya bean.

4. World trade in soya bean: Imports to Europe, production of soya bean in Manchuria (58% in North Manchuria), exports from Manchuria, oil and cake industry in Manchuria, soya bean production in Japan, in America, in Africa, in Australia, in Europe, in Java, in India, in other British possessions, estimate of world production of the soya bean, the desirability of the expansion of soya bean cultivation, imports and exports of soybeans, soya bean oil, and soya cake–1913-1927: Denmark, Holland, United States, Great Britain, Japan, France, Russia, China, Germany, Norway, Korea. Source: International Institute of Agriculture, Bureau of Statistics, 1921, p. 420-21. A table (p. 38) shows statistics for world production of soybeans "as estimated by the leading firm of London soya bean dealers" for various years from 1923 to 1929. This includes individual statistics each year for China [incl. Manchuria], Japan, and USA. The world totals in tons are: 3,095,000 (for 1923-25). 3,397,000 (for 1926). 4,325,000 (for 1927). 6,000,000 (for 1928), and 6,570,000 (for 1929; incl. China 5,250,000; Japan 550,000; USA 250,000; Java & Dutch East Indies 120,000; Other Asiatic countries & Africa 400,000).

5. Botany of the soya bean plant. 6. Classification of soya bean. 7. Cultivation of soya bean. 8. Diseases and pests of soya bean. 9. Cultivation of soya bean in India. 10. The constituents of soya bean. 11. Soya bean milk. 12. Soya bean flour. 13. Industrial uses of soya bean. 14. Enriching soil by addition of nitrogen and use of soya bean as fodder. 15. Food requirement of the human body. 16. European and American soya bean recipes. 17. Diabetic dishes, Mahatma Gandhi's experiments at Magan Wadi and opinion of scientists on soya bean. 18. Chinese and Japanese soya bean dishes: Toffu [tofu] or soya bean curd: Digestibility, utilization, toffu khan, toffu nao [doufu nao], tze toffu (fried bean curd), chien chang toffu (thousand folds), hsiang khan, kori toffu (frozen toffu), preservation of toffu. Natto. Tokio natto and Kyoto natto etc. Hamanan natto [Hamanatto]. Yuba. Misso [miso]. Soya sauce. Soya bean confectionery. Roasted beans (Chinese).

19. Indian soya bean dishes: Hindustani dishes, Moglai dishes, Gujarati dishes, Maharashtrian dishes, Bengali dishes, Goa dishes, Tanjore dishes. Appendixes. 1. Acreage of soya bean in Manchuria during the last 5 years. 2. Total figures of export during last 5 years. 3. Bibliography. 4. Some opinions about the first edition of this book.

The preface begins (p. iii): "This little book is written in response to innumerable inquiries I have had from time to time after the inauguration of the plantation ceremony of

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Soya Beans at the State Agricultural Experimental Station by H.H. the Maharaja Gaekwar of Baroda in November 1933.

"A few months after this a food exhibition was held in Baroda where many Soya Bean dishes–Indian, European and Chinese–were exhibited. The leading papers and journals all over the country spoke in very glowing terms about the Soya Bean dishes that were exhibited... Later on at the request of Messrs. Mitsui Bussan Kaisha Ltd., a leading Japanese Firm in Bombay, a Soya Bean Exhibition and Restaurant were run in the Japanese village at the H.O.H. fete. So keen was the interest and enthusiasm evinced by the cosmopolitan public of Bombay that seats in the restaurant had to be reserved in advance. The presence of H.E. the Governor and Lady Brabourne and many Indian princes was an additional evidence of the ever growing popularity of the tasty Soya Bean dishes served there.

"At the closing of the H.O.H. fete many prominent people of Bombay requested me to continue the restaurant at a convenient place in the city, and asked me to open soya-bean milk centres for the children of the poor who could not afford to buy cow's milk. Many were ready to finance any scheme that I would propose, but unfortunately my time was not my own as I had to attend to my duties in the State and could not take advantage of their generous offer.

"The Departments of Agriculture of the various provinces of India as well as many Indian States asked me to supply them with literature regarding the cultivation and the uses of this most useful bean. The Department of Commerce and Industry of the Government of Bombay inquired if I could furnish them with information about the machinery for the extraction of Soya-bean milk. Letters of inquiries from private individuals kept pouring in daily from all parts of India. All this has induced me to undertake the preparation and the publication of this book...

"From the number of experiments carried on in the Baroda territories and outside it, I feel sure that the Indian soil is most suitable for the cultivation of soya bean...

"The leading thought of the day in India is, 'Village uplift,' and 'Rural reconstruction.'

"Baroda, 7th January 1936, F.S.K. (p. iv)

"Preface to the Second Edition: I feel grateful to the public for having given such a hearty reception to the first edition of my book. It is running into a second edition within a year...

"Now, Soya Bean Bakeries and Restaurants have been started in the city of Bombay and in many other towns in India, and Soya Bean products are exhibited in almost all the exhibitions...

"I feel highly thankful to His Highness the Maharaja of Baroda who gave me an opportunity last year of visiting Russia, where I have seen that seven to ten per cent. of Soya Bean flour was being added to the wheat flour in order to enhance the nutritive value of the bread. The Soya Research Institute at Moscow is making researches into the nutritive, industrial and economical values of Soya Bean. I have seen there the actual working of the Soya-bean milk extracting plant. They make casein out of Soya-bean milk. Soya-bean cream is sold in the market.

"I visited the dietetic clinics in England, France, Germany, Austria and other European countries, where doctors prescribe Soya Bean bread for diabetic patients. In Russia, rickets and consumption are treated by Soyolk extracted out of Soya Bean...

"France is growing Soya Bean on côlt de jura [sic, Côte d'Azur, on the Mediterranean?]. In England, through the efforts of Mr. J.L. North, Soya Bean is realised as a field crop for the last two years.

"Paris, 3rd April 1937. F.S.K. (p. ix)."

Note: author's name is pronounced KAL-ay, not KAYL (rhymes with tail or sail). (Continued). Address: Food Survey Officer, Baroda State, India.

417. MacDonald, Donald Alexander. 1937. Changing life of a Korean village. Hamheung, Korea: [s.n.]. 254 p. [Eng]*

418. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybeans. *Yearbook of Agriculture* (*USDA*) p. 1154-89. For the year 1937. [67 ref]

• ***Summary:*** Contents: History of the soybean. World distribution and production. Utilization of the soybean (with chart). Improvement of soybean varieties. Methods in breeding: Natural and artificial crossing, mutations. Inheritance studies and cytology: Plant characters (flower, stem, pubescence, and foliage; height of plant and maturity; pod-bearing habit and pod characters; sterility, growth habit), seed characters (color of seed coat, hilum, and cotyledon; other seed characters), yield of seed. Disease resistance. Identification of genes and chromosomes. Selected references on genetics of the soybean. Appendix: 1. Workers identified with soybean improvement: United States, foreign countries. 2. List of soybean genes (table). 3. Linkage of soybean characters (table). 4. Soybean varieties: Origin and varietal characteristics (table listing 101 named soybean varieties; for each is given the place and date of introduction or origin, days to mature, flower color, pubescence color, and seed characters {coat color, germ color, hilum color, seeds per pod, seeds per pound}, uses {dry-edible beans, forage, green-vegetable beans, grain}).

The section titled "History of the Soybean" states: "The early history of the soybean is lost in obscurity. Ancient Chinese literature, however, reveals, that it was extensively cultivated and highly valued as a food for centuries before written records were kept. It was one of the grains planted by Hou Tsi, a god of agriculture. The first record of the plant is contained in a materia medica describing the plants of China, written by Emperor Sheng Nung [sic, Shen Nung] in 2838 B.C. The crop is repeatedly mentioned in later records and it was considered the most important cultivated legume

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and one of the five sacred grains essential to the existence of Chinese civilization. Seed of the plant was sown yearly with great ceremony by the Emperors of China, and poets extolled its virtues. The records of methods of culture, varieties for different purposes, and numerous uses indicate that the soybean was perhaps one of the oldest crops grown by man."

Note 1. This is the earliest English-language document seen (Nov. 2017) which states that: (1) The soybean was one of the "five sacred grains." (2) "The early history of the soybean is lost in obscurity." (3) The soybean was planted at an early date by "Hou Tsi, a god of agriculture." (4) The "soybean was perhaps one of the oldest crops grown by man." It is also the earliest document seen (May 2014) in which William Morse mentions the mythical Chinese emperor "Sheng Nung" in connection with soybeans.

More broadly, this entire story linking Shen Nung with the earliest written record of the soybean, is completely incorrect. Yet because the story was written by Morse (highly regarded as America's leading authority on the soybean) in a USDA publication, it has unfortunately been repeated, and this source cited, again and again down to the present day (see Hymowitz 1970; Hymowitz and Shurtleff 2005).

Note 2. This is the earliest English-language document seen (May 2014) in which the emperor's name is spelled "Sheng Nung."

Note 3. This is the earliest document seen (July 2007) in which William Morse tries to write an early history of the soybean in China. Unfortunately, he does not cite his sources.

The section titled "Improvement of soybean varieties" states: "In the United States, more than 50 percent of the acreage devoted to soybeans is used for forage and pasture; breeding work, therefore, has tended largely toward the development of varieties for hay, silage, and pasture. The development of such varieties as Virginia, Laredo, Otootan, Wisconsin Black, Manchu, Wilson-Five, Kingwa, Peking, and Ebony by selection from introductions has been the principal factor in the increased use and acreage.

"Beginning with 1929, the use of soybean seed by oil mills has led to a demand for yellow-seeded varieties of high oil content. Agronomists and plant breeders have attempted to meet this demand by making large numbers of selections from foreign introductions and locally grown varieties and by analyzing these for oil content. This has brought about the development of several superior oil varieties and has resulted in a large increase in production of beans for milling purposes. The most popular of these varieties are Illini, Dunfield, Mukden, Mandell, Scioto, Mansoy, Manchu, Mamredo, Delsta, and Mandarin. Results of analyses with more than 1,000 selections and varieties have shown a range of from 12 to 26 percent in oil content. From studies of the oil content of varieties grown in a given locality, it seems possible, from the breeding standpoint, to produce varieties high or low in oil, at least within the known ranges of variation exhibited by common varieties." (p. 1161-62).

Soybean varieties that have excellent flavor and become soft in less than 2 hours of cooking include Easycook, Bansei, Rokusun, Jogun, Chusei, and Sousei. These are "now in the hands of growers and seedsmen. Experiments by commercial firms have shown that these varieties are superior to commercial varieties for the manufacture of food products, such as bean flour, roasted beans, bean milk, and bean curd [tofu].

"In Japan, certain varieties of soybeans were found that were used solely as green shelled beans. Ranging in maturity from 75 to 170 days, many of these introductions, and selections from them, have been found especially promising for the various sections of the United States. The vegetable soybean offers an excellent food of high nutritional value, especially in the fall when other green beans are lacking and in sections where the Mexican bean beetle prohibits the growing of garden beans. As a result of selection, cooking tests, and adaptation studies, eight green vegetable varieties–Hahto, Kura, Kanro, Hokkaido, Higan, Chusei, Sousei, and Jogun–have been introduced in various sections of the country" (p. 1163).

Photos show: (1) "The late Charles Vancouver Piper, agronomist, United States Department of Agriculture, 1902-26. Pioneer in the introduction and development of soybean varieties for United States conditions." (2) "Storage yard of a Chinese grain merchant near Kungchuling, Manchuria. More than 80 osier bins, each holding four cartloads of soybeans, were in this yard." (3) A Manchurian farmer and how he harvests, threshes and cleans soybeans by methods learned from his ancestors; comparison with modern U.S. machine harvesting. (4) "Millions of soybean oil cakes are stored in warehouses in Manchuria awaiting shipment to Japan, Chosen, China, and the East Indies, where they are used for fertilizing purposes and for cattle feed." A person looks up at the towering stacks. (5) Coolies loading large sacks of soybeans on a freighter for shipment to the oil mills of Europe. One man has hoisted a huge sack onto his back. (6) Five Manchurian farmers who have been awarded certificates and prizes for producing high-quality soybeans. (7) Twenty seeds of a natural soybean hybrid showing peculiar types of coloration. (8) Illustration (line drawing) of a soybean flower and its parts enlarged. Front view, side view, parts of the corolla (standard, wing, one of the keel petals), stamens, pistil. (9) A. Stems and pods of fasciated soybean plants; B. Determinate pod-bearing type; C. Indeterminate pod-bearing type. 10. Chromosome chart showing four groups of linked genes in soybeans.

A table (p. 1157) shows: "Increase in production of soybeans over an 11-year period, 1924-25 to 1935-36, inclusive, in the principal producing countries of the world" (Manchuria, Chosen [Korea], Japan, United States, Netherland India).

Soybean seed size (p. 1177): "The range in size of

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soybean seed varies according to the variety, each variety having its own typical seed size. Varieties and introductions tested at the Arlington Experiment Farm ranged in average weight of 100 seeds from about 4 grams for the smallest to about 40 grams for the largest." Address: 1. Senior Agronomist; 2. Assoc. Agronomist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry [USDA, Washington, DC].

419. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybeans: Appendix 1–Workers identified with soybean improvement in the United States and abroad (Document part). *Yearbook of Agriculture* (*USDA*) p. 1154-89. For the year 1937. See p. 1184-85.

• ***Summary:*** In the United States: (1) USDA Bureau of Plant Industry, Division of Forage Crops and Diseases: W.J. Morse, Washington, DC. W.M. Stuart, Jr., and C.H. Brinkley, Arlington Experimental Farm, Arlington, Virginia. J.L. Cartter, Urbana, Illinois. M.G. Weiss, Ames, Iowa. J.L. Stephens, Tifton, Georgia. T.F. Akers, West Point, Mississippi. R.E. Stitt, Statesville, North Carolina. H.A. Schoth, Corvallis, Oregon.

(2) State agricultural experiment stations (32): Alabama, Auburn: H.B. Tisdale. Arkansas, Fayetteville: C.K. McClelland. Stuttgart: G.C. Banks. California, Berkeley: W.W. Mackie. Colorado, Fort Collins: D.W. Robertson, A. Kezer. Delaware, Newark: G.L. Schuster. Florida, Gainesville: G.E. Ritchey. Belle Glade: A. Daane. Quincy: J.D. Warner. Georgia, Athens: J.R. Fain. Experiment: R.P. Bledsoe. Illinois, Urbana: C.M. Woodworth, W.L. Burlison, J.C. Hackleman, L.F. Williams. Indiana, La Fayette: G.H. Cutler, R.R. Mulvey, K.E. Beeson, A.H. Probst. Iowa, Ames: H.D. Hughes, J.B. Wentz. Kansas, Manhattan: J.W. Zahnley. Kentucky, Lexington: E.J. Kinney. Louisiana, Baton Rouge: J.P. Gray. Maryland, College Park: J.E. Metzger, R.G. Rothgeb. Michigan, East Lansing: C.R. Megee. Minnesota, St. Paul: A.C. Arny, W.M. Myers.

Mississippi, State College: W.R. Perkins, J.F. O'Kelly. Stoneville: H.A. York. Poplarville: J.C. Robert. Missouri, Columbia: W.C. Etheridge, C.A. Helm, B.M. King. New Hampshire, Durham: F.S. Prince. New Jersey, New Brunswick: H.B. Sprague. New York, Ithaca: R.G. Wiggans. North Carolina, Raleigh: C.B. Williams, R.L. Lovvorn. North Dakota, Fargo: A.F. Yeager. Ohio, Columbus: J.B. Park, P. Preston. Wooster: L.E. Thatcher. Oklahoma, Stillwater: B.F. Kiltz. Pennsylvania, State College: C.F. Noll, C.E. Myers. South Carolina, Florence: E.E. Hall. Tennessee, Knoxville: H.P. Ogden. Texas, College Station: E.B. Reynolds. Virginia, Blacksburg: M.S. Kipps. Williamsburg: R.P. Cocke. West Virginia, Morgantown: J.A. Rigney. Wisconsin, Green Bay: E.J. Delwiche. Madison: G.M. Briggs, B.D. Leith.

Foreign countries (6):

Australia (4): Department of Agriculture, New South Wales: Glenn Innes, S.L. Macindoe. Traftor: W.H. Darragh. Richmond: N.S. Shirlow. Sydney: H. Wenholz.

Canada (3, all in Ontario province): Central Experimental Farm, Ottawa: F. Dimmock. Dominion Experiment Station, Harrow: C.W. Owen. Agricultural College, Guelph: O. McConkey.

England (1): Royal Botanic Gardens, London: J.L. North.

Germany (3): Kaiser Wilhelm Institute, Manchberg: W. Rudorf. Südd. Soya-Institut, München: K. Baumeister. Soya-Institut, Mannheim: L. [Lene] Mueller.

Japan (Incl. Chosen/Korea) (6 stations): Imperial Agricultural Experiment Station, Tokyo: H. Terao. Hokkaido Imperial Agricultural Experiment Station, Kotoni: V. Fujine and T. Hoshino. Saitama Agricultural Experiment Station, Ageo: T. Hasegawa. Central Agricultural Experiment Station, Suigen (Chosen [Korea]): I. Nagai. Central Agricultural Experiment Branch Station, Shariin (Chosen [Korea]): Y. Takahashi. Akita Agricultural Experiment Station, Akita: K. Adachi.

Manchuria (6 workers at 3 South Manchuria Railway Agricultural Experiment Stations). Kungchuling: Y. Nakamoto, S. Tsuda, M. Ishikawa, and K. Adachi. Hsiungyocheng: K. Hisatake. Kaiyuan: S. Kofuku. Address: 1. Senior Agronomist; 2. Assoc. Agronomist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry [USDA, Washington, DC].

420. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybeans: World distribution and production (Document part). *Yearbook of Agriculture* (*USDA*) p. 1154-89. For the year 1937. See p. 1156-57.

• ***Summary:*** "One of most striking agricultural developments in the United States in recent times is the rapid rise of the soybean. In 1907 there were 50,000 acres; in 1935, nearly 5,500,000. In 1920, seed production was 3,000,000 bushels; in 1935, about 40,000,000. Remarkable progress has been made in the last few years in developing food and industrial uses. Soybean breeding to meet varied cultural, food, and industrial needs is being conducted by the United States Department of Agriculture and by experiment stations in 32 States, and more than 10,000 introductions have been made for study and experiment. In spite of extensive investigations, the work of developing this versatile plant to its fullest possibilities is still in its infancy."

"The soybean is grown to a greater extent in Manchuria, often called 'The Land of Beans,' than in any other country in the world (fig. 2). It occupies about 25 percent of the total cultivated area and is the cash crop of the Manchurian farmer (fig. 3). Chosen [Korea] and Japan are large producers, and south of China the soybean is cultivated more or less in the Philippines, Siam [Thailand], Cochin China [southern Vietnam], India and the East Indies.

"In the central part of the Union of Soviet Socialist Republics the districts of the Don and the southwest are

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said to be especially suited to the culture of this crop. In Czechoslovakia, in 1935, commercial beans were produced on a small scale. Rumania has also succeeded in growing soybeans of high quality, and the production of the seed is rapidly increasing. In other parts of the world, particularly Germany, England, South Africa, British East Africa, Algeria, Egypt, New South Wales, and New Zealand, soybeans have been tried or are being grown in a small way.

"In the Western Hemisphere the production of soybeans is concentrated chiefly in the Corn Belt region of the United States. in 1920, 14 States produced 3,000,000 bushels of seed, the leading States being North Carolina, Virginia, Alabama, Missouri, and Kentucky–North Carolina producing about 55 % of the total. By 1931, seed production had increased to nearly 15,500,000 bushels, with Illinois, Indiana, North Carolina, and Missouri leading. In 1935, about 40,000,000 bushels of seed were produced, of which about 37,50,00 bushels (92 percent) were harvested in Illinois, Indiana, Iowa, Missouri, and Ohio, the first three States producing about 87 percent of the total. In Canada, production is confined chiefly to the Province of Ontario, where about 15,000 acres are being planted to this crop."

Note: The Don is one of the major rivers of Russia. It rises southeast of Moscow, and flows for a distance of about 1,950 kilometers (1,220 miles) to the Sea of Azov, which is just north of the Black Sea and which borders on southeastern Ukraine. The main city on the river is Rostov on Don, and its main tributary is the Donets.

In 1935 in Czechoslovakia soybeans were produced commercially on a small scale.

Note: This is the earliest English-language document seen (April 2020) that contains the term "Union of Soviet Socialist Republics" in connection with soybeans–even though the Soviet Union was formed on 30 Dec. 1922. Address: 1. Senior Agronomist; 2. Assoc. Agronomist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry [USDA, Washington, DC].

421. Woertge, Karl Heinz. 1937. Entwicklung und weltwirtschaftliche Bedeutung der Sojabohnenerzeugung und -verarbeitung [Development and international economic significance of soybean production and processing]. Thesis, Friedrich Alexander University, Erlangen, Coburg, Germany. 119 p. 28 cm. [112 ref. Ger]

• ***Summary:*** Contents: Foreword. Part I: History and culture of the soybean. 1. History, natural requirements and technology of soybean production; chemical composition of the soybean. 2. Occurrence of the soybean and methods of production in various countries: Asia (Manchuria and China, Japan, Korea, Formosa, Dutch East Indies, other Asian countries incl. British India, Cochin China, Ceylon), America, Europe (Southeast Europe, Austria, USSR, France, Italy, England, Poland, Switzerland, Czechoslovakia, Germany), Africa and Australia.

Part II. Scale and global economic significance of soybean production in the main producing areas. 1. General overview of world soybean production: Production for seeds, for fodders. 2. Scale of soybean production in the main producing areas: Asia (Manchuria, Japan, Korea, Formosa, Dutch East Indies [Java and Madura/Madoera]), America, Europe (Southeast Europe, USSR).

Part III. Development and global economic significance of soybean processing. 1. Soybean processing possibilities: A. Processing soybeans to make foods: Asia (general, methods used in China and Japan to make vegetable-type soybeans and salads, koji, soymilk, shoyu [soy sauce], miso, natto, tofu, methods used in the Dutch East Indies), Europe (general overview, preparation of soybean meal, soymilk, coffee- and chocolate substitutes). B. The soybean as an oilseed: General, methods of obtaining the oil (in Asia, Europe, USA), use of soy oil (as human food, other). C. Obtaining lecithin from the soybean. D. Use of soybean press-cake for livestock feed. E. Use of the soybean meal for fertilizer. 2. World trade in soybeans, soy oil and soybean cake/meal (*Sojakuchen/Sojaschrot*)*:* World trade in soybeans (Manchuria, Asia, Europe, USA), world trade in soy oil, world trade in soybean meal.

Closing remarks: The state of the world soybean market with special consideration for the current German conditions. Appendixes and tables. Address: Nuernberg [Nuremberg], Germany.

422. Landy, Pierre. 1938. Le commerce et l'industrie du soja [The commerce and the industry of soya]. *Annales de Geographie* (*Paris*) 47(265):9-24. Jan. 15. [13 ref. Fre]

• ***Summary:*** This is basically a summary or review of the literature; the main sources used are cited on page 9.

Contents: Introduction. I. Soybean production: The plant, the crop (used for forage or seed; in Manchuria, in Japan), distribution of the crop geographically (Manchuria, China, Korea, USA, etc.). II. Soybean industries: The ancient industries of the Far East (oil, meal, soymilk, shoyu), the great modern soy industries (in Asia, in Europe, in the USA). III. Soy commerce (local transport, exportation, trade routes and markets).

Figures: (1) A soybean plantation in Manchuria. (2) A field of soybeans in Manchuria. (3) Distribution of the cultivated area in 1934. (4) Production of soybeans in 1934. (5) Transport of soybeans over the Manchurian plain. (6) Collecting soybeans in sacks at a railroad station. (7) A group of soybean silos. (8) Soybean depots at the port of Dairen. (9) Soybean imports to Europe in 1935.

423. Morse, W.J. 1938. Edible varieties of soybeans. *Proceedings of the American Soybean Association* p. 30-33. 18th annual meeting. Held 12-14 Sept. at Wooster and Columbus, Ohio.

• ***Summary:*** "Although the soybean had attracted attention at

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various times as an article of food in the United States, it was not until the World War [World War I], when a cheap source of protein was being sought, that the soybean was really considered seriously as an article of diet for Americans. The dried beans were prepared in many ways but owing to the time required for cooking, the peculiar taste, and improper methods of processing, soybean products were not generally accepted. During this period cooking tests were conducted with all of the varieties and introductions then available in an attempt to find varieties lacking the unpleasant bean taste and which would cook quickly. Only two such varieties were found–the Easycook and Hahto. Some progress was made in getting people to eat these varieties..."

"Oriental varieties of soybeans are distinguished not only according to seed and plant characters but also according to use, such as for curd [tofu], sprouts, green vegetables, roasted beans, and numerous other food products. Attempts to obtain suitable edible varieties from oriental countries through correspondence met with but little success. During agricultural exploration work in the Orient from 1929 to 1931, many varieties of soybeans were found in Japan and Chosen [Korea] which were used solely as green shelled or dry edible beans. These edible types, ranging in maturity from 75 to 145 days, have been under test for the past six years at various experiment stations throughout the United States." In addition, "extensive investigations of the cooking qualities and composition of the green shelled and dry edible beans have been made by various Departments of Home Economics. Many of these varieties were judged much superior to the commercial varieties in flavor, texture, and ease of cooking. Moreover, tests indicate that the flour from most of the edible varieties has a better flavor than the available commercial soybean flours... Thirty-one of the varieties introduced as edible beans have been found sufficiently promising to be assigned varietal names, shown in table 1, and have been distributed into those regions to which they seem especially adapted. Although the supply of seed of these varieties at present is quite limited, seed stocks are being increased rapidly at several experiment stations and by various growers to meet the growing demand for edible soybeans... Both the green (immature) and dry beans contain much more fat and protein and less carbohydrates than other leguminous seeds. Few naturally occurring foods are as rich in protein as soybeans... The soybean is also a good source of some of the mineral elements, containing more calcium and phosphorus than any of the cereals and excelling most foods as a source of available iron. Because of the alkaline elements in soybeans, they belong to the class of alkali-forming foods.

Table 1, titled "Characteristics of edible varieties of soybeans" (p. 32) lists the following 31 varieties: Agate, Aoda, Bansei, Chame, Chusei, Easycook, Fuji, Funk Delicious, Goku (the smallest bean in this table; 3,216 seeds/lb), Haberlandt, Hahto (the second largest bean; 1,250 seeds/lb), Hakote, Higan, Hiro, Hokkaido (the largest bean; 1,232 seeds/lb), Imperial, Jogun, Kanro, Kura, Nanda, Osaya, Rokusun, Sato, Shiro, Sioux (the next to smallest bean in this table; 3,000 seeds/lb), Sousei, Suru, Toku, Tokyo, Waseda, Willomi. For each variety the table shows: F.P.I. number, number of days to ripen, seed color (green, straw yellow, olive yellow, brown, black), hilum color (brown, black, pale), seeds per pound, oil content and protein content (% on moisture-free basis), and use (green vegetable, or dry edible).

"Some commercial concerns are now canning the green beans and at the Illinois Agricultural Experiment Station attempts to preserve green soybeans with freezing storage methods have been very successful.

"Extensive nutritional studies revealing the unique dietary value of the soybean and its products during recent years have had much to do with the rapid and growing popularity of the soybean as a food."

Note: This is the earliest document seen (Nov. 2020) that mentions the soybean varieties Aoda or Sioux. Address: Bureau of Plant Industry, USDA, Washington, DC.

424. Kishlar, Lamar. 1938. Soja max–The soybean. In: Soybean Nutritional Research Council, ed. 1938. The Composition and Nutritive Properties of Soybeans and Soybean Oil Meal; A Literature Review. Chicago: SNRC. 62 p. See p. 7-9. Oct. [9 ref]

• ***Summary:*** "This is the success story of an immigrant plant which came in to America and made good. This is the story of Soja Max, the soybean, who waited 5,000 years for his big chance, and, when opportunity knocked, made a lasting place for himself in American agriculture and commerce on the basis of merit and merit alone.

"The soybean is a native of Asia. It is one of the oldest crops grown. How long ago man started to cultivate the soybean no one knows. Some say that soybeans have been grown for 25,000 years (Breedlove, 4 June 1936, p. 12). The first written record seems to be a Chinese book on Materia Medica, *Pen Ts'ao Kong Mu* written by Emperor Shen-nung about 4,800 years ago (Horvath, May 1931, p. 36).

"Even the name is cloaked with mystery. For the salted soybeans [fermented black soybeans], the early Chinese had a word pronounced 'Shi.' Another word, 'Yu,' was given to the oil used as a condiment. Later the term 'Shi-yu' [fermented black soybean sauce] was applied to the plant and to the raw beans" (Chicago J. of Commerce, 20 June 1936, p. 14).

"Linnaeus, the first botanist to make a scientific study of the leguminous plants, applied the Greek word, glycine, meaning sweet, to all the ground nut species of legumes. Since the soybean had very large nodules on the roots, he called it Glycine Max. Many years later Moench found that the soybean was a distinct genus. He renamed it Soja Hispida. More modern authorities have shown a preference for Soja Max, the name which has become generally

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accepted.

"The soybean was a long time in coming to America. In 1804 a Yankee Clipper ship, searching the Chinese ports for a return cargo, loaded several bags of soybeans as reserve food supply and brought the first importation to America" (Burlison 1936).

"More than one hundred years passed. A few soybeans were raised mostly as botanical curiosities. In 1907, Dr. C.R. Ball of the United States Department of Agriculture, described twenty-three varieties of soybeans, all that were then known in the United States (6). These included fifteen introductions by the United States Department of Agriculture between 1900 and 1905. The remaining eight were brought by individuals from the Orient, several by the way of Europe.

"By 1913, the list had grown to 427. By 1925, 1,133 varieties were described. In all more than 7,000 samples of seed have been collected from Japan, Chosen, Manchuria, China, Formosa, Java, Sumatra, and India (3). Of these, there are more than 2,000 distinct types, which have maturities ranging from 75 to more than 200 days. These types and varieties have been grown in various places, the less promising varieties being discarded, until, at present, more than 100 named varieties are widely grown, or are being increased for greater distribution in the United States (7).

"The soybean is a summer leguminous annual (1). The pods are from 1 to 2½ inches long and contain from 2 to 4 seeds. The root tubercles, which permit this plant to build up the fertility of the soil, are large and abundant. The stems, usually strong and woody, grow from 2 to more than 6 feet in height. The flowers are small, sweet-pea shaped, and white or purple in color. The seeds which grow in the pods may, when mature, be yellow, green, brown; or black in color. Some seeds are round; some are oval; while some are flat like a lima bean.

"Some varieties of soybeans are useful only as an oil seed or for feed. They are so hard that several hours' boiling fails to properly soften them. However, some of the newer varieties are useful for food and, when cooked, are delicious eaten as a vegetable. The University of Illinois has tested 467 varieties of vegetable or edible soybeans and has given six, a very good, and seventy, a good rating (8). The soybean was probably first utilized for the production of oil and meal in the United States about 1910 by an oil mill on the Pacific Coast. The beans were imported from Manchuria.

"During the World War, the general shortage of fats and oils made it necessary to import very substantial quantities of Manchurian soybean oil. This oil was frequently of very poor quality because of the crude equipment on which it was made. Often it was shipped from the Orient in five gallon kerosene cans which had been improperly cleaned, and the contaminated oil was ruined for edible purposes. In 1918 import figures show that 336,000,000 pounds of soybean oil were imported from the Orient (9).

"The production of soybean oil from domestic seed was started, in a small way, in North Carolina in 1916. The first oil was produced in a cotton oil mill in the off season, using cotton oil presses. In 1920, soybean oil was produced in Chicago Heights, Illinois, using an expeller. In 1922, oil was made by the A.E. Staley Manufacturing Company of Decatur, Illinois. At first, only one expeller was used, but two more were installed shortly afterward, and about 90,000 bushels of beans were crushed that year (9).

"From this modest beginning, the soybean processing industry has grown until soybean production in the United States reached a peak for the crop year 1935-36 when some 44,378,000 bushels were harvested. Over half of this production was processed, yielding a total of approximately 600,000 tons of soybean oil meal. The year 1938-39 is expected to exceed the record of 1935-36. When one realizes that the industry produced only 21,000 tons of soybean oil meal for the crop year 1928-29, it is obvious that a product must have merit to increase in volume 30 times during years when all feedstuffs were cheap and plentiful.

"Thus, the Asiatic visitor was quick to catch on to American ways, to thrive on American soil, in American climate. He grows nearly everywhere that corn or cotton can be grown. When history is finally written, the story of Soja Max will be the greatest success story of the great World Depression." Address: USA.

425. Imperial Economic Committee. 1938. Vegetable oils and oilseeds. London: H.M. Stationery Office. 116 p. *
• ***Summary:*** The world's leading soybean exporters in 1937 (in million lb) were: Manchuria 3,350, Korea 343, Other countries 179. The world's leading soybean importers in 1937 (in million lb) were: Japan 1,670, Germany 1,324, Denmark 542, Sweden 258, and Netherlands 220. Address: England.

426. *Revue Internationale des Produits Coloniaux et du Material Colonial*. 1939. L'extraction des dérivés du Soja [The extraction of soy derivatives]. 14(158):76-77. Feb. [Fre]
• ***Summary:*** This communication from the French commercial attaché in Tokyo describes the activities of several large, modern Japanese soybean processing companies in Manchuria. The modern soybean crushing mills use solvents, such as benzol or ethyl alcohol. The latter process, studied since 1926 by Dr. Masayasu Sato of the Central Laboratory, South Manchuria Railway Company (SMRC), is patented in England, Japan, France, Italy, and Denmark. The Sato process is used commercially by the Manchuria Soya Bean Engineering Co., a private company with capitalization of 1.5 million yen subscribed by the SMRC and by the Nippon Food Stuff Engineering Co., an affiliate of Nippon Sangyo K.K. The factory / mill, which processes 80 metric tons (tonnes) per day of soybeans, and has the capacity to be within 300 tonnes, is located on the outskirts of Dairen, Manchuria. The company has also

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studied the processes for extracting from the oil a number of special products such as lecithin, vitamin B, a food condiment, saponins, and sugars. The residual cake, which is in the form of flakes named Soya Rex Flakes, would be of great food value. These products are to be produced by an affiliate, with capitalization of £200,000, the Manchurian Society for Soya Products, which is presently constructing a factory at Kawasaki, near Yokohama.

The sodium glutamate which is extracted from the cake could rival a condiment widely used in Japan under the name Aji-no-moto. The Society for nitrogen based fertilizers created this last April an affiliated firm with a capital of £10,000,000, a fourth of which is paid out, called "the Soya Bean Chemical Engineering Co." that will produce, exclusively a dozen products all derived from the soy oil or soya cakes in a factory currently being built at Konan (in Korea), where the master company already owns a very important group of chemical industries. Among these new products, we quote: amino-acid, oil based paints, boiled oil and lecithin used in tanning hides.

Several factories, among them Honen, Nisshin, and Nikka, that up until now were just producing soja oil, will now start outputting derivatives. Mentioned are substitutes for butter, wheat flour, soap, oil for human consumption, boiled oil for the printing industry.

The Japanese chemical industry, as is being done in Germany, is thus throwing itself systematically into the exploitation of this very complex raw material, the soybean, that it will find at its door step, on the Manchukouo [Manchurian] territory.

427. Cates, J. Sidney. 1939. Big-time performance for soys. *Country Gentleman* 109(3):23, 78-79. March.

• ***Summary:*** Today, over 7,000,000 acres of soybeans are planted in the United States. But the soybean has not hit the "big-time" by accident or chance. "It is one of the few great American crops coming into its own by research, planned research, patient effort and design. The late C.V. Piper, a scholar, a dreamer and philosopher, who for many years headed the [USDA] Office of Forage Crops at Washington [DC], was the man who guessed that the soybean might find a large place in our agriculture if we were only equipped with regionally adapted varieties that somewhere in the world must already exist.

"Back in 1907, Piper picked W.J. Morse, a shy, sturdy New York State farm boy who stood up with distinction under the regimen of required studies at Cornell University, and turned over to Morse the task of building a new crop plant for American field agriculture.

Nearly a decade ago [in Feb. 1926] Piper passed away, but Morse, whom he selected for his soybean work, can now look back over the thirty-one years and scan a record of achievement which I do not believe could be matched even by Piper's hopes and dreams. If there ever was a one-man-made crop in this country, it is the soybean. And W.J. Morse is the man."

"In 1907 when Morse started work with the crop, there was probably less than 50,000 acres of soys in the whole country.

"Morse realized that if the crop were ever to become national, varieties adapted to the different sections must be developed. And so a dragnet was set for all the soy varieties the Orient had to offer. And through the years Morse has put more than 10,000 different lots of imported beans through his tests. And the Morse test is not just a routine affair. It consists of an intimate personal study of every single bean plant growing in the little plots of these introductions.

"A less exacting man than Morse might have put these lots of beans through a test and got nowhere, for not in a single case has an introduction led immediately and directly to the establishment of a new commercial variety in this country. These introductions, as they come in, are not pure strains. In fact, always a wide variation of plant types are found growing in these little plots of so-called varieties brought in from other lands. Year after year, for more than three decades, Morse has literally lived his summers out in the fields selecting the most promising-looking plants from each of these introductions. And it is from single-plant selections made by Morse that we have developed 90 per cent of the commercial soybean varieties today.

"Back in 1913, the first variety well adapted to the Corn Belt was introduced. This was the well-known Manchu. There followed such sorts as Virginia and Wilson."

The new trend, north and south, is toward growing soybeans for their seeds, "as higher-yielding varieties have been developed for the different sections and as a new and simple way of harvesting has been devised.

"The big grain yields have been in the Midwest, many of the growers getting around forty-five bushels to the acre. In Wisconsin, yields as high as fifty bushels have been secured... The drift everywhere is toward an earlier type of bean."

"With soybean oil coming into the picture with prospective large-scale use for paint and varnish, one weakness in the present commercial setup is that the oil mills have not yet offered a premium price for high oil-content varieties. Morse has consistently carried along oil-content studies of all his introductions, and there are now some splendid seed-yielding sorts which carry from 21 to 23 per cent oil, while the ordinary run of beans carries only 18 to 19 per cent. One of Morse's varieties, the Dunfield, a Midwest adapted bean, very seldom runs under 20 per cent oil." It has yielded as high as 23.3 per cent. "A sliding price scale based on percentage of oil might prove highly advantageous to both the grower and the oil mill."

Note: This is the earliest document seen (Aug. 2011) that discusses the many advantages of adopting the practice of buying and selling soybeans on the basis of their

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composition (oil or protein content).

"And while chemical and heat treatment already show great promise of making over soy oil into a quick-drying paint oil, Morse has started still another attack on this problem.

"Quick-drying oil: In Manchuria there are found little trailing, small-seeded, wild forms of soybeans. These wild soybeans rarely ever carry an excess of 10 per cent of oil, but this oil has a peculiar property. It has what the chemists call an 'iodine number,' which runs up to 155. In ordinary soy oil the iodine number is rarely over 130.

"This so-called iodine number is the key to how rapidly an oil will dry, the higher the number the quicker the drying. This wild soybean oil is a quick dryer, and therefore should be an excellent paint oil without any treatment."

"When Morse came back from the Orient in 1931, after a two-year stay studying this great Oriental crop, he brought with him a large collection of a radically new type of soy–the green-vegetable type. Previous explorers had missed this type of bean because, in the Orient, they go by an entirely different name. In Manchuria and Japan–the home of this bean sort–ordinary field beans are called *Daizu,* while the green-vegetable beans are called *Eda Mame.* Previous explorers, asking for *Daizu* never in a single instance got *Eda Mame.* Morse, living close with the bean growers, soon picked up this distinction and brought home the new product in all its variations.

"Today, from this material he brought back there have been developed something like seventy-five distinct green-vegetable varieties, fitting an even wider range of country than do the field-bean kinds. They vary in maturity all the way from seventy-five to one hundred and fifty days. One of these varieties matures seed at Winnipeg, Canada."

On pages 78-79 are three special sections to the article: (1) "Quick-drying oil:" Wild soybeans are found in Manchuria. They are small seeded and the viny plants have a trailing habit. The seed rarely contains more than 10% oil, but this oil has a very high iodine number (up to 155) which means that the oil dries quickly and is good for paints. The iodine number of regular soybeans is rarely above 130.

(2) "Late soybean news:" At the great soybean laboratory [U.S. Regional Soybean Industrial Products Laboratory] at Urbana, Illinois, researchers are extracting new compounds from soybean meal. These include a "laminated plastic" with almost metallic hardness and strength, a synthetic fiber closely resembling wool, and powdered, water-based paints. Not to mention 75 distinct "green-vegetable varieties" of soybeans for human food; they vary in maturity from 75 to 150 days. One of these matures seed at Winnipeg, Canada.

(3) "A clamor for seed:" An article that the present writer (Sidney Cates) wrote about green vegetable soybeans in *Country Gentleman* led to thousands of letters from readers to state experiment stations requesting the new types of soybeans. "Many canners are now packing the green beans, and I have never eaten anything more delightful from a tin can."

Photos show: (1) "The Korean version of the 'two-row planter;'" two workers with seed baskets in a field. (2) Crop machinery. (3) A field of soybeans at midseason. (4) Chinese storage bins for beans, made of "great 'ropes' of twisted straw."

428. Emperor: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1939. Seed color: Yellow (straw), hilum light brown.

• ***Summary:*** Sources: Lloyd, J.W.; Burlison, W.L. 1939. "Eighteen varieties of edible soybeans: Their adaptability, acceptability, culture and characteristics." *Illinois Agric. Exp. Station, Bulletin* No. 453. p. 385-439. March. See p. 401, 405-06, 408, 41-11, 412-13, 415-16, 423. Page 413 states of Emperor: Color of blossom: Purple. Color of pubescence: Gray. Color of seed: Yellow. Color of hilum: Colorless to light brown. Shape of seed: Intermediate. Weight of 100 dry beans: 29.66 gm. Page 425 states: "Emperor. A late variety of vigorous growth, with strong tendency to branch and sprawl. Seed yellow and large. Pods large, yellow, and attractive; devoid of blotches or colorations. Slightly more tedious to shell than some of the other large-seeded varieties. Yield good; shattering slight.

Associated Seed Growers, Inc. 1940. "A descriptive catalog of vegetables (No. 8): Asgrow." New Haven, Connecticut. 96 p. See p. 17. "Emperor. 108 days. Plants vigorous, branchy and sprawling. Pods large, gray. Beans large, oval, yellow." At the bottom of this page is a wide photo of a "Seed field of Emperor Soybeans on one of the Asgrow farms."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 10-11. Emperor is in the USDA Germplasm Collection. Maturity group: IV. Year named or released: 1939. Developer or sponsor: Illinois AES (Agric. Exp. Station). Literature: 10, 13, 14. Source and other information: From the AES (Agric. Exp. Station), Sariwon, Hwanghae Bug Do, North Korea, in 1932. Prior designation: PI 97155. Address: USA.

429. Primmer, George H. 1939. United States soybean industry. *Economic Geography* 15(2):205-11. April.

• ***Summary:*** Contents: Introduction. Recent phenomenal acreage increase. Soil relationships. Effect of slope. Climatic influences. Relation to pests and diseases. Use of soybeans for food and feed (coffee substitute, "cooked as a green vegetable," "soy sprouts of about two inches receive praise as a winter vegetable," "Duluth confectionary counters display 'Salted Soys' alongside other exotic nuts," "Recipes for preparing soybean 'milk' circulate widely").

Note. This is the 3rd earliest English-language document

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seen (Jan. 2013) that contains the modern term "soy sprouts."

Industrial uses of soybean oil and residue: the regional industrial products laboratory in Urbana, Illinois, staffed by 40 men.

Figures show: (1) Bar chart of the world's principal soybean producing countries in 1924-25, and in 1935-36. In 1936, Manchuria was by far the leader, followed by the USA, Chosen [Korea], Japan (whose production has decreased since 1925), and Netherland India [today's Indonesia].

(2) A map of the eastern half of the United States, with carefully located 50,000-acre dots showing areas of heaviest soybean production. Between 1934 and 1939, the area increased 5-fold in Mississippi and 21-fold in Minnesota. The area in Oklahoma decreased.

(3) A graph shows that the number of combines used to harvest soybeans in Illinois skyrocketed from 0 in 1924, to about 20 in 1925, to about 75 in 1926, to about 300 in 1927; by 1935 the number had increased to an estimated 3,000. (4) A photo shows a combine harvesting soybeans.

(5) A photo of a "Superior field of Indiana soybeans probably cultivated for the last time as plants shade most of the field's surface. Two-row corn cultivators or "beet cultivators may till four such soybean rows simultaneously.

(6) A graph shows soybean oil imports into the United states; these imports increased dramatically during World War I, peaking in 1918 [at 335.98 million lb].

(7) A map shows the location of soybean oil mills in the United States. There are large numbers in Illinois, Indiana, Ohio, Iowa, and North Carolina.

(8) A bar chart shows "Utilization of soybean oil processed in the United States" in 1934, 1935, and 1936. In 1934 the 30 million lb was used mostly by the drying oil industry. In 1935 the 140 million lb was used mostly for [lard] compounds and vegetable shortenings. In 1936 the 280 million lb was still used mostly for compounds and vegetable shortenings, but a significant amount was used for oleo, other edible, the drying oil industry, and soap.

(9) A photo shows a mill for removal of oil from Corn Belt soybeans; the processing plant serves an area tributary to Champaign, Illinois, and ships the oil to Chicago factory area.

"Soybeans provided some of the none-too-kindly remembered 'coffee' rations to Union Civil War soldiers. Sausage makers, at times, put up to 50 per cent soybean flour in part of their product."

Note: This is the earliest English-language document seen (Dec. 2012) that uses the term "Salted Soys" to refer to soynuts.

430. Morse, W.J. 1939. Soybeans–The world around. *Proceedings of the American Soybean Association* p. 39-44. 19th annual meeting. Held 11-12 Sept. at Madison, Wisconsin.

• ***Summary:*** Contents: Introduction. Asia: China, Manchoukuo [Manchuria], Chosen (Korea), Japan, Netherlands Indies [Indonesia], Philippine Islands. Europe. Rumania. North and South America. Africa. Australia.

In Europe, production is presently "confined largely to European Russia, Bulgaria, Yugoslavia, Czechoslovakia, and Rumania. In Europe as a whole, slightly more than 3 million bushels of seed were produced in 1938, 80 per cent of which was produced in Bulgaria, Rumania, and Yugoslavia. The largest increase has been in Rumania, due chiefly to the fact that Germany, by guaranteeing purchases, has given a certain stability to cultivation... Russian scientists have for the past several years carried on extensive experiments with the soybean. At the present time the principal areas of cultivation are the Ukraine and certain regions in northern Caucasus.

"Previous to the World War, Europe absorbed about 50 per cent of the exports of soybeans from Asiatic countries, the largest of the imports being taken by the United Kingdom, with Denmark and the Netherlands taking the remainder. In the post-war period [after World War I] important changes took place, Germany taking first place as an importer and other nations entering into the international trade in the bean and its products. At present Germany still holds first place as an importer of soybeans, followed by Denmark, England, Sweden, and the Netherlands. Among other countries that have increased their imports are France, Norway, Latvia, and Italy...

In South America, soybeans are at the experimental stage. "Successful results have been obtained in Cuba, Argentina, Brazil, Chile, and in some parts of Mexico."

"Africa: Extensive experiments have been conducted with the soybean in various parts of Africa for many years but as yet it is an unfamiliar crop to the majority of African farmers. It has been successfully cultivated in the upland, midland, and coast districts of Natal and throughout Gambia, Sierra Leone, Nigeria, and the Gold Coast Colony. In the cotton and corn growing districts of Belgian Congo the soybean has been grown successfully for forage and food purposes. Results in all cases, however, indicate that more and better varieties, and improved methods of culture and harvesting are essential before the soybean becomes a factor of much economic importance in African agriculture. The crop is advised more as a crop for domestic use than the European market. It is of interest to note that in 1938 nearly 4 million pounds of soybean meal were used in native rations in the mine compounds of South Africa.

"Australia: Successful results have been obtained with a few American varieties in Victoria and Queensland, but thus far efforts to establish the soybean as a commercial crop have been disappointing. At the present time, however, more extensive tests are being conducted to obtain adapted varieties in order to produce beans on a commercial scale."

A table (p. 43) gives "Acreage, production, and imports of soybeans by countries (Compiled from official sources),"

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based largely on 1938 statistics. The countries are: Austria, Belgo-Luxembourg [Belgium], British Malaya, Bulgaria, Canada, China, Chosen (Korea), Czechoslovakia, Denmark, Estonia, France, Germany, Hongkong, Italy, Japan, Kwantung, Latvia, Manchoukuo, Netherlands, Netherlands Indies, Norway, Poland-Danzig, Rumania, Sweden, Taiwan (Formosa), United Kingdom, United States, U.S.S.R. (Russia), Yugoslavia.

Leading soybean producers are: China 217,192,000 bushels (1936), Manchoukuo 170,269,000 bushels, United States 57,665,000 bushels, Chosen 18,480,000 bushels, Japan 13,473,000 bushels (1937), Netherlands Indies 9,873,000 bushels (production minus seed for planting), U.S.S.R. 2,502,000 bushels, Rumania 1,804,000 bushels.

Leading soybean importers include: Germany 28,766,356 bushels (the world's largest soybean importer), Japan 27,796,787 bushels (#2 worldwide), Estonia 195,475 bushels, Latvia 86,347 bushels, and Poland-Danzig 19,106 bushels. Address: USDA Bureau of Plant Industry, Washington, DC.

431. Morse, W.J.; Cartter, J.L. 1939. Soybeans: Culture and varieties. *Farmers' Bulletin* (*USDA*) No. 1520 (Revised ed.). 39 p. Nov. Revision of April 1927 edition, further revised in 1949.

• ***Summary:*** Contents: History. Description. Distribution and production. Climatic adaptations. Soil preferences, Varieties (classified by length of growing season into 7 groups, and divided within each group into "Seed, forage, green vegetable, and dry edible" types). Description of varieties (describes 125 varieties). Preparation of the seedbed. Fertilizers and lime. Inoculation. Time of seeding. Methods of seeding. Rate of seeding. Depth of seeding. Cultivation. Soybeans in rotations. Soybeans in mixtures. Soybeans drilled in small grains. Cost of production. Insect enemies of soybeans. Soybean diseases. Other enemies of soybeans.

"History: Ancient Chinese literature reveals that the soybean was extensively cultivated and highly valued as a food centuries before written records were kept. The first record of the plant is contained in a materia medica describing the plants of China, written by Emperor Sheng Nung in 2838 B.C. Methods of culture, varieties for different purposes, and numerous uses are repeatedly mentioned in later records, indicating the soybean to be of very ancient cultivation and perhaps one of the oldest crops grown by man. It was considered the most important cultivated legume and one of the five sacred grains essential to the existence of Chinese civilization. Soybean seed was sown yearly with great ceremony by the emperors of China, and poets through the ages have extolled the virtues of the plant in its services to humanity.

"The soybean was first made known to Europeans by Engelbert Kaempfer, a German botanist, who spent 2 years, 1691-92, in Japan. Seed sent by Chinese missionaries was planted as early as 1740 in botanic gardens in France..."

"Distribution and production: The soybean is grown to a greater extent in Manchuria than in any other country in the world. It occupies about 25 percent of the total cultivated area and is relied upon by the Manchurian farmer as a cash crop. China, Japan, and Chosen [Korea] are large producers and the soybean is cultivated more or less also in the Philippines, Siam, Cochin China, Netherland India [later Indonesia], and India. In other parts of the world, particularly Germany, England, Soviet Union, France, Italy, Czechoslovakia, Rumania, Mexico, Argentina, Cuba, Canada, New South Wales, New Zealand, Algeria, Egypt, British East Africa, South Africa, and Spain, various degrees of success have been obtained."

The section on diseases discusses the following: Purple spot of seeds, bacterial blight, bacterial pustule, mosaic, wilt, brown spot, sunburn or aphid injury, downy mildew, pod and stem blight, anthracnose, sclerotial stem rot, frog-eye spots, and *Pythium* root rot.

A table (p. 6-7) shows different varieties of soybeans recommended for four different uses (seed, forage, green vegetable, or dry edible), classified by the length of the growing season. Green vegetable–Very early (100 days or less): Agate, Sioux. Early (101 to 110 days): Bansei, Chusei, Goku, Kanro, Waseda. Medium early (111 to 120 days): Fuji, Hakote, Hiro, Hokkaido, Jogun, Kura, Osaya, Sato, Shiro, Sousei, Suru, Toku, Willomi. Medium (121 to 130 days): Chame, Funk Delicious, Imperial. Medium late (131 to 140 days): Aoda, Hahto, Higan, Rokusun. Late (141 to 160 days): Nanda.

Dry edible–Early (101 to 110 days): Bansei, Chusei, Goku, Kanro, Waseda. Medium early (111 to 120 days): Hokkaido, Jogun, Osaya, Sousei, Suru, Toku, Willomi. Medium (121 to 130 days): Funk Delicious, Imperial. Medium late (131 to 140 days): Easycook*, Haberlandt*, Higan, Rokusun, Tokyo*. Late (141 to 160 days): Nanda. Note: All dry edible varieties except three (Easycook, Haberlandt, and Tokyo–which are followed by an asterisk (*)) are also included in the green vegetable group. But many in the green vegetable group are not included in the dry edible group.

Detailed descriptions of the following 125 varieties are given (p. 7-17): Agate, A.K., Aksarben, Aoda, Arksoy, Avoyelles, Bansei, Barchet, Biloxi, Black Beauty (same as Ebony), Black Eyebrow, Cayuga, Chame, Charlee, Chernie, Chestnut, Chiquita, Chusei, Clemson, Columbia, Creole, Delnoshat, Delsta, Dixie, Dunfield, Early Green (same as Medium Green), Early Virginia Brown (same as Virginia), Early Wilson (same as Wilson), Early Wisconsin Black (same as Wisconsin Black), Early Yellow (same as Ito San), Easycook, Ebony, Elton, Fuji, Funk Delicious, George Washington, Georgian, Goku, Guelph (same as Medium Green), Habaro, Haberlandt, Hahto, Hakote, Harbinsoy, Hayseed, Herman, Higan, Hiro, Hokkaido,

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Hollybrook, Hongkong, Hoosier, Hurrelbrink, Illini, Ilsoy, Imperial, Indiana Hollybrook (same as Midwest), Ito San, Jogun, Kanro, Kingwa, Kura, Laredo, Large Brown (same as Mammoth Brown), Large Yellow (same as Mammoth Yellow), Late Yellow (same as Mammoth Yellow), Lexington, Macoupin, Mamloxi, Mammoth Brown, Mammoth Yellow, Mamredo, Manchu, Mandarin, Mandell, Mansoy, Medium Early Green (same as Medium Green), Medium Early Yellow (same as Ito San), Medium Green, Medium Yellow (same as Midwest), Midwest, Minsoy, Missoy, Monetta, Morse, Mukden, Nanda, Nanking, Norredo, Northern Hollybrook (same as Midwest), Ogemaw, Old Dominion, Oloxi (formerly Coker's Black Beauty), Osaya, Otootan, Ozark, Palmetto, Pee Dee (Coker's 31-15), Peking, Pine Dell Perfection, Pinpu, Richland, Rokusun, Sato, Scioto, Shiro, Sioux, Sooty, Sousei, Southern Green, Southern Prolific, Soysota, Suru, Tarheel Black, Toku, Tokyo, Virginia (selection {19186-D} from the Morse variety at Arlington Experiment Farm in 1907), Waseda, Wea, White Biloxi, Willomi, Wilson, Wilson-Five, Wisconsin Black, Woods' Yellow, Yelredo (a nonshattering selection, Coker's 319), Yokoten. Address: 1. Senior Agronomist; 2. Assoc. Agronomist, Div. of Forage Crops and Diseases; Both: USDA Bureau of Plant Industry, Washington, DC.

432. International Institute of Agriculture. 1939. Oils and fats: Production and international trade. *Studies of Principal Agricultural Products on the World Market* No. 4. Part I. 345 p. See p. 59-76. [Eng]

• ***Summary:*** Nine major oilseed crops and their respective oils are discussed: cottonseed, groundnut, linseed, soya beans (p. 59-76), sunflower seed, colza seed–rapeseed–mustard seed, sesame seed, castor seed, perilla seed, others (hemp seed, poppy seed, maize/corn). I. Grinenco wrote section IV titled "Soya beans and soya bean oil." Contents: I. Production (p. 59-68). Areas of production: Table 18 shows "Areas cultivated for soya." Average 1924-1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, in China, Manchukuo, Chosen [Korea], Japan, Netherlands Indies [Indonesia], United States, U.S.S.R. [USSR, p. 61-62] (Territory in Europe and Asia), Europe.

Table 19 shows "Areas cultivated for soya" during the same time periods shown above. In 1936 the world's leading soybean producing countries (in 1,000 metric tons) were: China 5,911.0, Manchukuo [Manchuria] 4,175.5, United States 816.0, Chosen [Korea] 487.1, Japan 339.8, Netherlands Indies (Java and Madura) 247.4, U.S.S.R. [USSR] 44.3, Kwantung 17.7, Taiwan 4.4.

Table 20 shows "Area and production of soya in China by provinces (average 1931-1935)." The leaders in total production are (in 1,000 metric tons): Shantung 1,980.7, Kiangsu 1087.4, Honan 765.0, Szechuan 517.0.

Table 21 shows "Production of soya in Manchukuo by provinces in 1936 (in 1,000 metric tons):" Northern provinces: Pinkiang 1,083.9, Kirin 980.8, Lungkiang 464.9, Sankiang 260.6, Chientao 91.4, Heiho 2.7. Total north: 2,884.3. Southern provinces: Fengtien 985.4, Antung 154.7, Chinchow 151.1. Total south: 1,291.2.

Table 22 shows "Area cultivated for the production of soya bean in the United States (in 1,000 ha):" Figures are given for Illinois, Indiana, Iowa, Ohio, North Carolina, Mississippi, Missouri, Other states. Total.

II. Trade (p. 68-76). Principal countries exporting soya beans: Manchukuo, Chosen [Korea], The United States. Principal countries importing soya beans: Germany, Denmark, Sweden, Netherlands, France, Norway, Latvia, Italy, Japan, Chosen, Netherlands Indies. Principal countries exporting and importing soya oil: Manchukuo, Japan, United Kingdom, Austria, Czechoslovakia, Finland, French Morocco, Hong Kong. III. Conclusion (p. 76).

Concerning Norway: Table 24 (p. 71) shows "Net world imports of soya beans (in 1,000 metric tons)," yearly from 1929 to 1936, plus average 1909-1913, and average 1924-1928. A footnote shows that in 1910-11 Norway imported 700 tonnes of soybean oil, followed by an average of 100 tonnes in 1924-28. Norwegian imports of soybean oil were zero from 1929 to 1932, then 2,200 tonnes in 1933, rising to 15,300 tonnes in 1934, then 15,700 tonnes in 1935, and 22,900 tonnes in 1936.

Concerning Finland: Pages 74-75 state that Finland imports soya oil. Finland's first recorded imports were in 1931, when 684 metric tons (tonnes) were imported. By 1936 Finland was importing 2,565 tonnes of soya oil a year. Note: This is the earliest document seen (May 2002) concerning soybean products (soy oil) in Finland; soybeans as such have not yet been reported. This document contains the earliest date seen for soybean products (soy oil) in Finland (1931).

Concerning Latvia: Page 72 states: "Among the countries that have increased their imports of soya beans are France, Norway, and Latvia, although the quantities imported up to the present are relatively small." They are so small that no statistics are given. Address: Villa Umberto I, Rome, Italy.

433. International Institute of Agriculture. 1939. Oils and fats: Production and international trade. *Studies of Principal Agricultural Products on the World Market* No. 5. Part II. 423 p. [Eng]

• ***Summary:*** Contents: Section II. Land animal fats. Butter. Pig fats. Beef and mutton fats. Trends in world production of and world trade in fats of land animals. III. Marine animal oils and fats. IV. Production and consumption of fats and oils in certain countries. V. Utilisation of fats and oils. VI. Prices of fats and oils (with graphs). Address: Villa Umberto I, Rome, Italy.

434. Japan Year Book 1939-40. 1939. Tokyo: The Foreign Affairs Association of Japan. 26 + 1220 + 26 p. With folded map of Japanese empire. See p. 412-13.

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• ***Summary:*** The Preface indicates that this book was published in about Sept. 1939. The editor's name is not given.

Pages 412-13. "Leguminous plants:... Area of leguminous plants in 1937 was 606,184 cho and the production was valued at ¥96,048,470. During the past decade the area planted has been pursuing a slow downward movement, while a sharp reduction experienced by production was more than made good by the increase of 1933. Soy-beans and azuki (red) beans are predominant both in area and production. In 1937

Soy-beans were planted on 331,572 cho which produced 2.842 million koku worth 50,848,576 yen.

Azuki beans were planted on 104,288 cho which produced 0.833 million koku worth 17,272,620 yen.

Note: Production of azuki beans in 1937 in Japan was 29.3% that of soy-beans.

435. Japan-Manchoukuo Year Book. 1939. Tokyo, Japan: Japan-Manchoukuo Year Book Co. xxiv + 1202 p. Index. 26 cm. Sixth annual issue. [Eng]

• ***Summary:*** Each year book is divided into two main parts: Japan, and Manchoukuo. This book was published in late 1938.

In the Japan and Manchoukuo parts of the book, soya beans are most widely discussed in the respective chapters on Agriculture. In each case, information given the previous year is updated one year. The Foreword states: "A special feature of this issue is the supplement entitled Japan's Economic Position in China."

Page 332: Table 23 shows production of "Beans, potatoes and sweet potatoes" in hectolitres from 1927 to 1936. 1.80391 hectolitres = 1 koku = 5.11902 dry bushels (USA). For soya beans:

4.751 million hectoliters in 1936

Page 760: In the chapter on Railways. Table 5 shows "Staple commodities hauled" from 1931-1938.

1931–4.927 million metric tons (mmt) soya beans & other beans, 0.739 mmt bean cake, and 0.103 mmt bean oil.

1932–7.435 million metric tons (mmt) soya beans & other beans, 0.851 mmt bean cake, and 0.091 mmt bean oil.

1933–7.643 million metric tons (mmt) soya beans & other beans, 0.566 mmt bean cake, and 0.030 mmt bean oil.

1934–5.102 million metric tons (mmt) soya beans & other beans, 0.601 mmt bean cake, and 0.029 mmt bean oil.

1935–5.427 million metric tons (mmt) soya beans, 0.502 mmt bean cake, and 0.026 mmt bean oil.

1936–4.407 million metric tons (mmt) soya beans, 0.428 mmt bean cake, and 0.025 mmt bean oil.

1937*–2.676 million metric tons (mmt) soya beans, 0.233 mmt bean cake, and 0.022 mmt bean oil. * = Excluding North Chosen Line.

1938*–2.640 million metric tons (mmt) soya beans, 0.321 mmt bean cake, and 0.024 mmt bean oil. * = Excluding North Chosen Line.

Below this table is a section about the new freight rates.

Page 761: Table 6 shows "Soya-bean freight rates in yen per metric ton. Table 6A shows rates F.O.B. Rashin [Rason, Rajin, a port city on the east coast of Korea, 20 miles from the Russian frontier] from 12 localities Table 6B shows F.O.B. Dairen. from the same 12 localities.

Below that and on page 762 is a history of the South Manchuria Railway Company.

Page 759: A large table shows "Area under various crops (in hectares)" yearly from 1924 to 1938. In 1938 soya beans were planted on 3.784 million hectares.

Page 760: A large table shows "Output of principal of crops (metric tons)" in Manchoukuo yearly from 1924 to 1938. The latter year is an estimate. For soya beans: 4.381 million metric tons in 1938.

The other principal crops shown in the tables are other beans, kaoliang, millet, maize, wheat, rice, upland rice, and other cereals. The text about "Soya beans" is repeated on this page and the next.

Page 761: A table shows soya bean exports from Manchoukuo (in metric tons) from 1930 to 1937. Exports in 1937 were 1.974 million metric tons.

436. Matagrin, Am. 1939. Le soja et les industries du soja: Le soja en Afrique et en Australie [The soybean and soy industries: Soya in Africa and Australia (Document part)]. Paris: Gauthier-Villars. x + 390 p. See p. 57-58. 18 cm. [Fre]

• ***Summary:*** There are no indigenous soybean varieties in Africa, but soybeans were introduced by the English to the Cape [South Africa]; then to the Orange Free Province, Rhodesia, and Transvaal, and also to Nigeria, the Gold Coast [later Ghana], and Côte d'Ivoire. Likewise, they were introduced by the French to Dahomey [later Benin] and Togo. Today soybeans seem to offer good promise everywhere, but production has been developed only in southern Africa. In northern Africa, earlier trials, which were rather indecisive due to the lack of selection and lack of human experience (except for those of Asian peoples), have been undertaken more seriously since 1918 in Algeria, then in Tunisia and then in Morocco; the coastal regions, where irrigation is unnecessary, seem more favorable.

Elsewhere, it is important to get early maturing varieties in order to avoid dehiscence of the pods under the influence of the summer heat.

Note 1. Seedpods of some soybean varieties dehisce at maturity. That is, they split lengthwise along the natural line of the pod and discharge the contents of the pod–the soybean seeds.

The sandy and rocky soils, which are sometimes well tolerated by soybeans grown in the USA (North Carolina, etc.), are poorly suited in Algeria.

Following the advice of Mr. Rouest, we could try planting the seeds in two rows (20 to 25 cm apart), leaving

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between the two rows a space of about 1 meter of fallow (unplanted) land. In Tunisia, the climate and the vast territory offer advantages to many soybean varieties, and the trials which began in the 19th century, have now reached a certain amplitude / developed prosperously.

Note 2. Haberlandt (1878, p. 6) states that he obtained one green-seeded soybean from Tunis [later renamed Tunisia] in 1873 at the Vienna World Exhibition (*Wiener Weltausstellung*).

In Morocco, where 35,000 to 50,000 tonnes per year of other beans (*d'autres fèves*) are produced, at least one-third of which is exported (including the bean of Safi, which reminds one of the horse bean or dry kidney bean {*féverole*} of Egypt), this crop succeeds in the regions that are rather cool zones or that allow irrigation. This crop could enrich the soils with nitrogen in the valley of Sebou and the area around Fez, the small market-garden valleys of Mogador, perhaps even on the plains or plateaus of the Chaouïa and of the Doukala [Doukkala; the latter two places are now both in Morocco].

As for Egypt, it has already been worked over by the English propaganda, and soy has spread in the valley of the Nile, beside the horse-beans (*féveroles*) which have an ancient reputation.

In Australia this Asian legume is finally being cultivated successfully. It began at the start of the 20th century in the southeast, and today it grows all along the eastern coast (Queensland, New South Wales, Victoria). From there it somehow spread a bit to Tasmania and toward Adelaide, and above all to New Zealand, where it was welcomed. It does not seem that British New Guinea [later renamed Papua New Guinea] contributed its transmission, although the Dutch region of this large insular territory [Dutch New Guinea, later named Irian Jaya = Irian Barat or West New Guinea] did adopt the soybean, either from Mindanao (Philippines) or from Java [Indonesia].

Tables show: (1) Production and utilization of soybeans in the USA in 1934 and 1935, by states (in 100 metric tons) (p. 18-19). (2) Quantity and value of soybeans, soybean cake, and soybean oil imported into the USA from 1909 to 1928 (p. 26). (3) Importation of soybeans and soy oil into Great Britain (from 1913), Germany (from 1922), Netherlands (from 1913), Denmark (from 1913), and Sweden (from 1930) (all in Europe) in 1913, 1922, 1925, 1930, 1933, 1934, and 1935 (p. 41). (7A) Production of soybeans in China, Manchuria, Korea, and Japan (all in East Asia) in 1928 and 1935 (p. 51). (7B) Soybean trade among countries in Asia in 1909-13, 1922-23, 1924-25 incl. China and Manchuria, Japan, Korea, Dutch Indies, Java and Madura, Formosa, British and French possessions (p. 51).

Note 3. This is the earliest document seen (March 2021) concerning soybeans in Dahomey (later Benin), Côte d'Ivoire (Ivory Coast), or Togo, or the cultivation of soybeans in Dahomey, Côte d'Ivoire, or Togo. This document contains the earliest date seen for soybeans in Dahomey, Côte d'Ivoire, or Togo, or the cultivation of soybeans in Dahomey, Côte d'Ivoire, or Togo (1939; one of two documents for Côte d'Ivoire). The source of these soybeans is unknown. Unfortunately, the author gives no documentation for this early cultivation of soybeans in Dahomey, Côte d'Ivoire, and Togo.

Note 4. Matagrin says (without citing any source) that soybean trials were conducted in Tunisia (a protectorate of France from May 1881 to 1956) in the 19th century. If that were true, this document would contain the earliest date seen for the cultivation of soybeans in Tunisia. In 1869, Tunisia declared itself bankrupt. An international commission, with representatives from France, the United Kingdom, and Italy took over its economy. In 1878 Friedrich Haberlandt wrote that he had obtained 20 varieties of soybeans at the Vienna World Exhibition in 1873; at least one of these, he said, came from Tunis (Tunisia). How did soybeans get to Tunisia in order to be tested there? One possibility is that they were sent there from France by the Society for Acclimatization, which reported that it was conducting soybean trials in neighboring Algeria a few years before 1880. Address: France.

437. Matagrin, Am. 1939. Le soja et les industries du soja: Produits alimentaires, huile de soja, lécithine végétale, caséine végétale [The soybean and soy industries: Food products, soy oil, vegetable lecithin, and vegetable casein]. Paris: Gauthier-Villars. x + 390 p. Illust. 18 cm. [300 ref. Fre]

• ***Summary:*** Contents: Introduction. 1. The agricultural, industrial, and commercial history of soya: Asiatic origins and propagation in Europe, soya in America (its cultivation and industries), soya in Europe, Asia, Africa, and Oceania (1936) (1. Admission of soya in the agriculture and industry of European nations (p. 35): Soya in France, soy industry and commerce in central and northern Europe {England, Germany, Holland, Denmark, Sweden, Poland, Austria and Hungary, Switzerland}, penetration of soya into southern Europe {Iberian peninsula, Italy, Balkan countries of Dalmatia, Istria, Yugoslavia, Greece (p. 47), Bulgaria, Romania, Ukraine}, the grandeur and decadence of soya in Russia. 2. Soya in modern Asia (p. 51): China and Manchuria, Japan, Korea, Formosa, French Indochina {Tonkin, Cambodia, Cochin China}, the British and Dutch Indies {Siam, Assam, Bengal, Burma, Ceylon, India, Straits Settlements [later Singapore] / Malacca}, western Asia {Turkestan, Persia (p. 57)}. 3. Soya in Africa and Australia (p. 57-58): South Africa, Rhodesia, Nigeria, Gold Coast [later Ghana], Cote d'Ivoire, Dahomey, Togo, Algeria, Tunisia, Morocco, Egypt, Australia {Queensland, New South Wales, Victoria}, Tasmania, New Zealand, not yet in British New Guinea [later Papua New Guinea], Philippines, Java).

2. The botany and agronomy of soya: The plant, its names, its botanical characteristics, its varieties (original and

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created by selection), the cultivation of soya.

3. The general chemistry of soya: Chemical composition of the plant, structure and chemical composition of the beans.

4. Using soya in soyfoods and soyfood products: Whole soybeans (whole green, dry, sprouted, roasted and salted {*soja á l'état vert, fève de soja sèche, fève grillée, fève salée de soja, fèves de soja salées,* p. 166-67}, soynut butter {*un mélange rappelant les beurres végétaux*}, soy coffee, soy confections {*confiture de soja*}, soy chocolate, soy sprouts {*fèves de soja germées, germes de fèves de soja*}), soymilk and tofu (*le lait et le fromage de soja;* soymilk cream, concentrated soymilk, soymilk powder / powdered soymilk, fermented soymilk {*lait fermenté, yoghurt, kéfir, koumys,* p. 189}, fermented tofu {*fromages de soja*}), okara (*pulpe résiduaire de la préparation du lait de soja*), fermented soy products (solid, paste, and liquid condiments; natto, miso, and shoyu [soy sauce]; kiu-tsee and lactic ferments), soy flour and bread.

5. The soy oil industry and products derived from it: Extraction and refining of soy oil, properties and use of soy oil.

6. The vegetable lecithin industry: Extraction of vegetable lecithin, properties and use of vegetable lecithin.

7. The vegetable casein industries and plastic materials based on soya: Soybean cakes and flours from which the oil has been removed, use of such cakes and flours, in the crude state, as a raw material for plastics, manufacture and use of vegetable protein, soybean cellulose for artificial silk, soya furfural and furfuraldehyde (phenolic resins). Conclusion: How to launch soya industries in France. Important terms. A bibliography appears at the end of each chapter.

Note 1. This is the earliest French-language document seen that uses the terms *Fève grillée, fève salée de soja,* or *fèves de soja salées,* "roasted soy beans" to refer to soynuts.

Note 2. This is the earliest French-language document seen (April 2005) that mentions soynut butter, which it calls *un mélange rappelant les beurres végétaux.*

Summary: Matagrin wrote two previous books: *Manuel du Savonnier* (Paris, no date given) and *L'Industrie des Produits chimiques et ses Travailleurs* (Paris, 1925).

Francis G. Beltzer, a practical chemist, became a major force in visualizing new industrial uses for the soybean in the West. By contrast, Li and Grandvoinnet (1912) paid little attention to soy oil in their book, devoting only 3 pages out of 150 to the subject, and only ½ page to industrial uses, while largely ignoring lecithin. These two books had a great influence on soy in France and they nicely complement each other (p. vi).

*The Soybean,* by Piper & Morse (1923), was published in both New York and London. Horvath was a Russo-American chemist. Italians who made important contributions to the soybean were professors Bottari, Mattei, Panatelli, and Tito Poggi (p. vii).

Leon Rouest, French the agronomist, wrote an important book titled *Le soja français et ses applications agricoles et industrielles* (Chateauroux 1936). Since 1920 he has devoted himself to the culture of soybeans and to the selection of acclimatized varieties. He was director of the Laboratory of Soja in the north Caucasus from 1930 to 1935, and in 1921 he had already published a book, *Le soja et son lait végétal.* His new (1936) book benefitted from the collaboration of Henry de Guerpel, an agricultural engineer and mayor of Percy-en-Auge, who was also an indefatigable prophet of soybeans in France, until his untimely death in Jan. 1937.

Anyone in the world can order (from the U.S. Government Printing Office in Washington, DC) the many U.S. publications about soybeans from the USDA or state agricultural experiment stations. These substantial works are based on careful research and enriched with numerous tables and photos–a fine example of the key role that governments can play in introducing and popularizing soya. Recently J.A. LeClerc (of USDA's Bureau of Chemistry and Soils) said the soybean has become a naturalized American (p. viii).

More than a century ago Lord Byron wrote *Beppo,* the first Western poem on soy. It was an account of a carnival at Venice, Italy, in 1818. He advised the tourists to bring "Ketchup, Soy [sauce], Chili-vinegar."

Maurice Druel was one of the young engineers who worked with competence to launch a soy industry in France (p. x).

For an early chronology of soybeans and soyfoods in France (1856+, see pages 8-12). 1857-58: Lechaume planted soybeans at Vitry-sur-Seine and got encouraging results. A report by the National Society for Acclimatization declared: "The acclimatization of the soybean is complete."

1859–Setback for the first tests by Vilmorin with Chinese beans that were too late, but success by Dr. Turrel in le Var.

1862-69–Success of Mme. Delisse, in Gironde.

Then the Franco-Prussian war arrested these tests, so the center of interest moved to central Europe. The world exposition of Vienna in 1873 and Friedrich Haberlandt. In his book one finds the first analyses of the seed by Steuf, of the cake by Woelker / Voelker, the results of texts by Berndt on oil extraction (p. 9).

Podolie is in Ukraine.

Of Haberlandt's 148 trials in 1877, only 12 failed for lack of warmth. Much new agronomic information was accumulated.

Back in France: 1874-80–Society of Horticulture d'Etampes (Seine-et-Oise) grew a yellow Chinese variety which succeeded. This "soja d'Etampes" was studied intensively from the chemical and agronomic points of view by Lechartier and various authors. A doctor from the region prepared, for his personal use, a vegetable cheese (tofu). But the grain did not find buyers so its cultivation did not spread. There now remain only 2 or 3 innovators to cultivate

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soybeans and on 5-10 acres maximum. But Chinese soybeans mature in the region of Paris, as in 1879 at Marseille.

1880–While the tests of Boursier in l'Oise have succeeded. and while Olivier-Lecq, ardent propagator of soybeans, distributed 100 kg to farmers in the north, the national Society for Acclimatization organized cultural trials all over France. Results were obtained in each of the regions, some with record yields. The general objection of the farmers was the difficulty found in using the soybean as a legume (it was too hard) or to find buyers.

As Paillieux said so well: "Our point of departure has not been happy one; the soybean has been presented simply as a new legume" (p. 10).

The German successes in soybean cultivation were studied by Wein in 1881 (p. 10).

In the 1880s there was a big growth of interest in vegetarian diets in Europe. Compare this with the USA (p. 11).

Li Yu-ying: After his 1905 speech, in 1908 he created a laboratory for studies, which soon founded the factory La Caseo-Sojaine at Vallees, near Colombes (Seine), administered by a French-Chinese company. This establishment made soyfoods using imported soybeans, especially tofu (p. 12).

Dr. Bloch of France recommended thin sheets of pressed tofu as a reserve ration for troops.

Lever Bros. soap works used lots of soy oil in Britain (p. 12).

The British did some cultural trials in India, Burma, Siam (Thailand), and South Africa.

Japan, in effect, annexed Korea in 1895.

It was only after 1905 that soybean tests took place, first in Guyana, where the soybean matured easily.

Soybeans were grown for forage more in the South of USA than in the north. Continued. Address: France.

438. Magnolia: New U.S. domestic soybean variety. 1939? Seed color: Yellow (straw), hilum pale.
• ***Summary:*** Sources: Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 5. "Magnolia–P.I. 85537."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions, synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 10. "Magnolia–Introduced under P.I. No. 85537 from Suwon, Korea, in 1929. Maturity, medium late; pubescence, gray; flowers, purple; pods, two- to three-seeded; shattering, much; seeds, straw yellow with pale hilum, about 3,800 to the pound; germ, yellow; oil, 20.4 percent; protein, 43.7 percent; iodine number, 129."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Magnolia is in the USDA Germplasm Collection. Maturity group: VI. Year named or released: by 1939. Developer or sponsor: USDA. Literature: 13, 14. Source and other information: From the AES (Agric. Exp. Station), Suweon [Suwon], Gyeonggi Do, South Korea, in 1930. Prior designation: PI 85537. Address: USA.

439. *Genie Civil* (*Le*). 1940. Variétés: Las culture du soja en France et aux colonies. Ses applications industrielles au Japan [Varieties: The cultivation of soybeans in France and in its colonies. Its industrial applications in Japan]. 116(4):69-70. Jan. 27. [Fre]
• ***Summary:*** During the past decade, one finds from time to time in the agricultural journals, articles which vaunt the merits of this legume and call the attention of agriculturists of the interest in its culture in France.

The total soybean consumption of Japan proper, Korea and Formosa, during the fiscal year 1937-38, was 1,650,000 metric tons, of which 25% was used by oil mills and 50% at the table (condiments, soymilk, and tofu). Address: Paris, France.

440. Krauss, Frederick G. 1940. Diversified agriculture in Hawaii. *Honolulu Advertiser* (*The*) (*Hawaii*). Feb. 18. p. 42.
• ***Summary:*** "The Soja (Soy Bean): The most versatile of annual field crops. Potentially an important leguminous 'grain' (seed), forage and hay, and green manuring crop for Hawaii, with industrial possibilities."

"Introduction: No other crop is used for so many purposes as is the soybean, or of which there are so many agronomic forms, making it adaptable to many cultural conditions. For centuries the most important legume in Asiatic countries, it is fast gaining a like ascendancy in some parts of the continental United States, notably in Illinois, Iowa, Indiana, and on especially to North and South Carolina to and throughout much of the cotton Belt. Strange to say, although the crop has been experimented with in California for twenty years, it has rarely produced above a thousand pounds of seed per acre under the most favorable conditions that could be supplied there, and at $40.00 per ton, such small yields would be unprofitable. Consequently the soybean has not become established on the Pacific Coast, nor does it seem likely to, which has resulted in continued heavy importation of the seed from the Orient.

"It is the writer's opinion that light intensity, or 'length of day' growing factor, termed photoperiodism (the response of the plant to relative length of day and night), is the limiting factor in the region rather than other climatic conditions such as temperature, humidity, etc., too often attributed to causes of failure in crop production.

Hawaii's Adaptability: As to Hawaii's adaptability to the profitable production of the soybean (also termed

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the soja from its generic name), many varieties have been tested over a long period. Krauss in Bulletin No. 23, entitled *Leguminous Crops in Hawaii*, published by the Hawaii Experiment Station in 1911, records the successful culture of some dozen varieties, ranging from very dwarf types, which mature in 60 to 100 days, to varieties which attain a height of 4 feet or more, and requiring 4 months to mature. In succeeding years the Hawaii Experiment Station has added numerous other varieties, the most outstanding among them being the two Biloxi varieties from Mississippi. All together at least 200 varieties have been tested in cooperative field trials, among them some 40 varieties collected by the writer in China and Japan in 1909, 1927, and 1936.

"From this extended experience we would affirm that at least a half dozen varieties are available to the commercial grower that will produce average crops of a ton of seed per acre under favorable conditions.

"The writer would estimate that 2000 to 5000 acres might gradually be brought into this crop in rotation with potatoes corn and other similar field crops, including even sugar cane and pineapples. Such an acreage should produce from 2000 to 5000 tons of seed which would justify the setting up of a small oil expressing plant, and or a mill for producing soybean flour such as the well known British manufactured 'Trusoy' flour [launched in 1932] and several American brands, in addition to supplying the local demand for beans used in the manufacture of Oriental products such as tofu (soybean curd) and its by-product kirazu [okara], tonyu (soybean milk), miso (fermented rice and soybeans), shoyu (soybean sauce) and other, which together necessitate the importation of some 2½ million pounds annually, the product of more than a thousand acres. Lastly should mention be made of the important remaining by-product should Hawaii see fit to set up a soybean expressing plant– the resultant oil cake which is one of the most satisfactory sources of food from a vegetable source, used for livestock feeding, feeding especially for dairy cows. Large quantities of this feed concentrate are imported into Hawaii, at a cost ranging from $40 to $50 per ton.

"History and Adaptability; Botanical Characteristics: The soybean (*Soja max*), relatively new to American commercially, is one of the oldest and most important food crops grown in the Orient. The plant was referred to in Chinese literature at least 4800 [sic, 3100] years ago. It was first introduced into the United States about 1800 [sic, 1765]. However, it is only since 1908 [sic, 1890] that the crop has become generally known to those places of the United States where it now flourishes. The Hawaii Agricultural Experiment Station began conducting extensive experiments with the crop in the middle 1900s. By 1910 a hundred varieties were under comparative test at the Pensacola Street Station [in Honolulu] (See Bulletin 23, Leguminous Crops for Hawaii, 1911). In 1909 the writer collected some 40 varieties in China and Japan, which were added to the already large collection under test. One of these new Asian varieties, O-too-tan, is now said to be a foremost variety in the southern states, where it is grown in excess of a million acres, principally as a hay and silage crop (see such southern seed catalogs as Wood's, Reuter's and Hastings–the latter terms it the 'Hawaiian' soybean).

"To indicate the importance of the soybean as an Asiatic crop, mention may be made of Manchuria's production of 142 million bushels, in Korea 250 million bushels are produced and in Japan 11 million bushels, and in Netherland-India [today's Indonesia] 7.5 million bushels as of 1935. During the same period the United States produced about 40 million bushels, while in 1907 less that 50,000 bushels were produced, Remarkable progress has been made in recent years in the United States in the developing of food and industrial uses from the soybean, especially in the manufacture of oil, flour and oil meal cake, and lastly, plastic materials such as is being used in the automobile industry, in greatly increasing volume. Henry Ford alone used 2 million pounds of soybean oil, the product of 10,000 acres of soybeans annually, for the manufacture of the enamel with which he coats his automobiles. The resultant soybean meal, by-product after the oil is extracted, is used for making plastics used in numerous automobile parts. At present about 45 soybean oil mills are in operation in the United States. These, during the 1935-36 season produced 209 million pounds of oil, the product of 25 million bushels of soybeans grown on a million acres. The price paid for these beans is a few cents below $1.00 per bushel of 60 pounds. So important has the domestic soybean industry become that an exhaustive text by A.A. Horvath has recently been published by the Chemical Publishing Company under the title *The Soybean Industry* (second edition 1939).

"Description of the Plant:" A long, typical botanical description follows.

"(To Be Continued Next Sunday)." Address: PhD.

441. Ozouf, René. 1940. Le soja [The soybean]. *Journal des Instituteurs et des Institutrices* (*France*) 86(12):47. March 2. [2 ref. Fre]*

• ***Summary:*** This article appears in the section of this issue titled "Partie Scolaire," in the subsection titled "Pour les Grandes et les Adultes." Contents: Introduction. Its cultivation (one of the oldest cultivated plants in the world, widely cultivated for ages in East Asia (especially Manchuria)), it is an annual, which prefers temperate climates, there are more than 1,200 varieties, cultivated in the Corn Belt of the USA, and in Korea, Japan, Java, the USSR, Romania, Hungary, Bulgaria, Yugoslavia, and France (but yields here are low).

Its utilization: The bacteria in the nodules on its roots are a source of nitrogen fertilizer. It can be used as a green forage crop, like lucern / alfalfa. If this is dried, it can be made into hay or silage. Pigs can be raised on soybean

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pasture in the open air. It is much appreciated as a green manure. Because the seeds are rich in nitrogen, protein and oil, it is utilized in the form of beans or of oilseed presscake for the feeding of all farm animals. It also has many uses as an industrial product. Above al, it is used as a source of oil and cake / meal.

The modern soybean utilization industry is most highly developed in Manchuria, where the principal centers are (in order of importance) Dairen, Harbin, Antung and Yingkou (W.-G. Ying-k'ou; formerly Newchwang or Niuchwang); in China, above all in Nanking and Shanghai; in Korea at Konan (in today's North Korea) and in the ports of Seishin (Ch'ongjin, Chongjin, in today's North Korea), and Rashin; in Japan at Kobe-Osaka and Tokyo-Yokohama; in Siberia, in the Russian Far East at Khabarovsk and Vladivostok.

In Europe, Germany is in first place in the various soy industries, and especially of oil, lecithin, and cakes. Hamburg and its surroundings are the leading center, followed by Bremen, Stettin [part of Germany in 1940; Szczecin, in Poland as of July 2014], Berlin, etc. In the years immediately preceding the war of 1939, the Reich imported 40-50% of the soybeans produced in Manchuria. Hull is the principal soybean crushing center in England. Throughout Scandinavia the soybean is transformed into cake and margarine, as well as in the Netherlands and in Belgium. In France, two factories that make oil and lecithin are in operation near Arras and Lille.

In the United States soybean processing industries are developed everywhere, particularly in Chicago [Illinois] and Milwaukee [Wisconsin] and in the towns of Illinois and New York. Ford automobile factories use soybeans to make plastic accessories.

Soybean trade and commerce.

442. Burlison, W.L. 1940. Importance of soybeans to American agriculture (With some notes on soybean research). *Proceedings of the American Soybean Association* p. 27-30, 34-35. 20th annual meeting. Held 18-20 Aug. at Dearborn, Michigan.

• ***Summary:*** Contents: List of 11 things that the future of the soybean as an important Illinois crop is dependent upon–according to G.L. Jordan, Dep. of Agricultural Economics, Univ. of Illinois. Where do we go from here in soybean production? Table 1–Annual production of soybeans in five leading countries from 1925-1939: USA, Manchuria, Chosen [Korea], Japan, Netherland India. Table 2–World production of soybeans in 1,000 bushels (excluding China) from 1925-1939, including percentage increase each year over 1925. These figures include, in addition to the countries shown in Table 1, Kwantung, Taiwan, U.S.S.R., Rumania, Bulgaria, Yugoslavia, and certain other small countries in Europe. U.S. soybean production as a percentage of world production. Why this rapid increase in U.S. soybean production? Rapid increase in U.S. soybean production during the past 6 years. Research leads the way: List of typical research projects at larger corn belt agricultural experiment stations.

Extracts from letters on the future of soybeans in Illinois from thoughtful observers: H.G. Atwood, Allied Mills, Inc., 26 Dec. 1939. G.G. McIlroy, President, American Soybean Association, 7 Dec. 1939. W.J. O'Brien, The Glidden Co., 8 Dec. 1939 (use of oil in paints). N.P. Noble, Swift and Company Soybean Mill, 8 Dec. 1939 (Swift has now built soybean mills at Cairo, Illinois; Des Moines, Iowa; and Fostoria, Ohio. Swift is using larger quantities of soybean oil in their various products). Edward J. Dies, National Soybean Processors Assn., 14 Dec. 1939. D.F. Christy, Acting Director, USDA Office of Foreign Agricultural Relations, 17 Feb. 1940. E.F. Johnson, Ralston-Purina Company, 21 Dec. 1939. H.P. Rusk, Dean and Director, Illinois Experiment Station, 22 May 1940. J.W. Hayward, Archer-Daniels-Midland Company, 24 May 1940.

Growth in the number of soybean crushing mills in the USA from about 10 in 1925 to approximately 75 in 1939. Increase in soybean yields in Illinois from 13.5 bushels/acre in 1925 to 24.5 bushels/acre in 1939. Growing industrial utilization of soybeans. Conclusion: "The importance of soybeans to American agriculture is bound to be of greater significance as the years go by."

Concerning research: "Our research program on soybeans in this country is nothing less than remarkable. In 1937 a list of soybean projects was published by H.M. Steece, Specialist in Agronomy, Office of Experiment Stations, U.S. Department of Agriculture." In 1937 some 53 agricultural experiment stations were conducting 258 separate investigations on soybeans. "By far the largest number of these have to do with the varieties and methods of production." A photo (p. 29) shows a tractor pulling a combine harvesting soybeans in Indiana.

Note: This is the earliest English-language document seen (March 2003) that uses the term "soybean research" (see subtitle) to refer to research on soybean production. Address: Head, Dep. of Agronomy, Univ. of Illinois.

443. Noda Shoyu K.K. 1940. Noda Shôyu K.K. Nijûnen-shi [Twenty-year history of Noda Shoyu, Inc.]. Noda, Japan: Noda Shoyu K.K. 733 p. Illust. No index. 22 cm. [Jap]

• ***Summary:*** This is the earliest known major history of Kikkoman; it was written largely by Mr. Morio Ichiyama. Contents: Preface. 1. History: Before the establishment of Noda Shoyu K.K. (The origin and its changes {Thoughts on its origin, Tokugawa period, Meiji period, beginning of the Taisho period}, development of shoyu industry and the town of Noda, Noda Shoyu Jozo Kumiai, family trees and family traditions of the Mogi, Takanashi, Horikiri, and Ishikawa families, virtues of the family), foundation of Noda Shoyu K.K. {the opportunity to unite, the establishment of a joint undertaking}, 20 years after the establishment. 2. Organization and management. 3. Plants (17): Korea,

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Jinsen?, Keijo plants. 4. Fermentation process: Special products (mirin, miso, sauce), testing center. 5. Business. 6. Cultural welfare facilities. 7. Connected enterprises: K.K. Noda Shoyu Ginko, Sobu Tetsudo K.K., Noda Transportation K.K., Gomei Company Senshukai, Foundational Juridical Perdon Kofukai, Manchuria Noda Shoyu K.K., Choshi Shoyu K.K.

Appendixes. Timeline / time table / chronology: Ranking of capital investments of shoyu producing companies in Japan, graph of yearly shoyu production in Japan, sales of shoyu, mirin, and miso by the company, sales of the company's shoyu comparing by area and also container, the company's shoyu exporting map, average sales of the company's shoyu, prices of raw materials of shoyu production, prices of shoyu in different type containers.

Pages 461-65 give an introduction to and description of each of the major brands produced by companies presently in the Noda Shoyu group. Under the Kikkoman brand, we learn that the producer of this brand of shoyu is the Saheiji MOGI family. It is said that the logo was designed by Manpei SARANUMA. It is said that the meaning and origin of the brand is as follows. The first "big army of God" in Japan was honored at a place named *Shimousa no Kuni, Kikkô mountain* (*Kikkô-zan*), *Katori Shrine* (*Jingu*). The name of the mountain, Kikkô, was used in the brand. The tortoise (*kamé*) symbolizes long life and is thus a symbol of happiness. It is said that a tortoise lives for 10,000 [*ichi-man*] years. The grace with the tortoise is born shows high-class dignity with supernatural power.

Pages 466-480 show all of the shoyu brands (including minor ones) produced by companies in the Noda Shoyu group. For each brand, the name, year of introduction, quality rank, and area where sold are given. Early brands, those introduced before the start of the Meiji period (1868), are read from top to bottom, right to left.

The Saheiji MOGI line produced a total of 15 shoyu brands. The earliest was introduced in 1784. Early brands were: Kikkôman (Tenmei 2 = 1784), Kikkôdai (Tenmei 2 = 1784), Azumaichi (Tenmei 2 = 1784), Yamataika (Tenmei 2 = 1784).

The Shichirouemon MOGI line produced a total of 58 shoyu brands. The earliest was introduced in 1772. Early brands were: Kihaku (Anei 1 = 1772), Kagikashiwa (Anei 1 = 1772), Fujikashiwa (Anei 1 = 1772), Shôchikuba (Anei 1 = 1772), Kikkôkashiwa (Tenmei period = 1781-89), Hôzan (Kaei 2 = 1849).

The Shichizaemon MOGI line produced a total of 30 shoyu brands. The earliest was introduced in 1830. Early brands were: Kushigata (Tenpo 1 = 1830).

The Hyôzaemon TAKANASHI line produced a total of 39 shoyu brands. The earliest was introduced in 1772. Early brands were: Jôjû (Anei 1 = 1772), Betatakara (Anei 1 = 1772), Tachitakara (Anei 1 = 1772), Jigamisakari (Anei 1 = 1772), Fundonokina (Genji 1 = 1864), Fujitakara (Kaei 2 = 1849).

The Fusagoro MOGI line produced a total of 48 shoyu brands. The earliest was introduced in 1753. Early brands were: Minakami (Ansei 2 = 1855), Fujimasa (Hôreki 3 = 1753).

The Noda Shoyu Goshi Gaisha produced a total of 13 shoyu brands, the Keizaburo MOGI line produced a total of 7 shoyu brands, the Monjiro HORIKIRI line and the Kanzaemon YOSHIDA line each produced one brand, and the Nihon Shoyu K.K. produced 2 brands, but all were introduced after the start of the Meiji period (1868).

A section on exports (p. 650-) notes that it is not clear when direct exports of shoyu from Japan to the western world began, but at some time during the Bunsei (1818-1830) or Tempô (1830-1844) periods it was shipped to Holland along with other goods. In 1854 (at the start of the Ansei period, 1854-1860) an American ship came to Japan and during the stay they bought some Japanese shoyu. Also during this same Ansei period it is said that special shoyu was made for export. Made by Sairinko SHIMAZU, it was bottled and shipped via Holland House (Oranda Yashiki) in Nagasaki.

Contains many photos and illustrations. Two of these, on unnumbered pages near the front of the book, are of special interest: (1) MOGI Shichirouemon (lived 1860-1929) was the first president and CEO (*shodai torishimaru shacho*) of Noda Shoyu Inc., which began operations on 1 Jan. 1918 and was the forerunner of today's Kikkoman. An inspiring tribute and eulogy to him appears in: Fruin, W. Mark. 1983. *Kikkoman: Company, Clan, and Community* (Harvard University Press, see p. 129-54). In 1889 he assumed headship of the Kashiwa family branch, then became the most influential director of the Noda cartel. After 1900 he was probably the most widely known and respected shoyu maker in Japan.

(2) MOGI Saheji was the first senior executive manager (*jomu torishimaruyaku*) of Noda Shoyu Inc. Saheji succeeded Shichirouemon as president of Noda Shoyu Inc. Saheiji is the name of a *bunke* or branch family. Anyone born or adopted into the family takes the name. So at one time this Saheiji was the head of a branch family of the Mogi clan that had among its brands, the Kikkoman brand.

Note 1. Fruin (1983, p. 302-03) further clarifies the relationships: Since the establishment of Noda Shoyu, Inc. "in 1918, kinship has been employed not for interfamily cooperation but for interfamily rivalry. Household membership has become all-important in determining access to the upper reaches of corporate power. Consider the following statistics... Of the twenty-eight main and branch households in the three Mogi, Takanashi, and Horikiri *dôzoku* (see figure A-1),... the percentage of households" by lineage that engage in shoyu manufacture is as follows: "Horikiri, 13; Takanashi, 50; Mogi, 53." But "within the overall Mogi clan one main and two branch households

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contend. The importance of the subdivisions within the Mogi clan is revealed by the fact that, although eight of the company presidents to date have been Mogis, within the greater Mogi lineage 63 percent of the company presidents can be traced to the Kashiwa branch household of Mogi Shichirouemon, 25 percent from the Mogi-sa group of Mogi Saheiji, and only 12 percent from the main house of Mogi Shichizaemon. Household hegemony was reflected as well on the first board of directors, with 67, 22, and 11 percent representation for the households of Mogi Shichiroeumon, Saheiji, and Shichizaemon respectively."

Note 2. A *dôzoku* is a lineage or clan composed of several stem families or descent groups, called *ie* (Fruin, p. 343, Glossary). Address: Noda, Japan.

444. Bazore, Katherine. 1940. Hawaiian and Pacific foods: a cook book of culinary customs and recipes adapted for the American hostess. New York, NY: M. Barrows and Company. xxiii + 286 p. Illust. Index. 24 cm. [79* ref]
• ***Summary:*** This is a remarkable book. The author has a good understanding of the various ethnic groups in the Hawaiian Islands.

In the chapter on "Chinese Foods and Food Customs" (p. 43-58) is a section titled "Beans and Bean Products" (p. 50-51) which notes that the Chinese use many kinds of beans, including soybeans. From the soybean a "'milk' is extracted which does not, however, contain the nutrients found in cow's milk. A dark brown pungent salty liquid is soy sauce or soya. From red beans comes *hung see yau*, a red soya sauce which is sweet and sharp flavored..."

"Footnote: The Romanized names of Chinese foods are given in the Cantonese dialect. For these, the author is indebted to Dr. Wing-tsit Chan, Professor in the Oriental Institute, University of Hawaii."

"Soybeans are used to make bean curd or *tau fu*... Such curd may be sold fresh, dried, frozen, fried or preserved in oil... Dried bean curd skin (*fu chook*) is soaked in water, then combined with a number of ingredients to make monk's food or *tsai*, the meatless dish, served on New Year's Day. A thick white bean curd paste (*tau fu mui*) is used with green vegetables. *Nam yue* (a red bean curd), flavors meat." See also "tsai," (p. 58).

In the chapter on "Japanese Foods and Food Customs" (p. 59-69) is a section titled "Beans and Bean Products" (p. 61-51) which mentions Buddhist priests as vegetarians, edamame (the green soybean), miso and miso soup, bean curd, natto, soybean curd ("When fresh it is called tofu; when dried it is known as *koyatofu* or *koridofu*), aburage, and *inari-sushi* and shoyu. Page 62: "After tofu has been made there is a residue which the Japanese use, calling it kirazu (55). It is inexpensive, may be eaten by animals as well as humans. Sometimes the shops give it away with purchases of tofu." A recipe for Kirazu with vegetables (O kara) (with "5 cups kirazu {bean curd residue}," p. 199-200. "This is a very inexpensive dish as the kirazu may frequently be obtained free at the tofu factory"). Page 68: See sukiyaki.

The chapter on "Korean Foods and Food Customs" (p. 70-75) begins: "The Koreans comprise one of the smaller national groups living in Hawaii." The section on "Beans and Bean Products" (p. 72) mentions soy sauce, soybean curd. "Cooked rice and soybeans are allowed to ferment [to give meju], producing a product called *toichang*, much like Japanese miso. Toichang is an ingredient in hot red pepper sauce.

Recipes–Pages 139-40: Tofu shoyu soup (Tofu jiru). Miso soup with daikon (Daikon no miso shiru). Miso soup with milk (Miruku no miso shiru).

Page 266-67: Foods commonly used at the present time: Chinese, Japanese, Korean.

Katherine Bazore was born in 1895. Address: Chairman, Home Economics Dep., Univ. of Hawaii.

445. Becker, Joseph A.; Froehlich, Paul; Fraser, W.O.; et al. comps. 1940. Agricultural statistics 1940. Washington, DC: U.S. Government Printing Office. 737 p. Index. 24 cm. For soybeans and soy products see p. 299-311, 377, 383-84, 455-56, 459-60, 519, 523.
• ***Summary:*** This volume presents information formerly published [until 1935] in the statistical section of the Yearbook of Agriculture" (p. 1).

In this 1940 volume, tables concerning soybeans are on pages 299-311, 377, 383-84, 455-56, 459-60, 519, 523.

Page 301: Table. Soybeans: Acreage and production in specified countries, average, 1930-34, annual 1935-40. The countries in approximate descending order of production are: China (excluding Kwangsi Province; Guangxi Autonomous Region in southern China), Manchuria, United States, Chosen [Korea], Japan, Taiwan, Netherlands Indies, Rumania (assuming that Bessarabia accounted for 80% of the total), Bulgaria, Yugoslavia, and Hungary. The world total each year excludes the USSR.

Page 305: Table. The main countries exporting soybeans are China, Manchuria and the United States. The main countries importing soybeans in 1938 are Germany, Japan, Denmark, United Kingdom, Sweden, Italy, Netherlands and Canada.

Page 305: Table. The main countries exporting soybean oil are China, Manchuria, Denmark, Japan, and Sweden. The main countries importing soybean oil in 1938 are Netherlands, United Kingdom, Italy, Germany, United States, Belgium, Chile, France, Morocco, Norway, Algeria [a French colony], Austria, Czechoslovakia, Canada, USSR.

Page 308: Soybean production in specified countries in 1924-1939. The countries are United States, China, Manchuria, Chosen [Korea], Japan. Netherlands Indies.

Page 309: Soybean crushed, and production, imports and exports of soybean oil, cake, and meal, 1929-39. Soybeans crushed rose from 1.666 million bushels in 1929 to 44.648

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million bushels in 1939. Production of crude soybean oil rose from 13.424 million lb in 1929 to 416.111 in 1938. Soy oil was both imported and exported every year. Soybean meal and cake production increased from 40,000 tons in 1929 to 1,054,000 tons in 1938. There were small imports each year but no exports.

Page 377, 383-384: Fats and oils used in the manufacture of compounds [shortening] and vegetable cooking fats, United States, 1929, 1931-40. The main fat used was cottonseed oil, but soybean oil increased from 10.8 million lb in 1931 to 201.599 million lb in 1939. Imported palm oil was also used largely.

Page 455, 458-60: Tables. Oleomargarine: Materials used in manufacture, United States, 1924-1940. The main animal materials were oleo oil and neutral lard. The main vegetable oils were cottonseed oil (by far). Soybean oil increased from 11,000 lb in 1929 to 87.1 million lb in 1940. Coconut oil was also largely used. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

446. Soybean collection at the N.I. Vavilov All-Russian Research Institute of Plant Industry (VIR) based on the log book of 1940. 1940.

• ***Summary:*** This list of soybean accessions at the VIR (St. Petersburg, Russia) in 1940 was sent by Irina Seferova, Soybean Collection Curator at the VIR. Based on that year's log book, it shows that the VIR had 4,014 accessions of various types (landrace, breeder resource, primitive line, advanced Cultivar, and a few wild forms) which are not individually designated. These come from 35 different countries, regions, etc. as follows: Africa 1. Africa, Congo 2. Africa, South Africa 6. Austria 1. Canada 14. Caucasus, Abkhazia (USSR) 21. Caucasus, Georgia (USSR) 31. Caucasus, North Caucasus (USSR) 9. Central Asia (USSR) 5. Ceylon (Sri Lanka) 2.

China 2,347.

China, Manchuria, Experimental Station Echo 547. Cuba 1. France 9. Germany 11. Guatemala 2. Hungary 4. India 37. Iran 1. Ireland 1. Italy 7.

Japan 171. Korea 49. Latvia 2. Lithuania 6. Mexico 1. Netherlands 1. Poland 4. Russia, European part (USSR) 29.

Russia, Far Eastern Region (USSR) 421. Russia, Siberia (USSR) 13. Ukraine (USSR) 14.

USA 233. Uzbekistan (USSR) 9. West Asia 3.

Total 4,014.

Note: This is the earliest document seen (July 2014) concerning the cultivation of soybeans in Latvia. This document contains the earliest date seen for the cultivation of soybeans in Latvia (1940). The source of these soybeans is unknown.

A separate table sent by Irena on 30 Nov. 2010 shows 13 major collections of soybeans. They are ranked on the table by number of soybean accessions. All of the entries are dated and some have multiple dates. Moreover, it is not clear whether that soybeans were collected during an expedition or whether they were sent to VIR for some reason. We will assume an expedition only when its leader is named.

(1) 1,859 accessions from Experimental Station Echo, Manchuria (China), Donor: A.D. Woeikoff [Aleksandr Dmitrievich Voeikov (1879-1944)- LC transliteration]. Years: 1923, 1929, 1931.

Note: According to a USDA periodical in March 1926, Woeikoff was director, Experimental Station, Echo" at "Tiehlingho, Kirin Province, Manchuria." This "Experimental Station. Echo" in Manchuria was operated by the old Chinese Eastern Railway.

(2) 529 accessions from Echo Experimental Station, Manchuria (China). Years: 1923, 1924, 1927, 1928, 1929, 1932.

(3) 232 accessions. VIR Expedition to Far East Region (USSR), led by Trofim Jakolevich Zarubajlo [Trofim IAkolevich Zarubailo] (born 1906). Year: 1932. Note: A post-graduate student of the VIR in 1932, he then became an employee of the VIR and was the leading expert in the genetics of cereal crops.

(4) 194 accessions. VIR Expedition to USA, led by D.N. Borodin, Head of the Division, Dep. of Applied Botany and Plant Breeding. Accessions from USA, Japan, China, Korea, and Russia. Years: 1921, 1922, 1923, 1924, 1925, 1926, 1928.

(5) 171 accessions. from Manchuria, Agronomical Department of the Chinese Eastern Railway, Vrachinskij [Vrachinskii]. Year: 1929. Vrachinskij is the family name of a person. Nothing more about him is known.

(6) 79 accessions. VIR Expedition to Japan led by Evgenija Nikolaevna Sinskaja [Eveniia Nikolaevna Sinskaia–LC transliteration] (Sinskaya). Year: 1928. Note: An employee of the VIR, Sinskaya (a woman) was one of the most talented botanists and plant breeders in Russia. She created her own scientific schools. An exceptional field researcher, experimenter and theorist, botanist, geographer, ethnobotanist, and environmentalist, Evgenia Nikolaevna was not only a good friend and active adherent of N.I. Vavilov, who selflessly helped him in carrying out his scientific and institutional programs, but she was also an outstanding follower, playing a significant role in the development of his ideas and concepts.

(7) 74 accessions from Manchuria Agricultural Society, China. Year: 1925, 1926.

(8) 66 accessions. VIR Expedition to Far East Region (USSR), led by M. Tchenkova. Year: 1929.

(9) 62 accessions from the Moscow Agricultural Exhibition, Russia. These accessions came from Russia, Ukraine, Caucasus, Central Asia. Year: 1923.

(10) 87 accessions. Expeditions to Italy (1927), China, Japan, and Korea (1929) led by N.I. Vavilov (See separate record for 1929).

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(11) Other, 661 accessions (1921-1940).

Photos show: (1) E.N. Sinskaja / Sinskaia (1889-1965). (2) Trofim Jakelovich Zarubajlo / Zarubailo (born 1906).

Note: "Today, the N.I. Vavilov Institute of Plant Industry in St. Petersburg still maintains one of the world's largest collections of plant genetic material. The Institute began as the Bureau of Applied Botany in 1894, and was reorganized in 1924 into the All-Union Research Institute of Applied Botany and New Crops, and in 1930 into the Research Institute of Plant Industry. Vavilov was the head of the institute from 1921 to 1940. In 1968 the institute was renamed after him in time for its 75th anniversary" (Source: Wikipedia, at Nikolai Vavilov, Dec. 2010). The VIR celebrated its 100th anniversary in 1994–www.vir.nw.ru. Address: St. Petersburg, USSR.

447. Deasy, George F. 1941. Geography of the United States soybean-oil industry. *J. of Geography* 40(1):1-7. Jan. [2 ref]

• ***Summary:*** Contents: Development of the United States soybean industry. Distribution of American soybean mills. Uses of soybean oil. Future of the United States bean soil industry,

Tables show: (1) "United States production of vegetable oils from domestic oil-yielding seeds." Cottonseed oil 1,678 million lb. Soybean oil 323 million lb. Linseed oil 157 million lb. Corn oil 137 million lb. Peanut oil 78 million lb. Olive oil 5 million lb. Tung oil 2 million lb. Thus, soybean oil ranks second only to cottonseed oil–but a distant second. The amount of soybean oil produced is only 19% as much as the amount of cottonseed oil.

(2) United States acreage and production of soybeans, 1924 to 1938. For even-numbered years gives: Total soybean acreage (increased from 1.78 million in 1924 to 7.79 million in 1938). Acreage harvested for soybeans (increased from 0.448 million to 2.898 million). Total production of soybeans (increased from 4.947 million bushels to 57.665 million). Soybeans crushed (increased from 0.307 million bushels to 48.886 million). Percent of total production crushed (increased from 6.2% in 1924 to 84.8% in 1938).

(3) Comparative conditions of the soybean industry in selected regions and states of the U.S., 1937. Defines and gives figures for 2 regions and 2 states: North-central states, southern states, Illinois, Mississippi. Gives for each: Percentage cut for hay, hogged off, and cut for beans. Yield of beans in bushels/acre. Total soybean production.

(4) U.S. factory consumption of soybean oil, 1938 (million pounds): Edible products: Shortening 137.133. Oleomargarine 39.885. Others 11.280. Inedible products: Paint and varnish 15.183. Soap 10.897. Linoleum and oilcloth 3.605. Miscellaneous products: Unclassified 5.399. Loss: (incl. foots) 14.046.

Bar charts show: (1) Estimated soybean production in leading countries, 1938: China, Manchukuo, United States, Chosen [Korea], Japan. (2) Estimated soybean production in leading U.S. states: Illinois, Indiana, Iowa, Ohio, North Carolina, Missouri, Others.

Maps show: (1) Total U.S. soybean acreage, 1934. Each dot represents 1,000 acres (2) Total U.S. soybean production, 1934. Each dot represents 5,000 bushels. (3) Location of soybean mills in the USA, Nov. 1939. Each dot represents a mill which processes soybeans, or is reported to be equipped or will be equipped for soybean crushing. Most of the mills are in the Midwest, or the central Atlantic seaboard. Address: Formerly Univ. of Cincinnati, Ohio.

448. *Soybean Digest.* 1941. World [soybean] production increases in 1940: Gains in Manchurian and European production offset losses in the United States. Trade drops. April. p. 2.

• ***Summary:*** "Preliminary information from countries reporting the 1940 soybean harvest indicates that total production was about 2 percent above the previous year, according to estimates received by the Office of Foreign Agricultural Relations. The crop in the United States was about 11 million bushels smaller and in Europe about 1 million bushels larger than in 1939. In Manchuria, official estimates indicate a 1940 crop slightly smaller but reliable trade sources place the production at approximately 15 million bushels larger than the small 1939 harvest. The crop in China was somewhat above the short 1939 harvest and was the largest in the past 4 years.

"Trade at Low Level: Total international trade in soybeans and soybean oil during 1940-41 (October-September) is expected to continue at a low level similar to that of the past season. Manchurian exports of soybeans and oil are expected to be somewhat larger than last year, while the United States shipments abroad will be much smaller. As to the importing countries, Japan will probably obtain the largest quantity, as in 1939-40. Germany, normally the largest soybean importer, hopes to secure as much as 15 million bushels during the 1940-41 season from Manchuria and European countries. Imports by other European countries are likely to be small.

"Carryover Small: Carry-over of soybeans on Oct. 1, 1940, was relatively small in the exporting countries, and in the importing countries it was smaller than a year earlier, especially in Japan and Germany. In the other European countries stocks have been small for the past two seasons.

"Prices for soybeans in the United States this season are averaging slightly lower than a year ago, while in Manchuria the Government monopoly is paying about 24 cents per bushel above last year. It is reported that last season the Manchurian farmers withheld a considerable proportion of their beans from the market because of the low purchase price. The Manchurian price for No. 1 grade mixed beans ex Dairen up to Jan. 31, 1941, was about $1.04 per bushel.

"The European war substantially reduced the international trade in soybeans and bean oil during the 1939-

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40 marketing season (October-September) as compared with previous years. A total of about 40 million bushels entered foreign trade during the marketing year as compared with 80 million during the 1938-39 season. In addition, international trade in soybean oil during 1939-40 amounted to approximately 55,000 short tons as compared with 80,000 short tons in 1938-39.

"Export Markets Closed: Exports of soybeans and soybean oil from the United States are expected to be much smaller during the current season as compared with the 1939-40 marketing year, when shipments abroad amounted to 11 million bushels of soybeans and 18 million pounds of oil. Last season, heavy purchases of American soybeans were made by European countries before the war broke out and later in the fall months, due to the existing shortage. The trade this season with these countries is almost entirely closed except with the United Kingdom and thus far there appears to be no demand from this market for beans or oil. The largest exports of soybean oil last year were made primarily to Cuba, Finland and Switzerland. Cuba is purchasing smaller quantities this season, and exports to European countries are expected to be small. The Manchurian soybean harvest for 1940 amounted to 141 million bushels as compared with 145 million bushels for the previous year, according to the official estimates. Trade sources in Manchuria, however, believe that the 1939 crop was over-estimated and that the harvest was one of the smallest in many years, amounting to only about 125 million bushels. Trade sources place the 1940 crop at 140 million bushels.

"Manchurian Acreage Drops: The 1940 planted acreage was placed at 9,459,000 acres as compared with 10,287,000 in 1939. The 8 percent reduction in acreage was the result of several factors such as, (1) the reluctance of farmers to plant a crop for which they considered the official price too low; (2) shortage of human and animal labor and the high cost of wages; and (3) lack of moisture during the early part of the planting season.

"The supply of Manchurian soybeans available for export during the 1940-41 marketing season is reported to be larger than last season and is estimated at 35 to 40 million bushels. It is expected that Japan will again obtain the largest proportion of these exports. Shipments to Germany may be somewhat larger this season, as it is reported that a German-Manchoukuo trade pact last September called for the exportation to that country of 11 million bushels of soybeans. It is expected that shipments will be made across Siberia and it is possible that some of this quantity may be taken in the form of oil. Recent information indicates that Japanese authorities are encouraging soybean-oil processing at Harbin and Hsinking and a reduction at Dairen.

"Chinese Crop Larger: The 1940 soybean crop in China was above the previous year as the result of more favorable growing weather, especially in North China where the harvest had been short during the 2 preceding years. Although China is the [world's] largest soybean producer, it is generally a net importer, obtaining small quantities of beans and oil from Manchuria.

"In the Danube Basin the 1940 production continued the upward trend begun several years ago. German companies operating in most of these countries guaranteed prices to growers before planting. The bulk of the exports from these countries has usually gone to Germany. About 80 percent of the Rumanian production was in Bessarabia; the area ceded to the Soviet Union, and it is not known how much of the production this season has been shipped to Germany."

A table shows: Soybeans: Production in specified countries. The countries are China, Manchuria, United States, Chosen [Korea], Japan, Taiwan, Netherlands Indies [Indonesia], Rumania (Earliest: 424,000 bu in 1935), Bulgaria (Earliest: 179,000 bu in 1936), Yugoslavia (Earliest: 36,000 bu in 1935), and Hungary (Earliest: 125,000 bu in 1939).

449. *Agricultural Gazette of New South Wales.* 1941. The soybean. 52(6):314. June.

• ***Summary:*** A half-page overview of the current status of soybeans worldwide. "First introduced to American agriculture in 1898, the soybean is now the basis of a multi-million dollar industry... According to the 1939 Census of Manufacturers, 47 manufacturing establishments in the United States were engaged primarily in the production of soybean oil, cake, and meal, the value of the products being 44,000,000 dollars."

Also discusses: Food uses of soybean oil (mainly in shortening and oleomargarine), lecithin, and soybean flour. Industrial uses of soy protein (acts like casein in plastics, paints, size for paper, textile dressing, and waterproofing). First record of cultivation in China in 2838 B.C. Manchuria is the world's leading soybean producer, with Chosen [Korea], Japan, and South China ranking high. Introduction to Europe in the 17th century. Tried in Germany, England, France, and Hungary. Germany is now the leader in making use of soybeans.

450. Green and Black: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1941. Seed color: Green and/or black.

• ***Summary:*** Sources: Morse, W.J. 1941. "Shanghaied... a super food." *Soybean Digest.* July. p. 4-5, 10. See p. 5. Green and Black is a late variety, maturing in 141 days or more.

Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 4. "Green and Black–P.I. 84784."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987.

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"USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 10-11. Green and Black is in the USDA Germplasm Collection. Maturity group: IV. Year named or released: 1941. Developer or sponsor: J.R. Fain, Jefferson City, Tennessee. Literature: 13. Source and other information: From the AES (Agric. Exp. Station), Suweon [Suwon], Gyeonggi Do, South Korea, in 1930. Prior designation: PI 84784. Address: USA.

451. Jefferson: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1941.
• ***Summary:*** Sources: Morse, W.J. 1941. "Shanghaied... a super food." *Soybean Digest.* July. p. 4-5, 10. See p. 5. Jefferson is a late variety, maturing in 141 or more days.

Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 4. "Jefferson–P.I. 82202."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Jefferson is in the USDA Germplasm Collection. Maturity group: IV. Year named or released: 1941. Developer or sponsor: J.R. Fain, Jefferson City, Tennessee. Literature: 13. Source and other information: From Gangweon Do, South Korea, in 1929. Prior designation: PI 82202. Address: USA.

452. Kanum: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1941. Seed color: Yellow (straw), hilum light brown.
• ***Summary:*** Sources: Morse, W.J. 1941. "Shanghaied... a super food." *Soybean Digest.* July. p. 4-5, 10. See p. 5. Kanum is an early variety, maturing in 101-110 days.

Weiss, Martin G.; Wilsie, C.P.; Lowe, B.; Nelson, P.M. 1942. "Vegetable soybeans." *Iowa Agric. Exp. Station, Bulletin* No. P39. p. 381-95. Jan. New Series. See p. 394. Table 1, titled "Summary of agronomic data and palatability scores of soybean varieties tested for suitability as human food at Ames, Iowa, 1935-1939" gives the following for Kanum: Date green beans picked: Aug. 26. Date mature: Sept. 18. Height in inches: 23.1. Lodging: 2.0 (0 = perfect, 5 = badly lodged). Seed quality: 3.8 (0 = poor, 5 = excellent). Seed mottling: 2.0 (0 = none, 5 = much mottling). No. of beans per pound: 1,744. Mature seed yield: 20.80 bu/acre. Palatability score: 7.0 (0 = very poor, 10 = excellent).

Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 4. "Kanum–P.I. 84668-1."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions, synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 9. "Kanum–Selection, P.I. No. 84668-1, made in 1930 at Arlington Farm [Virginia] from P.I. No. 84668 received from Suwon, Korea, in 1929. Maturity, early; pubescence, gray; flowers, purple; pods, two- to three-seeded; shattering, much; seeds, straw yellow with light brown hilum, about 1,800 to the pound; germ, yellow; oil, 19.1 percent; protein, 44.4 percent; iodine number, 117."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 12-13. Kanum is in the USDA Germplasm Collection. Maturity group: II. Year named or released: by 1941. Developer or sponsor: USDA. Literature: 13, 14. Source and other information: From the AES (Agric. Exp. Station), Suweon [Suwon], Gyeonggi Do, South Korea, in 1930. Prior designation: PI 84668-1. Address: USA.

453. Morse, W.J. 1941. Shanghaied... a super food. *Soybean Digest.* July. p. 4-5, 10. [10 ref]



DR. W. J. MORSE

• ***Summary:*** The super food is green vegetable soybeans from edible soybeans. "Attempts to secure seed of these food varieties from oriental countries through correspondence met with little success, due to the fact that the edible types were classified under another name than the soybean. During agricultural exploration work in the Orient from 1929 to 1931, many varieties of soybeans were found in Japan and Chosen [Korea] which were used solely as green vegetables or dry edible beans." These varieties have been under test for the past 8-9 years at various agricultural experiment stations throughout the United States.

A table shows 42 "edible varieties of soybeans classified according to maturity." Very early (100 days or less): Agate, Sioux. Early (101-110 days): Bansei, Chusei, Etum, Giant

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Green, Goku, Kanro, Kanum, Sac, Tastee, Waseda, Yellow Marvel. Medium Early (111-120 days): Fuji, Hakote, Hiro, Hokkaido, Jogun, Kura, Osaya, Sato, Shiro, Sousei, Suru, Toku, Willomi, Wolverine. Medium (121-130 days): Chame, Emperor, Funk Delicious, Illington, Imperial. Medium late (131-140 days): Aoda, Easycook, Hahto, Higan, Rokusun. Late (141 or more days): Green, and Black, Jackson, Jefferson, Nanda, Seminole.

"Most of these edible types have been found to be much superior to the commercial varieties in flavor, texture, and ease of cooking. Moreover, tests have indicated that the flour made from edible types has a better flavor than that made from commercial varieties. Some of the edible types have also been judged to be superior to commercial types in the manufacture of bean milk, roasted beans and other food products...

"One of the most promising uses of edible varieties of soybeans is as a green shelled bean and for this purpose the pods should be picked when the beans have reached the full size but are still green and succulent. The green beans resemble young, tender Lima beans and have a rich, distinctive and delicious flavor... The usual oriental way of cooking green soybeans is to boil the pods in water flavored with soy sauce or salt and serve them to be eaten from the pod."

In America, "Several commercial concerns have canned large packs of green soybeans, which have become quite popular."

Photos show: 1. Soybeans sprouts pushing up out of spherical earthenware pots at a market in East Asia. 2. A woman selling "soybean curd" ("the 'boneless meat' of millions of Oriental people") in a Korean market. 3. "In place of candy between meals, Japanese children often carry about a small bag of cooked [green] vegetable soybeans, break open the pods and lick the salty beans out with their tongues." 4. Roasted soybeans, which are used extensively in candies in Japan. 5. Portrait of Dr. [sic] William J. Morse. 6. Green vegetable soybeans (in the pods on plants, or shelled) being sold in a Korean farmers market. 7. "This Japanese farm girl has just pulled an armful of green vegetable soybean plants to prepare for market." 8. A Korean peddler with a large pack of green vegetable soybeans on his back.

Note: This is the earliest document seen (Nov. 2013) that mentions the soybean varieties Etum, Green and Black, Jackson, Jefferson, Kanum, Sac, Seminole, Tastee, Wolverine, or Yellow Marvel. Address: USDA Bureau of Plant Industry, Washington, DC.

454. *Washington Post.* 1941. Japan hems in Vladivostok, Soviet 'Doorway to Pacific.' Sept. 5. p. 11.
• ***Summary:*** A bulletin from the National Geographic Society explains that Vladivostok, which 75 years ago [i.e., about 1866] was a boisterous outpost of muddy streets, wooden shacks, saloons and gambling houses, is now a modern, busy city of about 206,000 inhabitants, and a Soviet air and naval base. The picturesque harbor, known as the "Golden Horn," is normally filled with ships. It has always been a link between the vast reaches of Siberia and the outside world, yet only a few miles from the border of Japanese dominated Manchukuo. A bit further south is Chosen [Korea], also dominated by Japan. And Japanese ships dominate the waters around the port.

"Vladivostock's harbor freezes over later in December and the ice lasts until mid-April." Ice-breakers keep the way open for steamers to enter and leave the port during that time.

"Warehouses along the waterfront [in Vladivostok] ordinarily are filled with soy beans and by-products, such as soy bean oil and soy bean cakes." These are the port's main export items, along with Siberian timber and dried fish.

455. Becker, Joseph A.; Froehlich, Paul; Jackson, D.; et al. comps. 1941. Agricultural statistics, 1941. Washington, DC: U.S. Government Printing Office. 731 p. For soybeans and soy products see p. 7, 299-305, 490, 494, 496, 519, 523. 24 cm.
• ***Summary:*** "This volume presents information formerly published (until 1935) in the statistical section of the Yearbook of Agriculture" (p. 1). "Export and import statistics of the United States include trade with the Philippine Islands. They also include any trade between foreign countries and Alaska, Hawaii, and Puerto Rico, but do not include shipments between continental United States and these possessions. Prior to January 1, 1935, the Virgin Islands of the United States were treated in the same manner as the Philippine Islands, but since that date the Virgin Islands are treated in the same manner as Alaska, Hawaii, and Puerto Rico." (p. 5). A bushel of soybeans weighs 60 lb and a gallon of soybean oil weighs 7.5 lb (p. 7). Note: No separate statistics are given for soybeans or soybean products grown in or exported to or from Alaska, Hawaii, Puerto Rico, or the Virgin Islands.

Table 392 (p. 299) gives U.S. soybean acreage statistics for the years 1924-1940, including: Acreage grown alone for all purposes, total acreage (incl. half the interplanted acres), acreage harvested for beans, yield per acre, production, price (dollars/bushel), farm value (in 1,000 dollars), foreign trade (imports and exports, year beginning in July). In 1924 for soybeans: Acreage grown alone for all purposes: 1,567,000. Total acreage: 1,782,000. Acreage harvested for beans: 448,000. Yield per acre: 11.0 bushels. Production: 4,947,000 bushels. Average price per bushel received by farmers: $2.46.

The corresponding figures in 1928 were: Acreage grown alone for all purposes: 2,154,000. Total acreage: 2,439,000. Acreage harvested for beans: 579,000. Yield per acre: 13.6 bushels. Production: 7,880,000 bushels. Average price per bushel received by farmers: $1.88.

Table 393 (p. 299) gives U.S. soybean production and

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farm disposition statistics for the years 1924-1940, including: Total production, used for seed (total, or home grown), fed to livestock, sold.

Table 394 (p. 300) gives U.S. soybean statistics for acreage, yield, production, and season average price received by farmers, by States, average 1929-38, annual 1939 and 1940. The states are: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, and USA total.

Table 395 (p. 301) gives soybean statistics for acreage and production in specified countries, average 1930-34, and annual 1935 to 1940. The countries are China, Manchuria, United States, Chosen [Korea], Japan, Taiwan, Netherlands Indies, Rumania, Bulgaria, Yugoslavia, Hungary, and estimated world total.

Table 396 (p. 302) gives the average price per bushel of soybeans received by U.S. farmers each month and season average from 1930 to 1940.

Table 397 (p. 302) titled "Soybeans for seed" gives the average wholesale price per bushel at Baltimore and St. Louis, 1931-1941, each month from Jan. to May and average.

Table 398 (p. 302) titled "Soybeans for crushing" gives the average price per bushel, U.S. No. 2 Yellow, bulk, carlots, net track Chicago, 1933-40, each month from Oct. to Sept.

Table 399 (p. 303) gives statistics on amount of soybeans crushed, and production, imports, and exports of soybean oil (crude basis), and soybean cake and meal, USA, 1930-1940.

Table 400 (p. 303) gives the average price per pound of soybean oil (domestic crude) in tank cars, midwestern mills, 1929-1940, each month and yearly average.

Table 401 (p. 303) gives the average price per pound of soybean oil (domestic crude) in drums, New York, 1931-1940, each month and yearly average.

Table 402 (p. 304) gives the average price per ton of soybean meal (41% protein), at Chicago, 1930-1940, each month and yearly average.

Table 403 (p. 305) for soybeans and soybean oil, gives international trade (exports and imports), averages 1925-1934, annual 1938, 1939. For soybeans: Principal exporting countries–China, Manchuria, United States, total. Principal importing countries–Germany, Japan, Denmark, United Kingdom, Sweden, Italy, Netherlands, Canada, total. For soybean oil: Principal exporting countries–China, Manchuria, Denmark, Japan, Sweden, total. Principal importing countries–Netherlands, United Kingdom, Italy, Germany, United States, Belgium, Chile, France, Morocco, Norway, Algeria, Austria, Czechoslovakia, Canada, Union of Soviet Socialist Republics, total.

Table 659 (p. 490) gives U.S. exports (in pounds) of vegetable oils (incl. corn, cottonseed, linseed, cocoa butter, coconut, peanut, and soybean oil) from 1914 to 1939.

Table 617 (p. 455) gives statistics on oleomargarine–materials used in manufacture, USA, 1924-1940. Concerning soybean oil: Less than 500 lb were used in 1924 and 1925, but 33,000 lb were used in 1926. The first significant amount was used in 1930: 2.25 million lb. Note: Additional statistics on oleomargarine production and consumption in the USA are given on p. 454-57.

Table 660 (p. 494) gives U.S. imports (in pounds) of oilseeds (incl. soybeans {but no data given for 1918-1926}, sesame seeds, rapeseed) and vegetable oils (incl. olive oil, palm oil, palm kernel oil, peanut oil, perilla oil, rapeseed oil, soybean oil, and tung oil) from 1914 to 1939.

Table 662 gives imports of principal agricultural products (incl. soybean and soybean oil) into the United States, by countries, each year 1932-1940. The source countries for soybean (p. 519) are: Kwantung, Japan, China, Germany, other countries, total. The source countries for soybean oil (p. 523) are: Kwantung, Japan, China, Netherlands, other countries, total. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

456. Blanchard, Marcel. 1941. Le soja en France: Ses possibilités culturales. Ses débouchés industriels. Son intérêt économique [The soybean in France: Its cultural possibilities. Its industrial outlets. Its economic interest]. Paris: Societe d'Editions Geographique, Maritimes et Coloniales, 17 rue Jacob, 6eme. ii + 200 p. Illust. 22 cm. [158 ref. Fre]

• ***Summary:*** Contents: Introduction. Part 1: Cultivation of soya. 1. The soybean. 2. Soybean cultivation worldwide. 3. The varieties of soybeans. 4. The requirements of the soybean crop. 5. Sowing soybeans. 6. The soybean during its vegetative stage. 7. Harvesting soybeans. 8. Mixed cropping and intercropping of soybeans. 9. The enemies and diseases of the soybean.

10. History of soybean cultivation in France (introduction in 1739 at Jardin des Plantes under direction of Buffon, 1850–National Society for Acclimatization, around 1880 MM Vilmorin-Andrieux, M. Paillieux, M.P. Olivier-Lecq, Messrs. Lechartier, Denaiffe, Dr. Le Goff, Boulanger & Dausse, Brioux, Semichon, Carle de Carbonnières, Rouest, de Guerpel).

11. The vegetative cycle of the soybean in France. 12. The soybean at the various French agricultural research centers (*les Centres de Recherches agronomiques français*) including Centre de Versailles, Station de Dijon, de Colmar, de Clermont-Ferrand, d'Antibes. 13. The possibilities of soya in France in terms of its cultivation.

Part 2: The nutritional value of the soybean. 1. The nutritional value of the soybean.

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Part 3: Utilization of soya. 1. Soybeans in the farm economy. 3. The soybean in human nutrition and in industry.

Part 4: The soybean from an economic viewpoint. 1. Commerce and trade in soybeans and soybean products up to Sept. 1939. 2. The present economic possibilities of the soybean in France. Conclusion. Bibliography. 16 illustrations. 8 maps.

The introduction begins: "In a letter written on 15 Jan. 1935, on board the *Chenonceaux* which was sailing toward Shanghai, Li Lu-Ying [sic, Li Yu-ying], president of the National Academy of Peiping (l'Académie Nationale de Péping) offered to furnish us with the translation of important documents in the Chinese, Japanese, and Russian languages concerning all aspects of soya. Let him find here the expression of our gratitude, because he introduced us to a plant, in which there is more interest abroad than in the country of its origin."

The publisher was formerly named Maison Challamel, founded in 1839.

Illustrations show: (1) The branch of a soybean plant, with the flowers and young pods, enlarged 3x. (2) The flower of a soybean plant as it is about to open, enlarged 5x. (3) A soybean branch with mature pods and leaves, enlarged 2x. (4) Two views of a soybean seed with parts labeled. C = chalaza (*chalze*). H = hilum (*hile*). M = micropyle (*micropyle*). R = radicle (*radicle*). A-H = hypocotyl axis (germ) (*axe hypocotylé*). G = raphe, bud, leaf-bud (*gemmule*). Enlarged 3x. Note: The raphe is a small grove extending to the chalaza, where the integuments were attached to the ovule proper.

(5) Microscopic view of a transverse section of the seedcoat: C.P. = palisade layer of cells (*cellules en palisade*). C.S. = hourglass cells (*cellules en sablier*). P.E. = spongy parenchyma (*parenchyme externe*). C.A. = aleurone layer (*cellules à aleurone*). P.I. = remains of parenchyma cells of endosperm or internal parenchyma (*parenchyme interne*). Enlarged 247x. (6) Cells of the epidermis facing the microscope. Enlarged 460x. (7) Microscopic view of a transverse section of a cotyledon, two views, showing starch grains (*grain d'amidon*), oil droplets (*oléolaste*), and aleurone grains (*grain d'aleurone;* high in protein). (7a) Six large maps of soy in Asia and in Oceania, in North America and in South America, in Europe and in Africa in 1939 (p. 12-36). (8) Nodules containing nitrogen-fixing bacteria on the roots of a soybean plant (p. 66). (9) Planting soybeans; a man walks behind a planter pulled by two horses (p. 84). (10) Cultivating soybeans; a man sits on a cultivator pulled by two horses (p. 89). (11) A field of long, straight, weed-free rows of soybeans in the United States. (12) Drying of soybean hay in shocks. (13) Harvesting soybeans; a man sits on a harvester pulled by two horses. (14) Threshing soybeans using a machine (p. 99). (15) Intercropping of soya and maize. (16) The soybean variety Lisbonne growing at the Central Station for Seed Trials (*Station Central d'Essais d Semences*) (p. 122). (17) Map of France with isotherm lines of July and a line showing the northern limit of maize cultivation (p. 134).

Tables: (1) Asiatic varieties: Chinese and Manchurian varieties (6 varieties), varieties from the British Indies (7), from the Dutch Indies (11), Japanese varieties (17).

(2). American varieties: Canadian varieties (7), U.S. varieties (40 varieties) (for each is given: Days to maturity, flower color, seed color, color of the oil, oil content, protein content, weight of 1,000 seeds in grams, seed yield (in kg/ha), yield of hay containing 15% moisture (in kg/ha)). (3) European varieties: German (7), Austrian (3), English (4), Italian (1), Polish (7), Czech (9), Soviet Russian (9).

Mineral needs of the soybean. Yield of two soybean varieties, with and without inoculation. Yield of three soybean varieties with and without inoculation. Germination percentages of 8 French soybean varieties at the Station Centrale d-Essais de Semences in 1938-39 (ranges from 91% to 100%). Variation in the composition of soybean hay at 4 stages of maturity. Weight of seeds vs. straw for 10 U.S. soybean varieties (the straw weighs 1.5 to 2.7 times as much as the seeds). Average yield of soybeans in four countries in 1933 (in kg/ha): Manchuria 1,200. Japan 1,000. Korea 650. China 950. Length of the vegetative cycle at four stations with 10 varieties in France (ranges from 98 to 157 days). Length of the vegetative cycle at four more stations with 16 varieties in France (ranges from 95 to 172 days). 18 varieties that completely matured their seeds at 2 stations in 1921 and in 1922. Oil and protein content of 7 French soybean varieties at Station de Clermont-Ferrand. The seed yield of 10 soybean varieties at the same station. The seed yield of 6 soybean varieties at Station d'Antibes. Six tables (p. 138-42) on the nutritional value of soybeans. Six tables (p. 148-61) on the utilization of soybeans in the farm economy and for feeding animals 2 tables (p. 162-42) on the soybean in the human diet and in industry. 5 tables (p. 175-42) in trade in soybeans and its by-products. 7 tables (p. 181-86) on the present economic possibilities of the soybean in France.

Chinese and Manchurian varieties soybean varieties (p. 48): Chu Yen Tou Erh, Kung-Chu-ling pai Mei, Pai Hoa Tso Tse, Su Li Huang, Ta Li Huang, Tieh Chia, Tou Tse.

Soybean varieties from the British Indies (*des Indes britanniques*) (p. 48): Behrum, Hto-nao, Hto-nang, Mirjanhat, Pekyat-pyin, Pe-Ngypi [pè-ngapi], and Santonauk. Note: According Thompstone & Sawyer (1914), some of the above names are the names of the yellow soybean in different parts of Burma.

Soybean varieties from the Dutch Indies (*des Indes néerlandaises*) (p. 48): Djepoen, Idjo, Ireng, Krawe, Mentik, Poetik, No. 16 sélectionné, No. 17 sélectionné, No. 27 sélectionné, No. 28 sélectionné, No. 29 sélectionné.

One variety from Indochina (p. 48) is Langson.

Soybean varieties from Japan (p. 50): Akasaya, Banseihikarikuro [Bansei hikari kuro], Chinseihikarikuro

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[Chinsei hikari kuro], Gindaizu [Gin daizu], Ishikarishiro [Ishi kari shiro], Kanro, Kurosaya, Mitsuishidaizu [Mitsuishi daizu], Naktchadaka, Oyachi no. 2, Rankoshi no. 1, Shimoshirazu no. 1 [Shimo shirazu no. 1], Shirokotsubu, Shirotsurunoko, Tsurunoko, Wasehodaka / Waschodaka, Yoshiokatairin [Yoshio katairin].

Soybean varieties from Canada (p. 50): A.K. (Harrow), Brun du Manitoba, Soja jaune de Montréal / Montreal, Soja jaune de Québec / Quebec 92, Manchu (Hudson), Mandarin (Ottawa), O.A.C. No. 211. Address: Directeur interimaire, Station d'Essais de Semences (Ministere de l'Agriculture), France; In 1946 Chef de Travaux at this station.

457. La Choy Food Prods. 1941? Brief history of La Choy. 2 p. Undated. Unpublished manuscript.

• ***Summary:*** In 1941 Beatrice Foods acquired La Choy. This 1-page typescript originated at about that time.

"Archbold, Ohio, with a population of only 3,200 is the home of La Choy Food Products, largest producer of canned Chinese foods in the world–including China!

"The business actually was started in 1920, by Wally Smith and Ilhan New, who became friends while attending the University of Michigan." Smith, who owned a grocery store in Detroit, wanted to sell freshly grown [mung] bean sprouts. New, a Korean by birth, knew how to grow them.

"Sometime later the pair conceived the idea of canning bean sprouts in glass jars. The next logical step was to use metal cans, and this was accomplished in 1922, when the company was incorporated. New left the company shortly after 1930 and Smith was killed by lightning in 1937.

"After several moves, each time to larger quarters, the first La Choy plant was built in 1937 in Detroit." At the start of World War II, this plant was sold to the government and the firm moved to its present 25-acre site in Archbold, Ohio.

"Today, after several additions, including a new 42,000 square foot Frozen plant, La Choy houses approximately 8½ acres under one roof.

"'Chinatown USA' is more strategically located for the efficient and economical production of Chinese foods than a glance at a map would indicate. Just to the north are the famed celery beds of Michigan. La Choy is the largest single user of Michigan celery in the nation. More than 5,000 tons are used annually in the new process developed by La Choy which produces up to 50 tons a day of extra-fancy fine cut celery for chop suey and chow mein dishes.

"To the east is the famed Pennsylvania mushroom belt, and La Choy is among the largest users of fresh mushrooms in the nation. Archbold is the largest cattle auction center between New York and Chicago [Illinois] and a major poultry area. More than 100,000 beef cattle were sold here last year.

"The fertile farm country in and surrounding Fulton County yields many of the other necessary ingredients, while such items as flour and shortening for chow mein noodles readily are available from Toledo, only 40 miles distant, and Chicago, Columbus, Detroit, Cleveland and Cincinnati, merely a few hours away by fast freight.

"Into this Northwest Ohio town, located on the main line of the New York Central between Chicago and New York, flow bamboo shoots and water chestnuts from Formosa and mung beans from Peru, Brazil and Thailand as well as Oklahoma and Texas, and other exotic imports that are essential ingredients of Chinese delicacies."

Note: This is the earliest document seen (Sept. 2005) concerning the work of Koreans overseas with soy. Address: La Choy.

458. Miller, Harry W. 1942. Answering America's protein problem! *Soybean Digest.* Jan. p. 6.

• ***Summary:*** "Editor's Note: Dr. Miller, whom we here introduce to the readers of The Soybean Digest, is a leader of the soybean food industry. President of the International Nutrition Laboratory, Mt. Vernon, Ohio, manufacturers of Miller's Soya Foods, he has had a most interesting career.

"Graduating in medicine in Chicago [Illinois] in 1902, he went to China the next year as a medical missionary under the Seventh-day Adventist board. He spent 8 years in the interior of China, and then was transferred to the superintendency of the Washington Sanitarium and Hospital, Tacoma Park, D.C., where he remained from 1913 to 1925.

"Returning to China in 1925, he established several medical centers in that country and in Japan, Korea, the Philippines and the Malay Peninsula.

"Becoming interested in dietary problems, because his specialty, goiter surgery, was directly concerned with a dietary deficiency condition, and because of the high Oriental mortality rate due to malnutrition, he began studying the food products which might ease the situation.

"This led him to the soybean, because, he observed, malnutrition was not nearly so acute in those sections in which the soybean was an article of diet.

"In 1936 Dr. Miller established a food plant in Shanghai from which he manufactured milk from the soybean. As he puts it: 'This work was nicely underway when the Japanese invasion of Shanghai resulted in the complete destruction of the plant, and after a year of waiting I again returned to America and established in Mt. Vernon the International Nutrition Laboratory where we have specialized on the processing of the soybean, not only studying varieties best suited for human food, but methods of preparing the bean and also developing processing equipment, that will give us a more satisfactory product."

"Dr. Miller has an interesting statement regarding the use of Soya Milk in infant feeding: 'In this country nearly a score of babies that we are in touch with have either been started on Soya Milk or have been transferred to it very shortly after birth, and the number of users of Soya Milk for infants are increasing very rapidly. Our results of feeding

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large numbers of babies and children are to be found in the National Medical Journal of China.'"

"Soybean foods for human consumption have to date been scarcely available in America, and the question arises: Why bother to supplement a dietary which is already so abundant?

"Still, it would seem strange it the raw material which has been a mainstay in the Oriental diet for so many centuries could not be utilized in the American diet. It can be!

"That part of the American diet most often lacking is protein. Most animal proteins are cumbered with toxins, and most vegetable proteins are inadequate for nutrition.

"Soybeans the Answer: The soybean provides the answer to the protein problem. With a protein content of more than 40 per cent, it is the best source of protein which we have. Its protein is biologically equal to that of meats and animal foods, and it has the advantage of being free from toxins.

"The effectiveness of the soybean is strikingly demonstrated in China. Where vegetable protein is abundantly supplied in the diet as in Manchuria, and in North China, we have a stalwart race of people. However, in South China where the major products are oil and sugar we see dwarfed bodies and it is a rare exception to find in the warm climate among oil and carbohydrate feeders a single well-developed individual." A photo shows "The International Nutrition Laboratories, Mt. Vernon, Ohio, home of 'Miller's Soya Foods.'" The building is large, and appears to be constructed from bricks. Address: M.D., International Nutrition Lab., Mt. Vernon, Ohio.

459. Chevalier, Aug. 1942. Production mondiale de graines de Soja [World soybean production]. *Revue de Botanique Appliquee & d'Agriculture Tropicale* 22(245-246):98-99. Jan/Feb. [Fre]

• ***Summary:*** The world's leading soybean producers in the mid- to late 1930s, in terms of million tonnes produced, were: China 5.01, Manchuria 4.32, USA 1.57, Korea 0.507, Japan 0.367, and the Netherlands Indies [Indonesia] 0.288. Address: France.

460. A. 1942. Die europaeischen Oelfruechte: Sojabohnen erobern Europa [European oilseeds: Soybeans conquer Europe]. *Deutsche Landwirtschaftliche Presse* 69(16):158-59. April 18. [Ger]

• ***Summary:*** About the importance of soybean production in various countries of Europe, including areas planted and amount harvested.

While rapeseed, field mustard (*Rübsen*), and flax are among the age-old oil seeds of European humanity, the soybean only appeared in the field of vision of European peoples at the beginning of the twentieth century [sic, in the 1870s]. And it was even later that the step was taken for trials with the cultivation of soybeans in Europe. The homeland of the soybean is East Asia, where it has been cultivated in China, Manchukuo, and Japan since ancient times in the largest areas. In 1936, the soybean harvest amounted to 5,911,000 metric tons in China, 4,147,000 metric tons in Manchukuo, 492,000 metric tons in Korea, and 339,800 metric tons in Japan.

Article of World Trade Since Only 1908: For centuries, or indeed millennia, the soybean remained merely a valuable foodstuff of the East Asian peoples. Only in 1908 were the first 100 metric tons of soybeans brought to the London market by the renowned Japanese trading house Mitsui & Co. The attempts that were made here with the soybean for its industrial utilization led to such positive results that from this year forward, the soybean developed into a first-class article of world trade. During the years 1910-1913, average imports already amounted to 230,871 metric tons to the United Kingdom, 34,432 metric tons to Denmark, and 32,342 metric tons to Holland. During the years 1930-1934, the average imports of soybeans then amounted to 1,035,000 metric tons for Germany, 229,280 metric tons for Denmark, and 141,570 metric tons for the United Kingdom. Germany had thus become the main import country for soybeans. But in recent years, imports have not continued at the especially high average of 1930-1934. They amounted to 515,840 metric tons in 1935, 484,060 metric tons in 1936, 600,870 metric tons in 1937, and 782,900 metric tons in 1938. In addition, larger quantities of soybean oil were also brought in not only by Germany, but also by other European countries.

"The Soybean as a European Cultivated Plant: It is not surprising that with the great significance of the importation of soybeans into Germany, the attempt was made to also introduce this crop into our Fatherland, since in other European countries, particularly after the First World War and then increasingly since the beginning of the 1930s, the acclimatization of the soybean had begun.

The soybean belongs to the Papilionaceae family (*schmetterlingsblütig*) of plants. It grows upright or winding around itself. Leaves, stems, and pods are densely covered with soft brown hairs. The pods are rather broad and slightly curved. Many times they contain only one seed. The soybean seed is spherical or bean-shaped in the form of small peas or beans. The color of the seed varies greatly. In addition to yellow and yellowish-green seeds, there are also brownish-red and black varieties. The value of the seed lies not only in its oil, but above all also in its protein content. The amount of protein consists on average of 40%, in addition to 20% fat and 2% lecithin. The soybean finds application as both human and animal food, while the oil that is obtained is used for food and industrial purposes.

With regard to the soil, the soybean makes its great demands. Richer sandy soils, loam, and chalky soil especially appeal to it. But genuinely good harvest results have also been achieved on poor and [illegible word:

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*trockenen* = dry?] sandy soil. On the other hand, the soybean does not thrive on acidic, cold, or wet soils. It can consequently be cultivated on any soil type. While with regard to the soil, the soy plant is therefore genuinely capable of adaptation, it makes substantially high and absolute demands upon the climate. As a plant which is greatly in need of heat, it flourishes especially well in all areas with a sunny, warm climate. In particular, sunny, warm autumns are very necessary for its maturation. Sunny years will therefore always be good soy years. Its cultivation will therefore have success in Europe preferably in areas with a sunny, warm climate. With regard to fertilizing and care, the soybean is undemanding. Nitrogen fertilizing is not necessary, and in fact rather a disadvantage, since as a result of that, the maturation is delayed. The moderate administering of potash and Thomas slag (*Thomasmehl*) have proven to be useful. For grain, soy is a good preceding crop, and soy after soy has also proven itself well. According to more recent trials, the planting distance should not be below 40 cm. The sowing quantity amounts to 60 to 80 quintals per hectare [sic, 60 bis 80 *Doppelzentner pro Hektar*–translator's note: this equals 6,000 to 8,000 kilograms per hectare, and as this exceeds the yield (see below), it is presumed that what was meant was actually 60 to 80 kilograms per hectare]. The sowing period runs between early April and early May. Damage to the soy fields is caused above all else by mice, but then also by May bug grubs (*Engerlinge*) and wireworms (*Drahtwürmer*). The primary difficulty with the acclimatization in Germany consists of breeding varieties that mature sufficiently early yet still return an economic yield. To the greatest degree possible, the harvest should be carried out in late September. Efforts by breeders regarding those types of soybean varieties have been successful, but today they are still also by no means concluded. In spite of that, the cultivation of the soybean still plays a subordinated roll in Germany. Whether the soybean will be capable of still also becoming a significant factor in the fat and feed budget of Germany remains to be seen. Table 1

Translator's note: No explanation is given here of the meaning of the three symbols used in these tables. There is, though, a certain logic, and my guess (and it is only a guess) is this: "-" means few or no commercially producing soybean fields were planted that year in that country, "!" means data was not gathered, and "?" means data was gathered but it was not made available to us because it is in evil Bolshevik countries with which we are now at war.

Table 2. We in fact already said that sunny years supported soybean yields, while a rainy summer and above all a rainy autumn have a very unfavorable effect upon soybean yields. The rather large differences in the per hectare yields that are to be determined with the individual countries in the various years are to be traced back to this cause. On the other hand, the even larger differences between the yields in the individual countries have their roots in the different state of the agricultural operating techniques, a fact that indeed is to be observed not only with oil seeds, but with all agricultural crops.

Table 3

According to Wacker, the following were harvested in Germany at the experimental fields in Hohenheim: 1918: 7.72 quintals (100 kg), 1919: 5.51 quintals, 1920: 9.86 quintals, 1923: 9.46 quintals, and 1933: 10.90 quintals. In the Ostmark [today's Austria], average yields of 14 quintals per hectare were achieved in recent years, peak yields were at 25 to 30 quintals per hectare.

Note 1. This is one of the most recent documents seen written in Fraktur, a hard-to-read German Gothic script that was banned by the Nazis in the early 1940s. Continued.

Note 2. Translated by Philip Isenberg (MM, CT), Long Beach, California. Address: Dr.

461. Dies, Edward J. 1942. Tables (Document part). In: E.J. Dies. 1942. Soybeans: Gold from the Soil. New York, NY: The Macmillan Co. 122 p. April. 21 cm.

• ***Summary:*** Tables show: (1) U.S. soybean acreage, yield, and production, 1924-1941 (p. 5). During this time acreage has increased more than 12-fold from 448,000 to 5,855,000 acres. Yield as increased 88% from 11.0 to 20.7 bushels/acre. Production has increased more than 21-fold from 4.947 million to 106.712 million bushels.

(2) Soybean production in specified countries and estimated world total (p. 10-11). The countries are: China, Manchuria, United States, Chosen [Korea], Japan, Netherlands India [later Indonesia], Kwantung [Leased Territory], Taiwan, U.S.S.R., Rumania, Bulgaria, Yugoslavia, other Europe (incl. Poland, Czechoslovakia, and what was formerly Austria).

(3) Illinois soybean acreage, yield, and production, 1919-1941 (p. 25). Production (in bushels) increased from 30,000 in 1919, to 46,000 in 1920, to 167,000 in 1921, to 812,000 in 1922, to 1,431,000 in 1925, to 6,970,000 in 1930, to 24,012,000 in 1935, to 34,912,000 in 1940, to a peak of 49,128,000 in 1941.

(4) "Soybean varieties–Origin and varietal characteristics" (p. 38-47). For each variety is given: Place of origin, year introduced to USA, days to mature, flower color, pubescence color, seed characters (seed coat color, germ color, hilum color, seeds per pod, seeds per pound, oil percentage, protein percentage), use (de = dry edible beans, f = forage, gra = grain, gv = green vegetable).

Soybean varieties described in the table on p. 38-47 are: Agate, A.K., Aksarben, Aoda, Arisoy, Arksoy, Avoyelles, Bansei, Barchet, Biloxi, Black Eyebrow, Cayuga, Chame, Charlee, Chief, Chernie, Chestnut, Chiquita, Chusei, Clemson, Columbia, Creole, Delnoshat, Delsta, Dixie, Dunfield, Easycook, Ebony, Elton, Emperor, Etum, Fuji, Funk Delicious, George Washington, Georgian, Green Giant, Goku, Habaro, Haberlandt, Hahto, Hakote, Harbinsoy,

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Hayseed, Herman, Higan, Hiro, Hokkaido, Hollybrook, Hongkong, Hoosier, Hurrelbrink, Illini, Ilsoy, Imperial, Ito San, Jogun, Kanro, Kanum, Kingwa, Kura, Laredo, Lexington, Macoupin, Magnolia, Mamloxi, Mammoth Brown, Mammoth Yellow, Mamredo, Manchu, Mandarin, Mandell, Mansoy, Medium Green, Midwest, Mingo, Minsoy, Missoy, Monetta, Morse, Mount Carmel, Mukden, Nanda, Nanking, Norredo, Ogemaw, Old Dominion, Oloxi, Ontario, Osaya, Otootan, Ozark, Palmetto, Patoka, Pee Dee, Peking, Pine Dell Perfection, Pinpu, Richland, Rokusun, Sato, Scioto, Seminole, Seneca, Shiro, Sioux, Sooty, Sousei, Southern Green, Southern Prolific, Soysota, Suru, Tarheel Black, Tastee, Toku, Tokyo, Virginia, Waseda, Wea, White Biloxi, Willomi, Wilson, Wilson Five, Wisconsin Black, Wood's Yellow, Yelredo, Yokoten.

(5) U.S. production and crushing of soybeans, and production of soybean oil and meal from 1924 to 1941 (p. 53, based on government reports). Domestic production of soybean oil, only 2.2 million lb in 1924, had increased almost 6-fold by 1929 to 13.424 million lb. Then in June 1930 the protective Smoot-Hawley tariff went into effect. By levying a tariff on imported soybeans and soybean oil, it stimulated domestic soybean crushing and production. Oil production (in million lb) jumped immediately, from 13.424 in 1929 to 34.688 in 1930 (even though the Great Depression had begun), to 208.9 in 1935, to 565.2 in 1940. Note: A semi-log graph of U.S. soy oil production vs. time shows that it increased at the most rapid rate from 1924 to 1935. This rate decreased slightly between 1935 and 1942, then decreased again from 1942 to about 1980.

(6) Soybean oil imported and exported (pounds to and from USA, from 1912 to 1940) (p. 58). The first soybean oil was exported from the USA in the latter half of 1919. At least 1 million pounds/year was exported from that time until 1940. The peak year was 1920, when 46.7 million lb were exported. Source: Department of Commerce, Bureau of the Census.

(7) Factory consumption of soybean oil by classes of products, 1931-1940 (p. 61). The classes are: Compounds and cooking fats [shortening], oleomargarine, other edible products, soap, paint and varnish, linoleum and oilcloth, printing ink, miscellaneous, foots and loss, total. In 1931 and 1932, and in most subsequent years, the leading class was shortening. In 1939 the top four classes were (in million lb): shortening 212.3, oleomargarine 87.1, other edible products 39.9, and paint and varnish 29.8. Source: Bureau of Census reports.

(8) Supplies of feed in 1939 (p. 78). Feed supplies are composed of feed grains (91.73% of the total), cereal by-products (5.16%, including wheat meal products, gluten feed, distillers and brewers dried), and oil and cake meals (3.10%, including cottonseed {1.55%}, soybean {1.04%}, linseed {0.32%}, and other 0.17%). Address: USA.

462. Dies, Edward J. 1942. Soybeans: Gold from the soil (Statistical tables and charts). New York, NY: The Macmillan Co. 122 p. April. Index. 21 cm. Revised ed. March 1943. 122 p. Includes index, Illust., 22 cm. [205 ref]

• ***Summary:*** Page 5: Soybean acreage and production, 1924-1941. United States crop. Soybean harvested for beans. Each crop year extends from Oct. 1 to Sept. 30. Acreage increased from 448,000 acres in 1924 to 5,855,000 acres in 1941. Yield per acre rose from 11.0 bushels in 1924 to a peak of 20.7 bushels in 1939. Production increased from 4,947,000 bushels in 1924 to 106,712,000 bushels in 1941. Sources: (1) Crops and Markets, USDA. (2) Illinois Crop Statistics, Circular 440-441. (3) Latest government reports, 18 Dec. 1941.

Page 10: Soybeans: production in specified countries, and estimated world total, in thousand bushels, excluding China. Estimated world production rose from 163.000 million bushels in 1922 to 266.700 million bushels in 1940. China production rose from 210.038 million bu in 1931 to 231.302 million bu in 1937. Manchuria production rose from 113.469 million bu in 1922 to a peak of 196.949 million bu in 1930, falling to 149.435 million bu in 1939. United States production rose from 4.947 bu in 1924 to 106.712 million bu in 1941. Chosen [Korea] production rose from 13.017 million bu in 1910 to 18.333 million bu in 1938. Japan production decreased from 17.855 million bu in 1909 to 13.473 million bu in 1937. Netherlands India [today's Indonesia] rose from 2.603 million bu in 1917 to 9.873 million bu in 1938. Kwantung production rose from 375 thousand bu in 1911 (with a gap between 1919 and 1924) to 650 thousand bu in 1937. Taiwan production decreased from 280 thousand bu in 1921 to 159 thousand bu in 1937. USSR rose from 2.060 million bu in 1936 to a peak of 10.384 million bu in 1932 falling to 2.504 million bu in 1934. Rumania production rose from 26,000 bu in 1934 to 2.572 million in 1939. Bulgaria production rose from 77,000 bu in 1934 to 827,000 bu in 1939. Yugoslavia production rose from 26,000 bu in 1934 to 213,000 bu in 1939. 1909-1941. Other European (Poland, Czechoslovakia, Austria) rose from 55,000 bu in 1932 to 60,000 bu in 1935. With many footnotes.

Page 19: Principal centers of soybean production in the USA. "Almost 90 per cent of all soybeans [in the USA] are harvested in Illinois, Iowa, Indiana, and Ohio. If three other states are included as shown on the map–Missouri, Michigan and Virginia–the total is 97 per cent. The size of the baskets is proportional to the volume produced.

Page 20: Principal centers of soybean processing [crushing] in the USA. "As Illinois produces about 52 per cent of the soybeans harvested for seed, Central Illinois is the center of soybean processing as shown on this map. The discs indicate relative importance of the processing centers. Total processing capacity in late 1941 probably exceeded 90 million bushels.

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Page 25: Illinois acreage and production of soybeans for beans, 1919-1941. Acreage harvested increased from 3,000 acres in 1919 to 2.285 million acres in 1941. Yield, in bushels per acre, rose from 10.0 in 1919 to 21.5 in 1941. Production increased from 30,000 bu in 1919 to 49.128 million bu in 1941.

Pages 38-47: Soybeans: Origin and varietal characteristics. This excellent table contains 18 columns. Variety. Origin (introduction from what country, selection, or cross). Year. Days to mature. Flower color. Pubescence color. Seed characteristics: coat color, germ color, hilum color, seed per pad (range), seed per pound, percent oil, percent protein. Use (green vegetable, grain, forage). The varieties are: Agate, A.K., Aksarben, Aoda, Arisoy, Arksoy, Avoyelles, Bansei, Barchet, Biloxi, Black Eyebrow, Cayuga, Chame, Charlee, Chief, Chernie, Chestnut, Chiquita, Chusei, Clemson, Columbia, Creole, Delnoshat, Delsta, Dixie, Dunfield, Easycook, Ebony, Elton, Emperor, Etum, Fuji, Funk Delicious, George Washington, Georgian, Giant Green, Goku, Habaro, Haberlandt, Hahto, Hakote, Harbinsoy, Hayseed, Herman, Higan, Hiro, Hokkaido, Hollybrook, Hong Kong, Hoosier, Hurrelbrink, Illini, Ilsoy, Imperial, Ito San, Jogun, Kanro, Kanum, Kingwa, Kura, Laredo, Lexington, Macoupin, Magnolia, Mamloxi, Mammoth Brown, Mammoth Yellow, Mamredo, Manchu, Mandarin, Mandell, Mansoy, Medium Green, Midwest, Mingo, Minsoy, Missoy, Monetta, Morse, Mount Carmel, Mukden, Nanda, Nanking, Norredo, Ogemaw, Old Dominion, Oloxi, Ontario, Osaya, Otootan, Ozark, Palmetto, Patoka, Pee Dee, Peking, Pine Dell Perfection, Pinpu, Richland, Rokusun, Sato, Scioto, Seminole, Seneca, Shiro, Sioux, Sooty, Sousei, Southern Green, Southern Prolific, Soysota, Suru, Tarheel Black, Tastee, Toku, Tokyo, Virginia, Waseda, Wea, White Biloxi, Willomi, Wilson, Wilson Five, Wisconsin Black, Wood's Yellow, Yelredo, Yokoten. Note: This long table "Specially prepared by the Division of Forage Crops and Diseases, Bureau of Plant Industry, U.S.D.A.

Page 53: "United States crop production of soybean oil meal and soybean oil, 1924-1940." This valuable table is poorly titled. It has 5 columns: (1) Year. (2) Production of soybeans. Increased from 4,947 bu in 1924 to 106.712 million bu in 1941. (3) Crushings [crushed]. Increased from 307,000 bu in 1924 to 64.180 million bu in 1941. (4) Production of meal. Increased from 7,400 tons in 1924 to 1.5369 million tons in 1941. (5) Production of oil. Increased from 2.269 million pounds in 1924 to 565.169 million pounds in 1941.

Page 58: Soybean oil imported and exported, 1912-1940. Imports rose from 24.959 million lb in 1912 to a peak of 335.984 million lb in 1918, decreasing to 4.848 million lb in 1940. Domestic and foreign oil exported decreased from 34.803 million lb in 1919 (For 6 months beginning July 1) to 15.953 million lb in 1940.

Page 61: Soybean oil: factory consumption by classes of products, 1931-1940. Compounds [shortening] and vegetable cooking fats rose from 10,869 lb in 1931 to 212.317 million lb in 1940. Oleomargarine rose from 623,000 lb in 1931 to 87.106 million lb in 1940. Other edible products rose from 180,000 lb in 1932 to 39.980 million lb in 1940. Soap rose from 3.816 million lb in 1931 to 17.612 million lb in 1940. Paint and varnish rose from 6.256 million lb in 1931 to 29.828 million lb. Linoleum and oilcoth rose from 2.612 million lb in 1931 to 29.828 million lb in 1940. Printing ink rose from 33,000 lb in 1931 to 82,000 lb in 1940. Miscellaneous rose from 2.051 million lb in 1931 to 16.538 million lb in 1940. Foots and loss rose from 1.625 million lb in 1931 to 20.924 million lb in 1940. The total of these uses for soybean oil rose from 27.885 million lb in 1931 to 431.641 million lb in 1940.

Page 68: Diagram of uses of the soybean. The major categories are: Green soybeans, used as fresh vegetables or in canned vegetable salads. Dry soybeans, used for seed or to make bean sprouts, soup, soy sauce, roasted soybeans, boiled soybeans, stock feeds, vegetable milk [soymilk] (used to make liquid milk products, dry soy milk products, bean curds, soy cheese), debittered soybeans (used to make full fat soy flour, soy coffee, soy butter, soy cereal). Soybean oil meal, soybean flour, soy lecithin, crude soybean oil (used to make fatty acids, alkyd resins. glycerine, core oils, soft soaps, hard soaps, insecticides, and many non-food products mentioned above). Refined soybean oil (used to make food products–vegetable shortening, margarine, salad dressing, edible oils, frying oils). Address: USA.

463. Swanson, Eric W.; Herman, H.A. 1943. The nutritive value of Korean lespedeza proteins and the determination of biological values of proteins for growing dairy heifers. *Missouri Agricultural Experiment Station, Research Bulletin* No. 372. 68 p. Aug. [110 ref]

• ***Summary:*** Soybean oil meal, hydraulic or expeller process, was also fed to cows for comparison. Address: Columbia, Missouri.

464. Miller, Harry W. 1943. Soybeans and the Orient. *Soybean Digest.* Sept. p. 18, 44.

• ***Summary:*** "It was my privilege during 23 years of residence in the Orient to travel very extensively through the provinces of China, and to acquaint myself with all eastern Asia relative to soybean production. I found that while the central and northern provinces of China including Manchuria are the principal soybean producing areas of the Orient, that soybeans are widely used by all the groups of Orientals, save the Filipinos, and the Malays, and are universally used by the Chinese, and that wherever they emigrate in any part of the world, the one universal food of the Chinese is soybeans, and not rice, as so often claimed.

"There are millions of the Chinese who do not live in the rice producing territories. The Chinese and many of

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the Oriental people have come to understand by common experience rather than scientific deduction that soy protein is an essential to livelihood and cannot with safety he dispensed with from their diet. Wherever in Chinese occupied territories soil and climatic conditions are at all favorable to the production of soybeans, they will be found as one of the stable crops. However the yield in the tropical portions of China is rather small. They have depended on importing beans from Manchuria and northern China. The same is true of the South Sea Islands.

"Foundation: Much that we have learned concerning handling soybeans and preparing them into food materials we must credit to the knowledge gained through studies made and travels in the Orient, chiefly in China, Korea, and Japan. Like their handling of many other things, they have developed the soybean culture and processing up to a certain point and there they stand. We have built upon their foundation, and have carried research in the agricultural field, as also processing methods several steps farther, and have made soya food products not only better but far more digestible, and therefore nutritionally more available, and found out that the bean can be made tasty as well.

"You may ask how are the Oriental people using the soybean. There are many ways. If you were to visit the Chinese markets during the late summer and early autumn months you would be able to purchase shelled green soybeans. You would also be able to purchase the unshelled beans, that is in the pods just like you buy peas in the pod. Some people prefer to purchase them in the pods, cook them in the pods in salt water, and then squeeze out the beans and eat them from the pod. There have been no canning facilities available to the Chinese for any of their products in years past, and so the use of the green soybean is only seasonable. You might expect that since the Chinese have stone mills everywhere to grind their wheat and their corn into flour and meal that they would be grinding their soybeans into a flour. But soy flour is largely an Occidental product. It would be very difficult for you to pick up in any of the markets of China a pound of soy flour.

"Curd: The Chinese have learned through long experience that the greatest value nutritionally from the soybean is obtained through a water extraction of its protein. This milky liquid after it is strained is coagulated into a cheese [tofu]. Ninety percent and possibly even higher of the nutrition the Oriental obtains from the soybean is taken in the form of this cheese. Of course they have many ways of dealing with this soft gelatinous curd, which has a very high water content. They press it into cakes, about the thickness of a large slice of bread. This then is placed in a brine solution or other flavored liquid, and later sliced up like we at times dice cheese. Again it is pressed into thin sheets that are about a sixteenth of an inch in thickness. These are also diced up and eaten like a relish or a salad.

"Another common product is a thin semi-transparent sheet of protein [yuba] made by a slow heating vat filled with this soya milk. A heavy scum will come to the surface, which they lift off at intervals and suspend to dry. These sheets are later on used as food wrappers. They can use these sheets which are pure protein, like we can use cellophane sheets, but instead of wrapping parcels with them they stuff them with certain vegetables, imitating the body and legs of a fowl, or the form of a fish, or they can represent almost anything in the way of an animal, and by submitting them to a little baking, give the same nice brownish hue by the use of a little oil, so you could hardly tell whether you were eating actual turkey or an artificial one.

"When you go to the market where the soybean producer delivers his finished products, you will see a great variety of foods made from soybeans. As I say, you can buy the bean curd in squares, or you can buy the patties, or you can buy the thin sheets of soya cheese, or you can buy these large semi-transparent sheets of soya protein. These in turn can be incorporated into many tasty and highly nutritious dishes, by the skill and ingenuity of the cook, and has also the likeness of meat in flavor and appearance. Naturally nutritionally we know of the high value of these proteins for a proper substitute for meat, fish, fowl, eggs, and the protein of animal milk.

"Of course the Chinese have as one of their big industries the making of oil from the soybean, and that is true of the Koreans and the Japanese. They heat the bean, grind it, and put it into wooden presses and extract the oil by driving wedges into their oil presses, bringing a tremendous pressure to bear upon the roasted beans. This oil is all used for edible purposes.

"The residue of the bean cake contains about 6 percent of oil, and has been exported in recent years to great extent. But the Chinese have in certain localities ground it up and used the bean cake meal for food, although much has been used in China and exported for fertilizer.

"The soybean is also extensively sprouted, and these sprouts are used in their vegetable food mixtures and eaten as bean sprouts.

"I shall not attempt at all to discuss the varieties of soybeans found in the Orient. I have seen almost every color, every shape and size, running from a small shot sized bean to the large jumbo sizes, such as we have in our edible list. All the beans that I have seen that come from India have been of a very small size. When we buy beans in China we go to the market and ask for soya beans. If we are not satisfied with what they have we go to another shop, and see if we can find a bean of superior size and quality. We never purchase soybeans in China by name of any variety.

"As is well known, China and most parts of the Orient grow from two to three crops per annum on the same ground. In some areas when they harvest a rice crop they plant a soybean crop on the same soil. In other areas when they harvest a wheat crop they put in a crop of soybeans.

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We believe in many of our central states, and certainly this would be true of the southern portions of our central states, that it would be quite practical to harvest a crop of peas, and disk the land, and plant and harvest a crop of soybeans" (Continued).

465. Gobecia S.A. Industrial, Commercial. 1943. La soja [The soybean]. *Revista de la Bolsa de Cereales* (*Buenos Aires, Argentina*) 31(1621):6-7, 23, 25-26, 28. Oct. 23; 31(1622):26-30. Oct. 30. [Spa]
• ***Summary:*** Note: These are the first two parts of a four-part series.

Oct. 23. Contents: Introduction. The soybean and its cultivation: Introduction, table of major soybean producing countries and production in 1924 and 1935 (Manchuria, Korea, Japan, USA), instructions for cultivating the soybean, preparation of the land, planting, quantity of seed per hectare, cultivation, harvest. Yields: production of hay, production of seed, advantages of cultivating the soybean. Chart showing products that can be obtained from the soybean. The soybean a new crop.

Oct. 30 (continued). Reasons for growing the soybean in Argentina. Its cultivation in North America. Its economic importance in the United States. Its cultivation in Argentina. Localities where the soybean has been planted and harvested in 1941-1941: Province of Buenos Aires, Province of Santa Fe, Province of Entre Rios, Province of Cordoba, Province of Corrientes, Province of Santiago del Estero, Province of La Rioja, Province of Mendoza, Province of Salta, Province of Tucuman, Gobernaciones, Rio Negro, Misiones, Chaco. advantages of growing, amount of production in the United States and in Argentina, costs of production of soybeans. Calculation on 100 hectares for maximum cost-minimum yield. The chemical composition of the soybean. Address: Buenos Aires, Argentina.

466. *Takoma Park Journal.* 1943. Spread of culture of soybean is credited to Takoma resident. Dec. 17.
• ***Summary:*** "One of our fellow townsmen, Mr. W.J. Morse, of 6809 Fifth street, wins high praise in the revised edition on 'Soy Beans' [sic, *Soybeans: Gold from the Soil* (March 1943)], by Edward Jerome Dies. Mr. Dies, in substance, gives Mr. Morse the main credit for development of and increased interest in this valuable plant.

"Mr. Morse, born in New York State, scoured the Orient for two years, visiting North China, Japan, Korea, and Manchuria,... he collected and assembled 5,000 distinct varieties."

"After a journey through the South in 1914 his efforts began to bear fruit and his converts grew in numbers and influence."

467. Billard, Juan J.; Aiub, Alberto. 1943. La soja; estudio económico posibilidades de su cultivo en la Argentina [The soybean: Economic studies on the possibilities of its cultivation in Argentina]. *Universidad Nacional de Buenos Aires, Instituto de Economia y Legislacion Rural. Publicacion* 4(5):150-273. [37 ref. Spa; eng; por]
• ***Summary:*** Most of the contents is taken from a 1936 report by the International Institute of Agriculture in Rome. Contents: Prologue. Introduction. 1. Utilization. 2. Development of soybean cultivation worldwide: By continent, by country, importance of soya worldwide compared with other major crops. 3. International commerce: Soybeans (importing countries, exporting countries), oil (importing countries, exporting countries), soybean cakes and meal (*tortas y harina de tortas*), world exports compared with other vegetable products. 4. Prices: European markets, U.S. markets, correlation. 5. Possibilities of soybean cultivation in Argentina. 6. Conclusions. 7. Summary. Address: Buenos Aires, Argentina.

468. Mendota: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1943. Seed color: Yellow (straw), hilum light brown to brown.
• ***Summary:*** Sources: Odland, M.L.; Rahn, E.M.; Link, C.B. 1943. "Snap bean, edible soy bean and lima bean variety and strain trials–1943." Pennsylvania Agricultural Experiment Station, Journal Ser. Paper No. 1205. 6 p. Nov. 13. Page 5: A table, "Edible soybean variety and strain trials–1943" gives the specific and general ratings described above. The varieties Giant Green (Excellent), Bansei (Good), Hokkaido (Excellent), Funk's Delicious [Funk Delicious] (Good), and Mendota (Good) were evaluated. Giant Green and Hokkaido were given the highest general ratings.

Walls, E.P. 1943. "Edible soy beans." *Maryland Agric. Exp. Station* (*Department of Horticulture*), *Miscellaneous Publication* No. 28. 7 p. Contribution No. 1934. See p. 6. Mendota is one of twelve soybean varieties that have been grown at the Maryland station for four years. It matures [to the green vegetable stage] in 68 days. In 1940 and 1941 it was not rated as one of the top 9 varieties in terms of quality when canned.

*New Jersey Agric. Exp. Station, Circular.* 1944. "Growing beans and peas in New Jersey home vegetable gardens." No. 480. 4 p. See p. 2. The best edible soy bean varieties for New Jersey gardens are "Bansei, Giant Green, and Mendota."

Combs, O.B. 1944. "Mendota: A new edible variety from Wisconsin." *Soybean Digest.* Jan. p. 17.

Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 6. "Mendota–Wisconsin Experiment Station selection."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions,

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synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 12. "Mendota–Selection from P.I. No. 84668 by the Wisconsin Agricultural Experiment Station in 1937. Introduction received from Suwon, Korea, in 1929. Maturity, early; pubescence, gray; flowers, purple; pods, two- to three-seeded; shattering, medium; seeds, straw yellow with light brown to brown hilum, about 2,100 to the pound; germ, yellow; oil, 17.5 percent; protein, 40.9 percent; iodine number, 139."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 14-15. Mendota is in the USDA Germplasm Collection. Maturity group: I. Year named or released: by 1944. Developer or sponsor: O.B. Combs, Department of Horticulture, Wisconsin. Literature: 13, 14. Source and other information: From the AES (Agric. Exp. Station), Suweon [Suwon], Gyeonggi Do, South Korea, in 1930. Prior designation: PI 84668. Address: USA.

469. **Product Name:** Soy Koree (Thick Soup–Korean Style. Dehydrated Soup Base).
**Manufacturer's Name:** Hodson's Pantry Products. Imperial Brands Co.
**Manufacturer's Address:** 537 S. Dearborn St., Chicago, Illinois.
**Date of Introduction:** 1944 January.
**New Product–Documentation:** Ad in *Nature's Path* (New York City). 1944. Jan. p. 16. "Try this new modern product from Hodson's Pantry." "Soy Koree: Thick soup–Korean style–49¢."

Taylor. 1944. The Soy Cook Book. p. 199.

Note: This is the earliest document seen (May 2021) that mentions the use of soy ingredients in Korean-style soyfood products outside Korea.

470. Delsoy: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. Synonym: Edsoy (Morse 1948). 1944. Seed color: Yellow (straw), hilum dark brown.
• ***Summary:*** Sources: U.S. Regional Soybean Laboratory. 1944. "Southern States Soybean Planning Conference, U.S. Regional Soybean Laboratory, Stoneville, Mississippi, February 29 to March 3, 1944." *RSLM* (U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois) No. 112. [March.] 14 p. "Dr. J. E. Adams brought up the question of the name, 'Edsoy', which had been assigned to the soybean variety, F.P.I. 85355 and which was introduced by the Delta Experiment Station. Dr. Adams read correspondence between a grower in the South, the A.E. Staley Manufacturing Company, Decatur, Illinois, and Mr. W.J. Morse which brought out the fact that the name, 'Edsoy' for that variety conflicted with the Staley Company's use of the name, 'Edsoy' for one of their food products. The Staley Company had used the name, 'Edsoy' for 13 years so the use of that word as a varietal name was clearly a case of infringement on the rights of the Company.

"Mr. Rigney made a motion, seconded by Mr. Manke, that the Conference recommend to the Delta Experiment Station that the variety, F.P.I. 85355 he renamed. Motion carried unanimously.

"Mr. Aamodt suggested that the Conference choose several names and let the Delta Experiment Station make the final decision.

"Several names were suggested. Finally the name 'Delsoy' was chosen and the representatives of the Delta Experiment Station agreed on that name for F.P.I. 85355."

Gattoni, Luis A. 1945. "Frijol soya" [Soybeans]. *Honduras Agricola* No. 8. p. 5-7. June.

Morse, W.J. 1948. "Soybean varietal names used to date." Washington, DC: Appendix to the mimeographed report of the Fourth Work Planning Conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois. RSLM 148. 9 p. May 26. See p. 2. "Delsoy–P.I. 85355."

USDA Production and Marketing Administration [Grain Branch]. 1948. "Soybean varieties: Descriptions, synonyms and names of obsolete or old and seldom grown varieties." Washington, DC. 25 p. Aug. See p. 5. "Delsoy–Introduced under P.I. No. 85355 from Suwon, Korea, in 1930. Maturity, late; pubescence, gray; flowers, purple; pods, two- to three-seeded; shattering, medium; seeds, straw yellow with dark brown hilum, about 3,500 to the pound; germ, yellow; oil, 17.4 percent; protein, 45.2 percent; iodine number, 133."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 10-11. Delsoy is in the USDA Germplasm Collection. Maturity group: VI. Year named or released: by 1943. Developer or sponsor: USDA. Literature: 13, 14. Source and other information: From the AES (Agric. Exp. Station), Suweon, Gyeongggi Do, South Korea, in 1930. Prior designation: PI 85355.

Note: During the 1990s several soybeans named Delsoy were registered, such as Delsoy 4210 (1992), Delsoy 4710, and Delsoy 5710. Address: USA.

471. *Country Gentleman.* 1944. How the Corn Belt struck oil. 114(8):20. Aug.
• ***Summary:*** This page has the large bold headline: "The U.S. Department of Agriculture page."

They call him "Soybean" Morse, and although his technical title at USDA is Principal Agronomist, he is more frequently described as "the daddy of the soybean in America, and when you say 'W.J. Morse,' everyone knows you are thinking about soybeans."

The soybean is now one of America's six largest crops in terms of farm acreage: only corn, wheat, hay, oats and cotton are grown on more acres than soybeans; 1943 were 195.9 million bushels were harvested from 10.82 million acres.

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During World War II, the soybean's great contribution to the USA has been oil. With the soybean, the nation has "struck oil in a big way–vegetable oil for shortening, margarine and salad oil, oil for quick-drying paints on battleships and planes, for soap, medicines, linoleum, oilcloth, printer's ink, glycerine, leather goods.

"War in the Far East cut the United States off from its former source of a billion pounds of fats and oils, but by 1943 the nation was already anticipating a yield of more than" 1¼ billion pounds of oil from one crop of soybeans. And after the oil is removed, the high-protein that remains is still very useful as a feed for livestock, a source of nutritious flour, and a material for plastics to take the place of metals that have gone to war.

Photos show: (1) W.J. "Soybean" Morse inspecting soy beans in Keijo (Seoul), Korea in 1929. (2) A combine and wagon full of soybeans. (3) Soybean oil being filtered for food use at a plant in Decatur, Illinois.

472. LaChoy Food Products. Div. of Beatrice Creamery Company. 1944. Genuine soy sauce (Ad). *Soybean Digest.* Sept. p. 12.

• ***Summary:*** This small black-and-white ad (2¼ by 3½ inches) shows a bottle of the soy sauce and states: "Famous cooks and expert chefs insist on La Choy Sauce not only in making genuine Chop Suey, Chow Mein, and other Chinese dishes, but also in frying steaks, chopped meat, meat balls and hashes–in making gravies and stews–for serving on the table as a condiment for steaks, chopped meat, roasts, chops, croquettes, spaghetti, fried eggs and sea food."

Note: This the first time this ad has appeared in *Soybean Digest.* It may have been run in response to the article titled "Lack of soy sauce worries Nisei workers" in the July 1944 issue of this magazine (p. 11).

This ad also appeared in the *Soybean Blue Book.* 1947. p. 72. However Beatrice was now "Beatrice Foods Company." Address: Archbold, Ohio.

473. International Institute of Agriculture. 1944. Agricultural commodities and raw materials produced and consumed in the different parts of the world 1934-1938. Villa Umberto, Rome, Italy: IIA. 229 p. Index. 24 cm.

• ***Summary:*** Concerning world soya production (worth $184 million gold), Asia [mainly China, Manchuokuo [Manchuria], Chosen [Korea], Netherlands Indies (Java and Madura), Japan, Kwantung, and Taiwan; based on 1939 IIA studies of world market #4] produces 89.6% (393.5 million bu of 60 lb each, worth $165 million), North America 9.4% (41.2 million bu, worth 17 million), USSR 0.6% (2.6 million bu, worth $1 million), and Europe 0.4% (1.8 million bu, worth $1 million).

Concerning world soya consumption (worth $184 million gold), Asia consumes 78.4% (worth $145 million), Europe 11.6% (worth $21 million), North America 9.3% (worth 17 million), USSR 0.7% (worth $1 million).

Between 1934 and 1938 soya production has increased greatly, rising 90% in Asia, 9% in North America, and 1% in the USSR and Europe. The biggest soya exporting continent is Asia, and the biggest importer is Europe. In Europe, Germany (at 24.3 million bushels, each 60 lb) imports more than all other European countries combined, followed by Denmark (8.8 million), the UK (4.8), Sweden (4.4), and Netherlands (3.7). Address: Rome, Italy.

474. Markley, Klare S.; Goss, Warren H. 1944. Soybean chemistry and technology. Brooklyn, New York: Chemical Publishing Co. vii + 261 p. Foreword by Edward Jerome Dies, President, Soybean Nutritional Research Council. Illust. Index. 28 cm. [684 ref]

• ***Summary:*** Contents: Part I: Foreword, by Edward Jerome Dies, President, Soybean Nutritional Research Council. Introduction. Composition and properties. Mineral constituents. Protein and other nitrogenous constituents. Enzymes. Carbohydrates. Glycosides: Saponins, phytosterolins, isoflavone glycosides. Pigments. Vitamins. Oil and oil-soluble constituents. Physical and chemical characteristics of soybean oils: Acetyl value (see hydroxyl number), acid value (see free fatty acids), break material (mostly phosphatides, pigments, and mucilaginous materials), color, congealing temperature, density, diene numbers, fatty acids, flash, fire and smoke points, fluorescence, free fatty acids, Hehner number, hexabromide number, hydroxyl number, iodine number, optical rotation, refining loss, refractive index, Reichert-Meissl number, saponification number (or Koettstorfer number), smoke point (see flash), specific heat, thiocyanogen number, titer, unsaponifiable matter, viscosity, miscellaneous data (Weight of soybean oil per gallon: 7.67 pounds. Weight of soybean oil per standard U.S. tank car: approximately 61,000 to 62,000 pounds. Volume of soybean oil per standard U.S. tank car, approximately 8,000 to 8,060 gallons).

Fatty acids and glycerides. Sterols and other unsaponifiable constituents. Oil-soluble pigments. Antioxidants. Phosphatides (p. 101-18): Applications– (1) Food modifier in oleomargarine, shortening, candies and confections, bakery, milk and other products. (2) Pharmaceuticals and cosmetics. (3) Textiles. (4) Leather. (5) Plastic compositions. (6) Soaps and detergents. (7) Special emulsifiers. (8) Petroleum products.

Literature cited.

Part II: Development of the soybean processing industry. Grading and storage. Methods of processing soybeans. Processing by means of continuous presses: The Anderson expeller, the French screw press, operation of continuous presses. Processing by means of continuous solvent extractors: The Hildebrandt system, the Bollmann system [or Hansa-Mühle], extraction system of the French Oil Mill Machinery Company (so closely resembles the

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Bollmann system in most respects that a detailed description will not be given), the Allis-Chalmers extractor, the Ford extraction system, the Detrex continuous extractor (uses non-inflammable trichloroethylene), other solvent systems, solvents, hot alcohol extraction process, extractor design data. Hydraulic pressing. Miscellaneous processing methods. Soy flour. Cost of processing soybeans: Manufacturers of soybean processing equipment, soybean processing mills in the United States. Production and refining phosphatides. Processing soybean oil for food uses: Neutralizing and washing, bleaching, hydrogenation, deodorization, winterizing, shortening, margarine. Literature cited.

The Allis-Chalmers extractor (p. 180-82): An early edition (Fig. 20) consists of a vertical, cylindrical column containing "a series of horizontal circular plates, equally spaced and fixed to a central shaft which is slowly rotated by a gear-motor. The upper surface of each plate is wiped by a stationary scraper arm fastened to the inner wall of the cylinder. Slots are cut in the plates so that, during rotation, the stationary baffles sweep material, resting upon the disks, through the slots into the plate immediately below." Footnotes explain that this design is based on U.S. Patents issued to Michelle Bonotto in 1937, 1938, and 1939, and called the Extractol Process.

Figures (photos unless otherwise noted) show: (1) The soybean plant, in foliage and mature. (2) Graph of spectral transmittance and color of crude pressed soybean oils. (3-4) Graphs of spectral transmittance and color of crude, solvent-extracted soybean oils. (5) Elevators at a soybean processing mill (Central Soya Co.). (6) Cracking rolls used to prepare soybeans for pressing in expellers or screw presses (Allis-Chalmers). (7) Two steam-heated rotary driers connected in series for drying cracked soybeans (Allis-Chalmers). (8) V.D. Anderson Super-Duo oil expeller. (9) French screw press (French Oil Mill Machinery Co.). (10) An installation of two rows of many Anderson expellers crushing soybeans. (11) A battery of French screw presses crushing soybeans. (12) Flaking mill for rolling cracked soybeans into thin flakes, in the solvent extraction process (Allis-Chalmers). (13) Flowsheet [Flow sheet] of the Hildebrandt system of solvent extraction, and cross-sectional view of the extractor–vertical screw (Sieck and Drucker, Inc.). (14) Side view of Hildebrandt extractor (3 floors cut away). (15) An installation of two Hildebrandt extractors (3 floors). (16) Hildebrandt solvent distillation equipment (3 floors). (17) Illustration of basket filling and discharging mechanism of Bollmann solvent extractor. (18) Cross-sectional diagram of Bollmann paternoster extractor. (19) An installation of the Bollmann system of solvent extraction. (20) Cross-sectional diagram of Allis-Chalmers extractor. (21) Side view diagram of Ford system of solvent extraction. (22) The horn-angle flaking rolls used in Ford extraction system. (23) Interior of Ford plant at Saline, Michigan. (24) Side view of the Detrex oil extractor. (25) Flow diagram of the Detrex oil extractor. (26) Primitive Manchurian oil mill powered by an ox. (27) Old Chinese wedge presses. (28) vertical screw presses at soybean oil mill in Dairen, Manchukuo. (29) Five-high flaking rolls (sectional view). (30) Phantom view of stack cooker used to prepare material for hydraulic pressing and for toasting solvent-extracted soybean flakes. (31) Cake former in which cooked soybean flakes are molded into flat cakes and wrapped in cloths, preparatory to hydraulic pressing (French Oil Mill Machinery Co.). (32) A hydraulic press. (33) Hydraulic press boxes. (34) Battery of Sharples Super-Centrifuges, soybean oil refinery, A.E. Staley Mfg. Co. (35) Battery of National Acme Centrifuges for continuous refining of soybean oil.

Tables: (1) Soybean production in selected countries from 1935 to 1941. The countries are China, Manchuria, United States, Chosen, Japan, Taiwan, Netherlands Indies, Rumania, Bulgaria, Yugoslavia, Hungary. In both 1935 and 1940 China was by far the world's leading soybean producer, followed (both years) by Manchuria. Source: *Foreign Crops and Markets.*

(2) Acreage, yield and production (in 1,000 bushels) of soybeans in the United States from 1924 to 1943. Source: USDA *Agricultural Statistics.* (3) Soybean utilization ("Prepared by Mr. W.J. Morse of the USDA, shows the diversity of uses to which the different parts of the soybean are put"): The plant, soybean oil, soybean meal, green bean, and dried bean (including industrial uses). (4) Chemical composition of soybeans. (5) Composition of the component parts of soybeans: cotyledons, germ, seed coat.

(6) Mineral content of soybeans (air dry beans). (7) Distribution of phosphorus in Dunfield soybeans, containing 6.02 milligrams of phosphorus per gram of whole bean. (8) Results of fractionation of monoamino acids of soybean protein. (9) Relative vitamin G content of common feedstuffs used in poultry feeding. Dried pork liver is by far the richest source at 100 units per gram.

(10) Factors affecting the refining loss of crude soybean oils [for 21 samples]. (11) Color variation of soybean oils in Priest-Gibson (N) color units. (12) Average smoke, flash, and fire points of soybean oils. (13) Specific heat of soybean oil (at various temperatures). (14) Viscosity of soybean oils (at various temperatures).

(15) Composition of [different varieties of] solvent-extracted soybean oils. (16) Component acids of phosphatides derived from soybeans. (17) Grade requirements for yellow soybeans, green soybeans, brown soybeans, black soybeans, and mixed soybeans. (18) Soybeans processed by expeller, solvent and hydraulic methods. By crop year from Oct. 1936 to Oct. 1941. [18A] Eight manufacturers of continuous process presses. [18B] The temperature and moisture contents of soybeans at various stages in the continuous process. (19) Manufacturers of different types of soybean processing equipment.

(20) Soybean processing mills in the United States

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(full- or part time). For each is given the state, city, company name, and capacity of mill (S = small = less than 50 tons of soybeans per day. M = medium = 50-200 tons per day. L = large = over 200 tons per day). Source: Northern Regional Research Laboratory; revised to Jan. 1944. (Continued). Address: 1. Principal Chemist, Southern Regional Research Lab., New Orleans; Northern Regional Research Lab.; 2. Senior Chemical Engineer, Northern Regional Research Lab., Peoria, Illinois.

475. Miller, Harry W. 1944. The story of milk from the soya bean (Continued–Document part III). Mount Vernon, Ohio: International Nutrition Laboratory. 37 p. See p. 12-18.
• ***Summary:*** (Continued): "Encouraged to Produce a Vegetable Milk: Having arrived at these conclusions which were based on extensive feeding experiments, we set about to get milk from a vegetable cow. However, my colleagues shook their heads saying, 'You might make something that looks like milk, but will it have those living properties that fit the requirements of a growing life in the form of a human individual?' But I have only to remind them that in the early days we thought of vitamins as living principles that evaded analysis, causing reactions but perishing with attempts at investigation, subsequent years have erased this argument and we can now analyze vitamins as well as manufacture them, as they have a chemical formula.

"I could easily have become discouraged in trying to bring out a substitute for animal milk because of the well established dairy business in America where sixteen per cent of United States industry flourishes, except that all the while I had in mind the people of the Orient in behalf of whom I had dedicated my life for service as a young man. Millions die annually for the lack of a suitable balanced food beverage to take the place that animal milk occupies in the American dietary, and as many more suffer lifelong weakness and ills because of faulty nutrition, especially in the early years of life. I was also well aware that in America we have many who cannot take animal milk, either dislike it, are fearful of it, or are allergic to it, who are ill nourished for lack of a milk substitute. And even yet cow's milk is not available to all the inhabitants of the Americas.

"As I pondered over what a suitable milk food would mean to the Oriental races, where there was such a lack of that kind of food, I felt that humanity was throttled at its start. I was also aware of the dangers to health and life that lurk in the lacteal secretions of animals and the way milk is handled in dairy yielding countries. Consider also the economic food waste, in view of the enormous amount fed to animals and the little protein return. Think of what this well-processed vegetable protein would mean were it fed to the starving millions of this world. I determined to work out the problem of a vegetable milk. It occurred to me that if wool could be made direct from vegetable protein instead of feeding protein to the sheep, we could make milk without the digestive laboratory of the cow.

"I first investigated to see what had been accomplished, and discovered that two groups of child specialists, one in Baltimore, the other in Cleveland, had fed infants a gruel made from soy bean meal, and the reported results were very satisfactory. In America, all experimental feeding work was done with mixtures made from milling the soy bean into flour, although the fiber of the meal was a drawback. Yet because of the high nutritive value of soya protein and its alkalinizing properties, it possessed remarkable values as reported in infant feeding by these authorities.

"We made the acquaintance of two men prominent in soy bean work of the U.S. Department of Agriculture, Dr. W.J. Morse, Chief of the Soy Bean Division of the Department of Agriculture, and Dr. J.A. LeClerc. Chief Senior Chemist of the Bureau. These men filled me with inspiration, enthusiasm and information. Throughout the succeeding years, we have had several interviews, and both of these men have made frequent visits to our Nutrition Laboratory at Mt. Vernon, Ohio.

"My preliminary studies made me aware that I would be confronted with many problems in producing from the soy bean an easily digested, tasty, wholesome milk that would meet a popular demand.

"My thirteen years spent at the nation's capital as surgeon and Medical Superintendent of the Washington Sanitarium and Hospital gave me a preliminary foundation in research methods for the years to follow in China. These years, from 1913 to 1925 were synchronous with the time of the beginning of modern dietetics. [Elmer] McCullum at Johns Hopkins University in Baltimore was neighbor to us, and he was actively pursuing the study of vitamins and their dietetic value. I was intimately acquainted with this pioneer worker and in fact at the Government Bureaus in Washington there was a great arousement on the importance of dietetics and cooking advances, to which work I had ready access, as well as utilizing the marvelous Surgeon General's and the Congressional Library facilities, seeking the latest publications on food, processing and nutritional work.

"It was during this year I published my first book entitled, *The Way to Health,* which has enjoyed a wide circulation.

"During all these studies, my thoughts were focused on the Soy Bean, the world's great protein yielder, and how to best utilize it, and incorporate it into the American dietary as a substitute for meat, fish, milk, eggs and cheese. Early and late we were running experiments at the little food plant we erected in connection with the Washington Sanitarium and Hospital. We realized that the large things in soy bean utilization in America, as also in the Orient, remained to be worked out in the future, and that our work was the first real effort to be recorded relative to a soy bean milk suitable for infant feeding and as a complete beverage milk.

"Further Studies in China: Finally in 1925 the

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opportunity came for me to return to China. My employing organization, the Seventh-day Adventist Church, sent me to establish a sanitarium at Shanghai. During the early years after my return to China, my time was fully occupied with medical and surgical work and the building of the Shanghai Sanitarium and Clinic, and assisting in the establishment of numerous other medical units in different parts of the Orient. However, simultaneous with this work, my son and I began to carry forward the assembly of a soy bean plant at the Shanghai Sanitarium. My work necessitated my return to America for a brief period about every two or three years and this gave me the chance to discuss my problems with chemists as well as investigate suitable processing machinery.

"In my contacts, while traveling in China, Korea and Japan, I discovered that a milky looking solution, a water extraction of soya protein, oil and its contained vitamins and minerals, had been tried out in infant feeding in some hospitals, in some instances with satisfactory results, but for the most part with quite disappointing results.

"The method used in its manufacture in most cases was to soak the beans, grind them in a stone mill with a stream of running water and this milky solution was filtered through a cotton cloth and then boiled, sugar added, and various flavors tried out to cover the beany taste, but flavor control was not possible by the strongest essences. As I examined this milk, it was apparent that something must be done to overcome the beany taste, and I concluded the reason the people were using bean curd rather than drinking the milk from which the curd was made, was that it tasted better after it was coagulated than before. Further, it needed to be farther processed to make it more digestible, and until we could add sugar and additional oil to it, we could not have a balanced milk as is found in human milk.

"Being familiar with the process of constituting cow's milk from skim milk powder, and sweet butter, through melting the butter, mixing it with the dissolved milk powder, and then homogenizing it, I concluded that we could do the same with this water-extracted solution from the hydrated soy bean.

"Since I knew that soy milk was a colloid liquid just the same as animal milk, and would hold a suspension of emulsified oil, I lost no time in getting a colloid mill that would do this same work, and could now constitute a liquid of any formula of protein, fat and sugar, so the resulting solution would be a colloid liquid as animal milk. Yet, I was far from having a milk that gave satisfactory results as to digestibility and could be borne by infants without too great looseness of the stools; and while you could sweeten it up so babies would take it, the older group would take a sip and turn it aside because of its bitter taste. To get rid of that beanish taste seemed far off, but to process it so that it could be more digestible, I thought was surely possible. Much work had been done at Ames, Iowa, in experimental animal feeding. Not only did these experiments show that thorough cooking under pressure of soy beans raised the availability of soy protein to 95 per cent absorption, but that weight and growth records in feeding of pigs and fowls were far superior to those of animals fed ordinary cooked beans, and thorough processing caused a disappearance of digestive disturbances."

Note. This is the earliest English-language document seen (Dec. 2013) that contains the word "beanish" or the term "beanish taste" used as the word "beany" or the term "beany taste" are used today. (Continued). Address: Mt. Vernon, Ohio.

476. Morse, W.J. 1945. Soybeans in the land of our enemies. *Soybean Digest.* Jan. p. 6-7.
• ***Summary:*** Text of a letter to the American Soybean Assoc., Guelph, Canada, written from Tokyo, Japan on 20 July 1929. This is the first ASA meeting Morse has missed. He and Dorsett, comprising the Oriental Agricultural Exploration Expedition, arrived in Japan on March 18 and set up headquarters in Tokyo. "It is amazing, the extent to which the soybean is used for food in Japan." For details, see Morse 1929 ("Letter from Dr. Morse"). Address: USDA Bureau of Plant Industry, Washington, DC.

477. Yamazaki, Momiji. 1945. Tôa hakkô kagaku ronkô [East Asian studies/theses on fermentation chemistry]. Tokyo: Daiichi Shuppan K.K. han. 436 p. Published 20 March 1945. [160* ref. Jap]
• ***Summary:*** This remarkable work, published in a limited edition of 1,000 copies, was written by Dr. Yamazaki, a microbiologist, who graduated from the Department of Agricultural Chemistry, Tokyo University, in 1914. The book is a review of existing Asian literature on fermented foods, with a good bibliography. Dr. Yamazaki may have been employed by the laboratories of the Manchurian Railway.

Contents: Introduction: Preface, origin of alcoholic beverages, various alcoholic beverages of the world, summary. Chinese fermentation chemistry documents: Preface, Chinese ancient grains, Chinese ancient grain foods, Various types of Chinese-made koji, Various Chinese-made alcoholic beverages, summary. Japanese fermentation chemistry documents: Preface, Japanese land, inhabitants on Japanese land, Japanese New Stone Age culture, conclusions. Real papers: Japanese ancient foods, Various types of Japanese-made koji, Japanese-made various alcoholic beverages, summary. Korean fermentation chemistry documents: Preface, Korean produced grains, Various types of Korean-made koji, Various Korean-made alcoholic beverages, summary. Tables.

478. Dorsett, P.H.; Morse, W.J. 1945. Soys in the Orient. *Soybean Digest.* April. p. 10-12. Text of a letter written July 1930.

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• ***Summary:*** Reprinted from: *Proceedings of the American Soybean Assoc.* 1930, p. 96-100. The article was originally titled "Soybeans in the Orient." One large photo shows Morse with several richly illustrated boxes of black miso [Hatcho miso]; smaller photos show abura-age [deep-fried tofu pouches], and tofu kasu [okara]. Address: Dairen, Manchuria.

479. Shelledy, F.H. 1945. Japanese trade studies: Soybeans. *U.S. Tariff Commission, Special Industry Analysis* No. 13. 6 p. May. [3 ref]
• ***Summary:*** Contents: Foreword. Introduction and summary. Description and uses. Production. Imports. Post-war problems.

This "report is one of a number which were prepared during 1944 and 1945 for the Foreign Economic Administration..." Most of the data "were taken from official and semi-official Japanese sources." Errors and inconsistencies in these data have frequently been detected.

"Japan is not important as a world producer of soybeans. It is, however, normally the world's principal soybean importer. Its annual production during 1928-39 was only 10 to 14 million bushels. By comparison, the production in the United States was 90 million bushels in 1939 and more than 190 million bushels in 1943 and 1944; the average annual production of soybean in Manchuria during the thirties was more than 150 million bushels annually.

"Prior to the present war Japan took most of the exportable surplus of Manchuria, the principal world exporter of soybeans, as well as substantial quantities from Korea, a country which produces almost twice as many soybeans as does Japan. During the 10 years 1928-1938, Japanese imports averaged 26 million bushels annually, approximately double its own production."

"If an annual per capita consumption of 0.5 bushels [30 lb] of soybeans were to be maintained in Japan in the post-war period," Japan would require a total supply of about 37 million bushels/year, based on a 1940 population of 73.1 million. An estimated 10-14 million bushels could be produced in Japan in the short term period after the war. The rest must be imported.

Uses of soybeans include miso, soy sauce or shoyu, and tofu. The main center of soybean production in Japan is the island of Hokkaido. The soybean is the principal oilseed imported into Japan.

Tables show: (1) Soybeans: Production, imports, exports, and apparent consumption, Japan Proper and Karafuto, 1928-39. Columns show: Production. Imports from Empire. Other imports. Total imports. Exports. Apparent consumption: Total and per capita. (2) Soybeans: Imports into Japan from principal sources, average 1928-32, annually 1933-39. The graph has two main parts: Quantity (1,000 bushels), and value (1,000 yen). Empire areas: Manchuria (incl. Kwantung), Korea, Formosa, total. Non-Empire areas. Grand total. Source: Monthly and annual returns of foreign trade of Japan, Korea, and Formosa. Address: U.S. Tariff Commission, Washington, DC.

480. Surrender of Japan after World War II (Important event). 1945.
• ***Summary:*** The surrender of the Empire of Japan on September 2, 1945, brought the hostilities of World War II to a close. The documents and terms of unconditional surrender were signed on board the battleship USS Missouri in Tokyo Harbor. The United States now stood astride the world as the only remaining Great Power.

The background to the surrender was:

By 1945, the Japanese had suffered an unbroken string of defeats for nearly two years in the South West Pacific, the Marianas campaign, and the Philippines campaign. The Allies captured the nearby islands of Iwo Jima and Okinawa in the first half of 1945. Okinawa was to be a staging area for Operation Downfall, the American invasion of the Japanese Home Islands. Such an invasion was dreaded by both sides; it was widely believed that Japan would fight to the bitter end and never surrender. Thus, the United States would have to fight, in enemy territory, for every inch, from Okinawa, on to Kyûshû, all the way to Tokyo. But the Japanese Imperial High Command was determined not to allow the allies to establish a beachhead on Kyûshû–Japan's southernmost main island. The strategy of making a last stand at Kyûshû was based on the assumption of continued Soviet neutrality.

1945 Aug. 6–The United States dropped an atomic bomb on the city of Hiroshima, hoping that the resulting destruction and devastation would cause Japan to surrender; it did not.

1945 Aug. 8–The United States dropped a second atomic bomb on the city of Nagasaki. Late in the evening of the same day, in accordance with the Yalta agreements, but in violation of the Soviet-Japanese Neutrality Pact, the Soviet Union declared war on Japan, and soon after midnight on August 9, 1945, the Soviet Union invaded the Imperial Japanese puppet state of Manchoukuo.

The combined shock of these events caused Emperor Hirohito to intervene.

1945 Aug. 15–In a recorded address broadcast across the Empire, Emperor Hirohito announced the surrender of Japan to the allies.

481. Ladejinsky, W.I. 1945. Agriculture in Japan: Prewar. *Foreign Agriculture* (*USDA Foreign Agricultural Service*) 9(9):130-42. Sept. [7 ref]
• ***Summary:*** The soybean is a staple food of the Japanese. Soybeans are also in demand for a number of industrial products, chief of which is soybean oil. The 1939 soybeans are estimated to have occupied 795,000 acres. Because of the competition from imported Manchurian soybeans, extension of mulberry-tree plantations prior to the 1930s,

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and increased acreage under orchards and vegetables, the soybean area declined from an annual average of 1,091,000 acres during the 5-year period 1920-24 to 808,000 acres in 1935-39, or by 26%. Production decreased from 18 to 13.5 million bushels. Despite the declining output, consumption of soybeans during the same period increased from an annual average of 32 million to about 44 million bushels. Production of soybeans in recent years has averaged about 30% of the country's consumption. The shortage of about 30 million bushels was made up by imports from Manchuria (80%) and Korea (20%). Address: Office of Foreign Agricultural Relations.

482. **Product Name:** Tofu.
**Manufacturer's Name:** Korean Tofu Co.?
**Manufacturer's Address:** Los Angeles, California.
**Date of Introduction:** 1945.
**New Product–Documentation:** Mildred Lager. 1945. The Useful Soybean. p. 86-87. "In another part of the same city [Los Angeles], a Korean has found a market for a firmer cheese [tofu] and is already packaging and selling it to some of the best known restaurants of Hollywood, where it is served as soybean curd or custard."

483. Lautensach, Hermann. 1945. Korea: Eine Landeskunde auf Grund eiener Reisen und der Literatur [Korea: A geography based on the author's travels and literature]. Leipzig, Germany: K.F. Koehler Verlag. xv + 542 p. Illust. (black & white photos). Maps (part folded, part color). 24 cm. Series: Geographische Handbücher. [1038* ref. Ger]
• ***Summary:*** A superb, scholarly work, with a huge bibliography, printed just as Germany was losing World War II.

Chapter 6, titled "The anthropogeographical character of ancient Korea" (p. 141+) contains extensive information about agriculture and food. Page 154: In wealthier sites, the farm buildings enclose a courtyard, to which an entrance gate gives access (Fig. 21e, p. 151). Some enclosures are so complete that a square courtyard results. In some corner or other of the courtyard stand the huge brown earthenware jars, in which soy sauce (*Sojabohnensosse,* jap. *shoyu*) is prepare and stored.

Page 176-77: In East Asia, after cereal grains, pulses / legumes are the next most important crop. In Korea, by far the most important is the soybean (*Sojabohne,* jap. *daitsu* [*daizu*] = large bean) which makes few demands on the soil. Korea's climate is ideal for soybeans (Tanaka 1931, p. 18); it is even better than Manchuria's climate, because of the large amount of precipitation during the summer. Today, soybeans are an indispensable part of the various dry-field crop rotations. After planting of the paddies has finished, soybeans are planted on the ridges too; there they grow extremely well without being fertilized. Soybeans are grown throughout Korea, but least in the Kaema upland because of the warmth they require. In northern Korea, on dry fields, they are planted between the end of March and beginning of May. Toward the south, planting is delayed until the end of June. They are generally harvested in October, except in Chejudo, where they are not harvested until early November. Soybeans are the crop that is left standing the longest, and they are not harvested until their leaves have turned brown and started to fall.

Soybeans are used as a very nutritious food for both humans and horses. Also, cooked soybeans are used as a fertilizer for the rice paddies. Above all, though, the hot brown soy sauce (*Shoyusosse*), which is never lacking on any Korean or Japanese table, is made of them, using salt and pepper and a process of fermentation. Bean curd (*Käse,* jap. *tohu* [*tofu*]) and soybean paste (*Mus*, jap. *miso*) are also made of them."

Page 180: The place of soybeans (*Soja*) in rotations, such as soya / hemp is mentioned. The winter crops consist of wheat, barley, or rye; the summer crops of soybeans, other beans or cotton. Page 181 mentions soybeans as a summer crop. Page 196: Soybeans are planted on the bunds of the rice fields. Page 199. Those who farm in central Manchuria are likely to grow soybeans. Page 224: Soybeans are mentioned several times.

A fold-out map facing p. 400 shows the distribution of soybeans in Korea. They seem to be slightly more densely grown in the south than in the north.

Page 435: Soybean oil mills (*Sojabohnenmühlen*) are mentioned. Page 460: Discusses imports and exports of soybeans. The main beans exported from Korea to Japan are soybeans, amounting to a weight of 1.3 to 1.9 million dz. in 1939. Note: One dz (*doppelzentner*) = 100 kg. Exports to other countries was small. By comparison, Manchurian soybeans were exported to the northern harbors of Germany and England. In addition, a significant amount of Manchurian soybeans were imported to Korea (0.29 to 1.02 million dz.). Also, a significant quantity of soybean products made in Korea were exported to Japan (Soy oil up to 11,550 dz. and soybean cake up to 1.2 million dz.). Likewise, up to 3,210 dz of soy oil and up to 1.3 million dz of soya cake were imported to Manchuria from Korea.

Page 466-67: A comparison of soybean production in Korea and soybean production in Japan is given. 85% of the imports of soy oil to Japan came from Korea.

Page 473. Soybeans are grown in the deep valleys of Korea.

Facing p. 144: A photo shows a man carrying a large, empty, pottery soy sauce jar on a rack on his back.

Hermann Lautensach lived 1886-1971. Korean place names are the old ones in the Japanese system. Address: PhD, Prof. of Geography at the University of Greifswald [northeastern Germany].

484. Morris, Harriet. 1945. Korean recipes. Wichita, Kansas:

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Published by the author. 50 p. Illust. 23 cm.
• ***Summary:*** "Dedicated to the members of the Korea Club of Wichita, Kansas: Jeanette Walter, Marion Conrow, Walter Morris."

The word "sprouts" appears on 15 pages in this book, usually as part of the term "bean sprouts." A recipe for "Bean sprouts" (p. 23-24) provides clarity: "Directions for sprouting beans. Bean sprouts may be grown from two kinds of beans, the small green Chinese mung bean, or the larger yellow soy bean. One cup of dry beans will yield approximately 2 to 3 cups of sprouts. Beans that are old will not sprout well. Look over beans and remove any that are cracked or broken as these will not sprout. Wash beans well, put into a 2 quart large mouth jar and soak 12 hours. Pour off water, place jar on its side, raise the bottom of the jar several inches so that all water can drain off. Keep in this position until beans are sprouted. Three times a day, pour luke-warm water over the beans and drain. The beans should be kept damp but not wet. At night add a pinch of chlorinated lime to the water used to rinse the beans. Keep the jar in a dark place where air circulates freely. Sprouting time depends upon the temperature. In cooler weather 3 to 5 days are required, but in hot weather 2 to 3 days are sufficient. When sprouts have formed, wash well and remove the skins from the beans and also the hair-like end from each sprout. Use in recipes as directed.

Bean Sprouts (*Khong na-mool*).

4 cups bean sprouts. 2 green onions, 2½ tbsp. soy sauce, speck red pepper, 2 tbsp. prepared sesame seed (see recipe), 1 tsp. salt, 1½ tsp. oil.

"Wash fresh beans sprouts and remove the hair-like end from each sprout. Cover with boiling water and cook until tender. Drain. Add soy sauce, prepared sesame seed, oil, chopped onion (reserving the tops), red pepper, and reheat until the seasonings are all absorbed. When almost done, cut the onion tops in 1 inch lengths and add to the bean sprouts, cooking until tender. Season with salt."

Note: This is the earliest Korean cookbook seen (March 2014) outside Korea that mentions soyfoods. Address: Wichita, Kansas.

485. United States, Office of Foreign Agricultural Relations. 1945. Civil affairs handbook, Japan. Section 7, Agriculture. Washington, DC: Headquarters, Army Service Forces. xii + 195 p. Maps. 25 cm. Supplement (xiv + 236 p.) issued in 1945. [1 soy ref]
• ***Summary:*** A digital version of this book is available on HathiTrust. This Section 7 is one in a series of 17 sections about Japan, including: 1. Geographical and Social Background. 2. Government and Administration. 3. Legal Affairs. 4. Government Finance. 5. Money and Banking. 6. Natural Resources, etc.

This book offers many deep insights into Japan's agriculture in 1945 and before. For example, we read on page xi that shortly before the war: "Practically all of the sugar had to be imported from Formosa; two-thirds of the soy beans from Manchuria and Korea; and 20% of the rice from Korea and Formosa." Japan's hard-working farmers supplied the rest.

The book contains 57 tables, 14 figures, and one map (4 maps on one page, xiv).

Printed across the top of the title page: "Army Service Forces Manual M 354-7." On the same page below the title: "Headquarters, Army Service Forces, 1 April 1944."

Page 59 states: "The principal soybean foods used daily in Japanese life are soysauce, miso (red, white, black), tofu or bean curd, soybean milk, green vegetable beans [edamame], roasted beans, soy flour, natto, yuba (film from soybean milk when heated), and beverages (coffee substitute and tea mixture with roasted beans). Soysauce is extensively manufactured by large concerns throughout the Japanese Empire. It is used at every meal by the Japanese family, taking the place of salt and other condiments. Miso is a fermented product from rice or barley, salt, and soybeans, usually requiring from 6 to 12 months for curing. It is a daily breakfast dish in the form of soup with vegetables and it is also used to preserve vegetables, fish, and meat. Tofu, made in small factories throughout cities and villages, is used extensively in place of meat. It is used in the fresh or dried state in soups with vegetables, mixed with vegetables and fried as squares in deep fat, and also toasted. Soy flour is used with wheat flour in the making of various breads, rolls, buns, crackers, and pastries. The roasted flour mixed with sugar is used in making various forms of confections. The roasted beans are used in much the same manner as salted peanuts, and in the making of numerous candies and cakes. Soybean milk is made in the tofu factories and sold as fresh milk [Interesting!]. Natto is a fermented bean, occurring in the various forms though not used as extensively as miso and tofu.

"Japan imports large quantities of soybeans, bean oil, and bean cake from Manchuria. The beans are used largely in the manufacture of soysauce and miso. Only a small percent of the Manchurian beans is processed for oil and meal as there are but three or four bean oil mills in Japan. The beans imported from Chosen [Korea] are of much higher quality than the Manchurian beans and, therefore, are used entirely in the manufacture of miso, tofu, and other food products. Bean oil is used in the manufacture of shortening, salad oil, cooking oil, and various industrial products such as paints, enamels, varnish, soap, and waterproof goods. Bean cake is used largely (90 percent) as fertilizer though considerable quantities are used as cattle feed and in the manufacture of a cheap soysauce. In recent years bean cake has also been used in the manufacture of a wool-like fiber."

Pages 101 and 104, in the section on "Leguminous crops," state: "The principal legume crops produced are soy beans, other beans, peas and peanuts. The most important is

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soy beans. Soy beans are a staple food of the Japanese, and are used for soy sauce, bean paste and bean soup. They are also in demand for a number of industrial purposes, chief of which is soy bean oil.

"The total area of all leguminous crops in 1936 was 1,516,000 acres (includes 19,000 acres under peanuts) or 7.6 percent of the total cultivated area. The soy bean crop alone covered 807,000 acres. The 1939 area under all these crops amounted to 1,449,000 acres of which soy beans are estimated at 795,000 acres (Table 41, p. 105). Because of competition from imported Manchurian soy beans, extension of mulberry tree plantations prior to the 1930's, and increased acreage under orchards and vegetables, the soy bean area declined from an annual average of 1,091,000 acres during the 5-year period 1920-24 to 803,000 acres in the period 1935-39, or by 26 percent. Production followed suit, with a decrease from 18 to 13.5 million bushels. Despite the declining output, consumption of soy beans during the same period has increased from an annual average of 32 million bushels to about 44 million bushels. Production of soy beans in recent years has averaged about 30 percent of the country's consumption.

"The shortage of about 30 million bushels was made up by imports from Manchuria (supplying 80 percent) and Korea (20 percent). Next to rice, soy beans form the largest single imported foodstuff. From the Japanese point of view, the mitigating factor of this situation is that the colonies are the sole source of supply. This fact has led a Japanese to remark that from a practical point of view Japan is self-sufficient in soy beans. With respect to other beans, such as 'azuki' and 'broad' beans [*sora mame*], the ratio of domestic production to total consumption has been estimated at 55 and 85 percent, respectively. The condition that applies to imported soy beans applies to these beans as well, since they, too, originate in Manchuria."

The word "soybeans" appears on 35 pages in this book, "soybean" on 28 pages, "soy" on 15 pages (p. 104, 101, 59, 68, 92, 105, 137, 140, 147, xii, 55, 58, 223, 228, 233), "soysauce" on 6 pages, "bean paste" [miso] on 5 pages, "miso" on 5 pages, "tofu" on 4 pages (p. 59, 100, 58, 233), "soy flour" on 3 pages, "soybean milk" on 3 pages, "green vegetable beans" on 2 pages (p. 56, 59), "shoyu" on 2 pages (p. 97, 100), "natto" on 2 pages (p. 59, 100), "yuba" (film from soybean milk when heated) on 2 pages (p. 59, 100), "roasted beans" on 1 page (p. 59). Address: Washington, DC.

486. Lager, Mildred. 1946. The meat without a bone. *Soybean Digest.* April. p. 22.

• ***Summary:*** "To anyone interested in unusual foods soy cheese is indeed fascinating. While it will never become popular in this country it is worth knowing about and trying at least once.

"Soy cheese or curd is known to the Chinese as tofu and it has been aptly described by them as 'the meat without a bone.'... The bean curd or soy cheese is the coagulated casein of the soybean and is made from soy milk very much as we make cottage cheese. The result is a white, very soft, watery substance, that can be pressed into a cake or soft cube. It is an easily digested food, fairly high in protein, and can be used as a meat, egg, or fish substitute, as a cheese, or as a topping or dessert.

"Every Oriental settlement has its tofu factory or factories which supply the restaurants and markets with fresh cheese. The methods used in some of them are very crude and primitive but the result is an excellent cake of cheese. There is an interesting little place in the heart of new Chinatown in Los Angeles run by two old Chinese who claim no knowledge of English, and can't be bothered with curious visitors. They did, however, allow me to watch from a distance. A large size coffee mill run by a little motor ground the beans. The curds were cooked in a clean wash tub and the cakes were pressed between two boards held down by a wooden bar which was attached to the wall at one end and weighted at the other end with a pail of sand. Naturally their output was limited but their product was excellent. Here was the old world working in the midst of the new making an ancient food that was yet new and novel."

Describes how to make tofu at home (vaguely), how to store it, basic preparatory techniques, and serving suggestions. It is delicious as a dessert "Some ingenious cooks even use it for cheese cake." Canned tofu is more in demand than fresh because it is more widely available. "Canned it is known as soy cheese, soy food or soy curd and the taste, texture and moisture varies with the different brands."

"Soy cheese will never become popular in this country. A certain amount will always be used, however, by the vegetarian, especially by those who do not use any animal products whatsoever [i.e., vegans], and by those who have developed a taste for it. It is an unusual food that does not appeal to everyone. It is becoming more and more popular in corrective nutrition because it often fills a need in the special diet.

"'The meat without a bone' is one of the interesting variations of the versatile bean. This ancient food is gaining a toe hold in our American diet and is filling a dietary need for many persons."

A photo shows a woman in a Korean market selling cakes of tofu on a round woven bamboo tray. Address: Author of "The Useful Soybean" [California].

487. Morse, W.J. 1946. The Pacific story. Radio broadcast. NBC. Hollywood, California. June 2. John Baker OI, Radio Service. 4 p. transcript

• ***Summary:*** The broadcast [written by Morse, apparently to East Asia] begins: "This Pacific program means a great deal to me. It is an impressive justification of the late Dr. Charles V. Piper of the Department of Agriculture who was my boss

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nearly 40 years ago when I started working on soybeans." It was his vision of the possibilities in the United States of this great crop of the East that started the development that has made it a team mate for our native Indian earn. It was in 1907 that Dr. Piper said to me, "this plant has great possibilities for our agriculture and industry," He soon backed up his faith with action. Not only did we work on collecting new varieties from every possible source but he sent me out to look over cottonseed-oil mills as possible outlets for the flood of soybeans he felt sure would come.

"It has been my wish many times that Dr. Piper could have lived to see these later days, especially the present ones when the United States as a soybean producer has occupied second place, headed only by China. It is pleasing to us now that products of American-grown soybeans are a part of the bread that is returning across the Pacific to those people [in China] who gave us generously of breeding material.

"We began collecting new varieties and strains from the Orient about 1908. A few varieties had been brought over a hundred years before but during that century it was merely a garden oddity. In those years we were living beside an undiscovered gold mine, you might say. But now we know we have something–the most valuable of the many p1ant gifts out China and perhaps the most versatile plant known.

"When I recite what we consider the virtues of the soybean, it may sound to the people on the other side of the Pacific like a school boy at the supper table announcing his discoveries of the day. Nevertheless, this is a good place to say that on both sides of this ocean and in Europe, too, it really deserves its name of "Wonder Bean"–a valuable aid to good farming, a protein feed for livestock, a big-tonnage raw material for industry, and a nutritious human food that is winning a high place in the diet. The war greatly emphasized its usefulness.

"In the United States the acreage of this crop had reached sizeable proportions before the war and it had a place on the grain exchange–along with such mainstays of our life as wheat and corn. But in 1907, when Dr. Piper visioned its future, the total acreage in the United States was only 50,000, Three years ago it reached a peak of nearly 16,000,000 acres. The production of soybeans in 1917 was about 70,000 tons. By 1945 it had increased almost 100 fold.

"We needed the soybean–farmers, manufacturers, and consumers–and, with great merit to start with, it was made to fit more exactly into various uses.

"Testing and selection are going on now at perhaps a greater rate than ever before, using types and strains brought in by the thousands from China, Japan, Korea, and Manchuria. More than 15 years ago I spent 2 years in those countries. I have pleasant recollections of the people who proudly brought in their favorite beans from farms and village garden plots. We now have under test more than 2,500 varieties, types, and strains, with about 100 varieties commercially available. Some of them, bred or selected for the north country, mature in 75 days and some, suitable for southern states, take 175 days.

"Until recent years the farmer has looked on the soybean mostly as a forage crop, Of late years it has gained in food and industrial uses. Today more than 100 oil mills are crushing soybeans; 200 concerns are manufacturing soybean food products; and more than 100 manufacturers are turning out various industrial products, including plastics and oils for paint and other uses. Now it is a $500,000,000 industry.

"Not only has Federal and State research widened the fields of usefulness of the soybean, but recently there has been much research by commercial interests.

"The soybean food list includes scores of products but those now getting most attention are soy flour, grits, flakes, and meat substitutes. Soy flour's greatest usefulness is in adding value to other foods.

"In industry the soybean is on a good and broad foundation, with about 70 percent or our production processed by oil mills. Industry uses the oil for the manufacture of cooking fat and many industrial products. The remaining high-protein meal is used for stock feed, flour, plastics and other industrial products.

"Altogether we have learned a lot about the soybean–from its home countries of the Orient and through our own efforts–and it has become so important as to be almost indispensable. Our plant pot is really a melting pot." Address: USDA.

488. Marquis, Arnold. 1946. The Pacific story. Radio broadcast. National Broadcasting Company (NBC). Hollywood, California. June 2. 30 minutes. 23 p. transcript.
• ***Summary:*** This radio broadcast is a fascinating story–told by many voices–of how the Japanese scientifically developed soybean production, utilization, and export in their puppet state of Manchukuo, and, how the USA intends to capture the soybean export markets lost by the Japanese when they lost World War II.

The Chinese speak of the soybean this way: "It is the poor man's meat. It is the cow of China. It is meat without bones. The Japanese speak of it this way: If we could have held Manchuria, it would have guaranteed that Japan could never be starved out. American nutritionists speak of it this way: It is high in protein. It is rich in vitamins–in A, B-1, C, G, and E–and also in the blood-clotting vitamin K. Weight for weight it contains several times as much B-1 as beefsteak. And as for minerals: One-half cup of soy flour contains as much calcium as a whole cup of milk... [and] as much phosphorus as two cups of milk. And weight for weight, it contains as much iron as liver, twice as much iron as molasses, and three times as much iron as whole wheat flour. The soybean is a wonder food. One pound of soy beans is almost a complete one-day ration for an adult."

The USA is now developing two famine-relief foods based on soybeans. The first contains 50% soybean, plus

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split peas, wheat flour, and a little peanut-meal, onion, salt, and fish-oil. Four million pounds of this mixture and twelve million pounds of another soy-based mixture are being sent "to the famine areas of China." In other words, soybean are being sent from the USA to the land of their origin, "where they have been a mainstay for five thousand years."

Discusses: The growing of soybeans in Manchuria. The Japanese takeover and extension of their control via the South Manchuria Railroad, whose terminus is Dairen. The importance of Manchurian soybeans to Japan. The Japanese Central Laboratory at Dairen and its research on soybeans. The two Japanese agricultural experiment stations in Manchukuo, outside of Dairen and at Kungchuling [pinyin: Gongzhuling]. Development of the benzine [benzene] solvent extraction process for soybean oil, "until there were 200 large bean plants in southern Manchuria." Soybeans as a livestock feed in Manchuria. Use of soybeans as food in China: "Tofu is bean-curd... This is fermented tofu. It is very good. Tofu is eaten in several forms. Fresh, fermented, dried or frozen. Just about any way it is prepared, its food value is preserved... We also use the oil of the soy bean. And with the soy bean we make soy sauce." Many Asiatic peoples also use soybeans to "make bean milk and bean flour." "They roast them for confections [kinako]. They eat them green [green vegetable soybeans]. They sprout them [soybean sprouts] and they even make drinks of them.

Note 1. This is the earliest English-language document seen (Oct. 2011) that contains the term "fermented tofu.

Industrial uses of soybeans in America. How Dairen became Japan's great center of the soy bean industry in Manchuria, and the Mixed Storage System. "About 55% of the soybeans grown in Manchuria are used for human food."

"You see, its all tied together. The growing of the bean, the processing, the transportation, and the export. Since 1937, the economy of Manchuria has been developed for the benefit of Japan." The Japanese and the Bank of Manchukuo (which is an instrument of the powerful Mitsui and Mitsubishi financial combines) are "buying up all the soybean business" and trying to eliminate the major European companies that were exporting soybeans before the Japanese moved in, such as Dreyfus Co. (France), and Wassard Co. (Denmark). Although the Japanese claim that Manchukuo is an independent nation, other nations realize it is a puppet state. The Chinese Eastern Railway, which was built by the Russians and has its terminus at Vladivostok, is in competition with the Japanese-controlled South Manchuria Railroad for the soy bean business of Manchuria. The latter uses rebates (kickbacks) to try to eliminate competition.

In 1937, after 6 years of dominating Manchuria, Japan invaded China proper–using Manchuria to supply their troops. "By 1941, Manchuria was yielding some four million tons of soybeans. The Japanese controlled every pound of it. And by 1941 they had fostered the growing of soybeans in Korea, and also in Japan itself. Also, by this time, the Japanese had seized a good part of the soybean country of China proper. But by Pearl Harbor [7 Dec. 1941], the United States was also growing soybeans: Over 3 million tons in 1941. By 1945 it was nearly 6 million tons."

Now that the war is over, the Japanese have lost the entire soybean industry in Manchuria–including the laboratories, bean oil mills, Dairen, the South Manchuria Railroad, and the Bank of Manchukuo which controlled it. China, which now controls Manchuria, "will consume much of the soybeans which, before the war, were exported to European countries, and to Japan." The United States has begun to supply this soybean export demand, and in fact "is already shipping soybean products back to the Far East–to the famine stricken areas of China."

America Doctor: "So far most of our soybeans have gone for feeding livestock. But now we known what they can mean to man. Narrator: Now, in this great crisis, we are learning what the Chinese have known for thousands of years. Chinese: It is the poor man's meat. It is the cow of China. It is meat without bones... Announcer: This is the story of the wonder food and the part it has played in our time."

Next comes a 5-minute segment in which W.J. Morse of the USDA Bureau of Plant Industry (Beltsville, Maryland) talks about the significance of the soybean and its development, and the new Pacific Program. Then the conclusion: "For a reprint of this program, send ten cents in stamps or coin to University of California Press, Berkeley, California. The Pacific Story is written and directed by Arnold Marquis. The original musical score was composed and conducted by Thomas Peluse. Your narrator–Gayne Whitman... This program came to you from Hollywood. This is N.B.C.–The National Broadcasting System." Note 2. A cover letter accompanies this manuscript. It is from Arnold Marquis, Writer-Producer, The Pacific Story, to Mr. John Baker, Department of Radio, USDA, Washington, DC. The letterhead reads: National Broadcasting Company, Inc., A service of Radio Corporation of America, Sunset and Vine, Hollywood 28, California. [Phone]: 6161. Dated May 13, 1946. Address: USDA.

489. *Soybean Digest.* 1946. Heartsill Banks goes to Korea. Sept. p. 78.

• ***Summary:*** "Heartsill Banks, for the past 2 years manager of the soybean division for the Kansas City [Missouri] plant of Ralston Purina Co., has resigned to accept a position in charge of rice experimentation and breeding work for the War Department in the American occupied territory in Korea. Mr. Banks embarked for Korea September 3. He will be stationed at Seoul."

"Mr. Banks has been well known in the soybean industry for many years. Prior to his assignment in Kansas City, he was in charge of agronomy operations for Ralston Purina at

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Osceola, Arkansas. He was instrumental in developing the Ralsoy" soybean variety.

A photo shows Mr. Banks.

490. *J. of the American Society of Agronomy.* 1946. Fellows elect: William Morse. 38(12):1116-18. Dec.
• ***Summary:*** "William Joseph Morse was born in New York in 1884. He was granted the B.S. degree by Cornell University [Ithaca, New York] in 1907 and the same year began his studies with the U.S. Dept. of Agriculture where he is, at present, principle agronomist in charge of soybean investigations for the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering. The U.S. Regional Soybean Laboratory, conducting research in twenty-four states is also under his direction.

"Although Mr. Morse has published many papers on his investigations on cowpeas, velvet beans and other miscellaneous legumes, his chief interest and work has been with soybeans. It may be appropriately stated that he is the father of soybean production in American agriculture. His many authoritative publications on varieties, culture and uses of the soybean attest to his outstanding work. From 1929 to 1931, he traveled through China, Japan, Korea and Manchuria collecting new varieties of soybeans and compiling data on cultural methods and uses for them.

"Mr. Morse was three-times president of the American Soybean Association, and has served the American Society of Agronomy for many years on the important committee of Varietal Standardization and Registration." A photo shows William Morse.

Note: This is the earliest document seen (June 2003) that uses the word "father" in connection with William Morse and soybean production in the USA.

491. *Soybean Digest.* 1946. From Heartsill Banks [in Seoul, Korea] (To the Editor). Dec. p. 24.
• ***Summary:*** "Not much news from over here. The soybeans, some 611,000 acres of them, are grown in small fields, planted, worked and harvested by hand.

"A rather small percent of them get to market commercially as each farmer eats a great many. They pull up stalks and all and bring them into the villages to let them be threshed by the women and children.

"Koreans also eat a lot of barley and millet, although rice predominates. Another national dish, the odor of which permeates every gathering of Koreans, is Kimchee, a sort of pickle or kraut made primarily of the huge Daikon radish and Chinese cabbage, combined in varying degrees with garlic, leeks, peppers, dried fish, chestnuts, et al." Address: Seoul, Korea.

492. Meals for Millions Foundation. 1946-1967. Meals for Millions Foundation Records, 1946-1967 (Finding aid for archival collection). Los Angeles, California: University of California at Los Angeles (UCLA). 48 boxes (24 linear feet). 1 oversize box.
• ***Summary:*** Collection No. 1107. Repository: UCLA Library, Dep. of Special Collections, Los Angeles. Physical location: Stored off-site at SRLF (Southern Regional Library Facility). Please contact UCLA for paging information.

"The Meals for Millions Foundation of Los Angeles was a non-profit organization dedicated to the eradication of hunger in the world through 'three-cent meals.' The plan for such a program was formulated by Clifford Clinton (of Clifton cafeterias in Los Angeles, California), who, with the assistance of Dr. Henry Borsook of Caltech organized the foundation in 1946. The basic product of the foundation, known as Multi-purpose Food, was a tasteless additive that could be mixed with virtually anything. Developed by Dr. Borsook, MPF was said to provide one-third of the daily vitamins, minerals, and protein needed by the average adult.

"Shortly after setting up the Foundation, Clinton brought in Florence Rose and Ernest Chamberlain to be co-directors and take over the day-to-day management. This collection or archive consists primarily of the office and personal files of Miss Rose, most of which she rescued from destruction when Meals for Millions began to change course in 1965. Florence Rose left the Foundation at that time and was then associated with Investors Overseas Services until her death in 1969.

"The collection came to UCLA indirectly (via Smith College [although Florence Rose's personal papers are still at Smith College]) from Ernest Chamberlain, close friend and confident of Miss Rose. The files have been alphabetically listed and their arrangement retained as originally filed. Consequently, a great deal of duplication exists throughout and the interrelationships of materials are often cloudy at best" (Quoted from the Biographical narrative on the website, July 2007). Organization: Arranged in the following series: 1. Alphabetical files of the Meals for Millions (MFM) Foundation (boxes 1-21); 2. Miscellaneous unsorted correspondence and ephemera (boxes 22-26); 3. Miscellaneous printed material (boxes 27-30); 4. MFM notebook files of printed material (boxes 31-37); 5. MFM projects in foreign countries (boxes 38-47); 6. Miscellaneous files re soybeans, MFM staff and financial information, newspapers (box 48); 7. Two records by Peggy Lee produced for MFM, photographs, People to people film (oversize box).

Boxes 38 to 47 are MFM projects in foreign countries or regions, listed alphabetically: Africa, Alaska, Argentina, Bolivia, Brazil, Ceylon, Chile, Finland, Germany, Haiti, Honduras, Hong Kong, Hungary, Iceland, India (5), Indonesia, Israel, Japan, Korea, Lebanon, Mexico, Pakistan, Paraguay, Peru, Philippines, South Vietnam, Taiwan, Tanzania, Thailand, Uruguay, Vietnam. Box 48 is oversize materials.

URL: http:// www.library.ucla.edu/ libraries/special/ scweb/. Address: Los Angeles, California.

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493. Illinois Business Review. 1946? The miracle bean. Radio broadcast. WILL. Urbana-Champaign. 13 page transcript. Undated.

• ***Summary:*** This is "a studio presentation of the University of Illinois Radio Service, WILL, in Urbana-Champaign." "These programs are presented in cooperation with the Bureau of Business and Economic Research of the College of Commerce at the University of Illinois." "This afternoon [12:30] our narrator has a tale about 'The Miracle Bean.'

"Narrator: One might suppose that we're going to launch into the childhood fantasy of Jack and the Beanstalk. But our miracle bean is much more than a fable. It is a fabulous fact." "It goes by a name common to us all–the soybean... has experienced a Cinderella rise in favor since its first introduction into the United States. Within the past twenty years its importance has increased phenomenally."

Discusses: Fables of the origin of the soybean–a merchant caravan train besieged by bandits. "For centuries, Chinese emperors made a ritual of the first spring planting. The first reference to the soybean was made by the Emperor Shen Nung who rules nearly 3,000 years before Christ [sic].

"And shortly after the turn of the century a lanky young Cornell [Univ., Ithaca, New York] graduate reported for work at the [USDA] Bureau of Plant Industry in Washington [DC]. He was William Morse who was assigned to duty under Dr. C.V. Piper, talented plant scientist. Dr. Piper's pet project was the nurturing of a dozen types of soybean plants out at the Arlington Experimental Farm in Virginia. His enthusiasm soon caught fire in young Morse, and the two men looked forward together to the tremendous role they were certain their little bean would someday play in agricultural economy.

"As Dr. Piper would often turn and say to his young assistant: 'Young fellow, these beans are gold from the soil. Yes, sir, gold from the soil. One must truly stand in awe of their potential power in the life of the Western World.

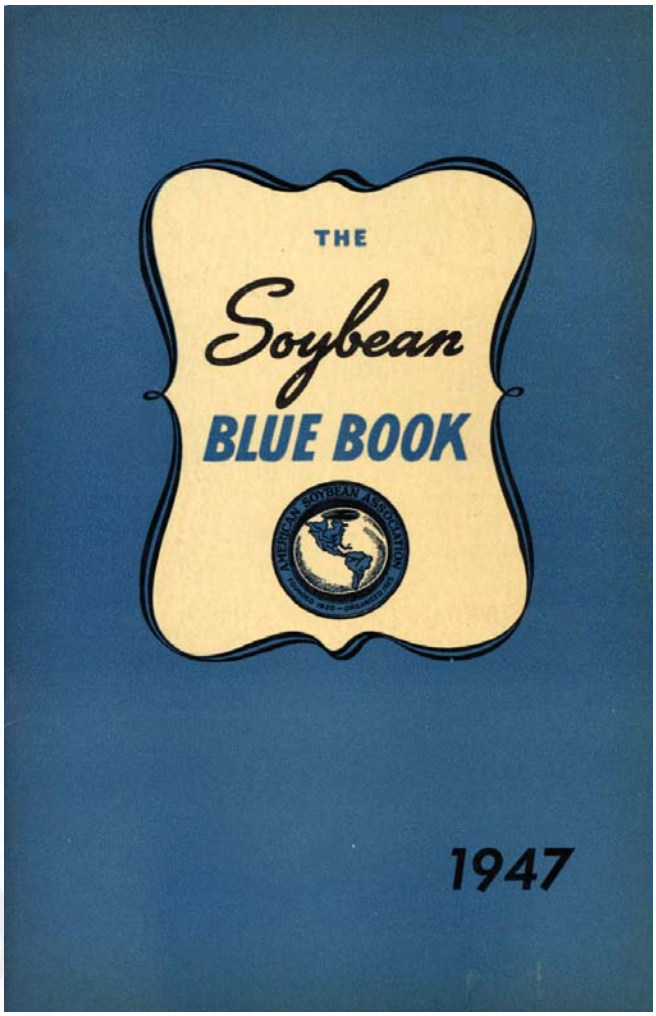
"Bill Morse was to follow through and see the rich harvest of the seed Piper had planted. It took years of hard work against jeering opposition."

Then tells the story of the Morse's expedition to North China, Japan, Korea, and Manchuria, and his years of hard work after he returned to the USA. But: "The phenomenal rise of the miracle plant cannot be attributed to the efforts of a single man." There follows a brief history of the soybean industry in the United States, and the many food and industrial uses of the soybean

Note: The most recent date in the text is 1945.

494. *Soybean Blue Book.* 1947-1964. Serial/periodical. Hudson, Iowa: American Soybean Assoc. Annual. Titled Soybean Blue Book from 1947-1966; Soybean Digest Blue Book from 1967-1979; Soya Bluebook from 1980 to present.

• ***Summary:*** A directory and information book for the soybean production and processing industries–but with much greater emphasis on processing and utilization. One of the most valuable sources of worldwide information on soybeans. During the period from 1947 to the 1960s, the Blue Book was usually published in March or April of each year.




In the 1966 Blue Book (p. 28-29) are two full-page tables titled "World Soybean Production." The first gives acreage in 1,000 acres, yield in bushels per acre, and production in 1,000 bushels. The second gives hectarage, yield in kilograms per hectare, and production in 1,000 metric tons. Figures are given for: 1950-54 (average), 1955-59 (average), 1963, 1964, and 1965. Statistics are given for the following countries: North America: Canada, United States. South America: Argentina, Brazil, Colombia, Paraguay. Europe: Italy, Rumania, Yugoslavia, Other Europe (excluding USSR). USSR (in Europe and Asia). Africa: Nigeria, Rhodesia, Tanzania. Asia: Turkey, China (Mainland), Cambodia, China (Taiwan), Indonesia, Japan, Korea (South), Thailand. Estimated world total. Address: Hudson, Iowa.

495. Agricultural Research Administration, USDA. 1947.

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U.S. style soybean gets world interest (News release). *USDA* (*magazine*) No. 1089-47. 1 p. May 19.
• ***Summary:*** "The soybean, a crop adopted from the Orient, has made such a good name for itself in the United States that it is attracting world wide attention.

"Twenty foreign countries were represented by the 50 scientists, business men, and government officials who journeyed during the past two years to Plant Industry Station, Beltsville, Maryland, to confer with W.J. Morse, head of soybean investigations for the U.S. Department of Agriculture. Some of these visitors remained for a year and traveled all over the country to study production, processing, and other phases of the soybean industry.

"During the past 3 years, Mr. Morse has filled around 160 requests from other parts of the world for soybean breeding strains. Some of the requests have come from the Orient where seed is needed to replace stocks seriously depleted and in some cases lost during the war.

"Mr. Morse is filling the requests with samples of improved, high-yielding strains developed by agricultural scientists in this country. He is also able to supply seed from samples he collected in other countries in pre-war years. For example, in filling a request from Korea recently, he included seed from the most promising strains of 2500 original samples he collected there in 1929 and 1930 and as kept viable by frequent growing."

496. *Soybean Digest.* 1947. To live: Japan must import more soybeans. May. p. 36.
• ***Summary:*** "The Manchurian soybean crop in large part holds the key to the economic health of the Japanese people. This situation is revealed in a special analysis prepared for the Foreign Economic Administration by F.H. Shelledy of the U.S. Tariff Commission... In the past the heavily peopled islands have grown only one-third of their needed soybeans. The rest have come from Manchuria, chief supplier to the world soybean trade, and to a smaller extent, from Korea. The soybean was one reason why the Japs over-ran Manchuria... Now, however, the Manchurians are growing a third fewer soybeans than they were before the war... Before the war Japanese farmers grew from 10 to 14 million bushels of soybeans annually. Most of their crop found its way to the island markets, being superior for food to the beans imported from Manchuria and Korea... But Japanese farmers used a large part of the crop as green manure, since they lacked animal manures. They also depended on the Manchurian soybeans as a source of fertilizer... Before the war the Japanese were importing 26 million bushels of soybeans annually...

"'Actually there appears to be little chance of any substantial increase in soybean production in Japan. If Japan is to have sufficient soybeans to supply its needs, it will have to import most of them,' Shelledy says."

497. Walsh, Robert M. 1947. Soybean production–Here and abroad: And possible competition from other oilseeds. *Soybean Digest.* May. p. 18-21.
• ***Summary:*** Editor's note: "It may be 10 or 15 years before world oilseed supplies become excessive, the author says."

Contents: Introduction: Soybean production concentrated in China, Manchuria, and USA, uses of soybeans oil. War-time role. Short during the war. Early postwar situation. Possible future developments. Long time [term] outlook.

"Before the war, Asia produced 400 million bushels of soybeans a year; the United States 56 million." China was the leading producer, with slightly over 200 million bushels/year–all of which was used domestically. Manchuria produced about 150 million bushels/year and was the world's chief exporter. "The United States, Korea, Japan, and the Netherlands Indies [today's Indonesia] were the only remaining producers of any consequence. Contrary to popular belief, output in southeastern Europe was extremely small."

In the USA, production grew from 5 million bushels in 1924 (mostly for seed use) to 23 million bushels in 1934, with an increasing percentage "going to oil mills for crushing. The severe drought of 1934 was a notable factor leading to the present day importance of soybeans as a cash crop in the United States. Soybeans proved to be more drought-resistant than corn. In 1935 farmers more than doubled their 1934 production." By 1939 production had reached 90 million bushels.

"Drought related shortages of lard in 1935-37 resulted in a rapid gain in the use of soybean oil in shortening." Between 1935 and 1939, soybean oil went from being used mostly in nonfood industrial products (paint and related products was the biggest use in 1935) to being used mostly in food products (such as shortening and margarine). Cottonseed oil was still the main liquid oil used in processed foods and linseed oil was still the main oil used in "drying-oil products."

"To sum up, soybean oil made notable gains in production and use during the late 1930's. This upward movement was sharply accelerated by the war which followed.

"War-time role: Throughout most of 1940 the United States had large supplies of domestic and imported oils, and prices were low. And our consumption of fats in 1941 was the largest in peace-time history. Real trouble began in 1942. Imports fell abruptly after the Japanese attack on Pearl Harbor. The United States had been dependent on Pacific sources for about half its imports of fats and oils. In the five years 1937-41, imports had averaged 2 billion pounds annually. From 1942 through 1946, yearly imports were less than half that amount. The major loss was in coconut oil," followed by palm oil from the Netherlands Indies, and tung oil from China. In addition, the U.S. had

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previously lost nearly 100 million pounds of olive oil from the Mediterranean region, and fairly large amounts of fish- and fish-liver oils from the European North Atlantic area.

During World War II, the U.S. government acted to increase domestic oil production and to ration supplies. Soybean production increased. "To induce larger output, AAA [Agricultural Adjustment Administration] restrictions on soybean acreage were partially relaxed in June 1941. The government offered to support prices of 1941-crop soybeans at approximately $1 per bushel. These actions, together with rising market prices, brought forth an increase of over 1 million acres in soybeans harvested for beans.

"An all-out war production program for oilseeds was launched in 1942. High production goals were set for soybeans, flaxseed, and peanuts... Large-scale increases in livestock production were fostered."

Production of soybean oil showed steady gains throughout the war, rising from some 500 million pounds in the 1940 season, to 1,200 million pounds in the 1942 season, and reaching a peak of 1,400 million pounds in 1945-46.

A graph shows "Soybeans harvested for beans: Production, crushings, and price, United States, 1924-46." The upper graph shows U.S. soybean production and crushings in millions of bushels. The lower graph shows the price received by farmers in dollars/bushel and the "comparable price (September 15)."

Photos show: (1) A storage yard of a Manchurian grain and soybean merchant. (2) The new flax and soybean plant of Cargill, Inc. at Port Cargill, Savage, Minnesota. Address: Special Asst. to the Chief, Bureau of Agricultural Economics [USDA].

498. Hedge, Porter M. 1947. Washington Digest: Army buys more [soy] flour. *Soybean Digest.* June. p. 39.
• ***Summary:*** "The Army has ordered 75,000 long tons of soy flour for June, July, and August delivery for civilian feeding in Japan, the Ryukyu Islands [which stretch southward from Kyushu, Japan's southernmost main island], and Korea.

"Of the total 62,600 long tons are for Japan proper and the Ryukyu Islands; the remainder for Korea. The Korean shipment, and 12,500 long tons of the Japan quota are a substitute for pulses."

499. *Soybean Digest.* 1947. Worldwide trek to learn about soys. June. p. 23.
• ***Summary:*** During the past 2 years more than 50 scientists, plus businessmen and government officials, coming from 20 foreign countries, have travelled to the Plant Industry Station, Beltsville, Maryland, to confer with W.J. Morse, head of soybean investigations for the USDA. During the past 3 years Mr. Morse has filled about 160 requests from other parts of the world for soybean breeding strains. "For example, in filling a request from Korea recently, he included seed from the most promising strains of 2,500 original sample he collected there in 1929 and 1930 and has kept viable by frequent growing."

A small portrait photo (taken in about 1937) shows William Morse.

500. Food and Agricultural Organization of the United Nations. 1947. Soybeans: Area, yield, and production. *Yearbook of Food and Agricultural Statistics.* See p. 101-02.
• ***Summary:*** Under soybeans, gives region / continent and country, then statistics for soybean area, yield, and production for each soybean producing country. Statistics show that the following countries produced the following amounts of soybeans (measured in 1,000 metric tons) during the 1934-38 period (the earliest period given).

Europe: Austria 0.2. Bulgaria 11.6. Czechoslovakia 0.9. Hungary 0 (but 6.2 in 1940 and 1.3 in 1945). Italy less than 0.5 (but 0.01 in 1940 and 0.9 in 1945). Poland 0.5. Rumania [Romania] 11.7, Yugoslavia 1.5. Europe total: Former boundaries 550, present boundaries 260. USSR: Former boundaries 68.1, present boundaries 97.1.

America: Canada 5.5. United States 1,164.0. Total 1,170.0

Asia: China: China Proper 6,092.7, Formosa (Taiwan) 4.2, Kwantung 20.2, Manchuria 3,851.0. Indochina: Cambodia 0.4 (in 1937). Japan 325.1. Korea 518.6. Netherlands Indies [Indonesia]: Bali and Lombok 9.0, Java and Madura 236.4. Asia total: 10.60. Africa: Southern Rhodesia less than 0.5 (but 0.3 in 1942 and 0.2 in 1945).

World totals: Excluding USSR–Former boundaries 11.829. Excluding USSR–Present boundaries 11.800. Including USSR: 11.9000.

501. La Choy Food Products, Inc. 1947? Essential characteristics of genuine soy sauce, compared with synthetic or imitation substitutes (Leaflet). Archbold, Ohio. 3 panels each side. Each panel: 23 x 10 cm. Undated.
• ***Summary:*** Contents: Origin of Soy Sauce. Modern processes. Food values. Essential characteristics. Synthetic and imitation substitutes. La Choy Brown Sauce. Suggestions for using genuine soy sauce.

Note: This leaflet tries, quite deceptively, to present the viewpoint that traditional Chinese fermented soy sauce is inferior to La Choy's "genuine" HVP sauce.

"The Chinese method of preparing the sauce consisted of storing crushed soya beans in casks or wooden tanks, openly exposed to the elements for several months to ferment and mold, after which the liquid sauce was drained or pressed out and stored in vats or kegs.

"Modern processes: Although the Chinese are still using their crude methods, processors of genuine Soy Sauce in this country have greatly improved the process through development of enzymatic and hydrolytic methods of fermentation. The best grades of Soy Sauce are manufactured from whole or parts of soya beans. Parts of

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wheat or corn with water and salt, are often added to achieve a more desirable color and flavor. Such products are under laboratory control to achieve predetermined specifications and scientifically filtered and blended to evenly diffuse and suspend the solids and preclude precipitation of sediment to the bottom of the container... Genuine Soy Sauce is distinguished from other varieties of Chop Suey or table sauces by the presence of amino acids and purines..."

"Many imitations of Soy Sauce are on the market. Such synthetic sauces are ordinarily made from various grades of molasses, syrups, and caramel combined with water and salt to achieve and imitate the appearance and consistency of Soy Sauce." Address: Archbold, Ohio.

502. American Soybean Association. 1948. Soybean Blue Book. Hudson, Iowa: American Soybean Assoc. 112 p. Advertisers' index. 22 cm.

• ***Summary:*** See next page. Under the heading "Canadian production" are five tables (p. 44) with the following titles:

(1) "Production of soybean oil and oilcake in Canada." For each crop year (Aug. 1 to July 31) from 1945-46 to 1946-47 gives oil produced (pounds), and oilcake meal produced (pounds). Soybean oil production increased from 14,665,566 pounds in 1945-46 to 22,797,939 pounds in 1946-47. Source of data: Dominion Bureau of Statistics.

Note: This is the earliest document seen (Aug. 2019) that gives soybean crushing statistics for Canada.

(2) "Production of soybeans in Canada, 1942-1947." For each year gives acreage, yield per acre, and total production. Production grew from 725,300 bushels in 1942-44 to 806,000 bushels in 1947. (3) Production by Provinces. (A) Ontario. Soybean production in Ontario increased from 697,500 bushels in 1942-44 to 806,000 bushels in 1947.

(B) Manitoba. Soybean production in Manitoba decreased from 26,300 bushels in 1942-44 to 2,000 bushels in 1945. (No data for years since 1945).

(C) British Columbia. Soybean production in British Columbia was 4,500 bushels in 1943. (No data for years since 1943).

A table (p. 48) shows "Canadian consumption of soybean oil" (1938, 1944, 1945) for each of eight different uses. In 1938 some 2.4 million lb were used including 1.6 million lb in soaps and washing compounds. In 1944 some 11.2 million lb were used in slaughtering and meat packing.

Page 22: "World soybean production." Gives acreage, yield per acre, and production in bushels for 1935-39, 1945, 1946, and 1956 preliminary. The producers given are:

North America: Canada, United States.

Europe: Bulgaria, Hungary, Italy, Rumania, and USSR (Europe and Asia).

Asia: Turkey, China proper (22 provinces), Manchuria, Japan proper, Formosa, South Korea, Netherland Indies (Java and Madura [today's Indonesia]), Total World.

The three largest soybean producers (in million bushels) in 1946 were: United States 196.7. China proper 163.6. Manchuria 122.6. World: 512.8

Note: This is the earliest issue of the *Soybean Blue Book* that gives world soybean production statistics. Address: Hudson, Iowa.

503. Morse, W.J. 1948. Soybeans yesterday and today. *Foreign Agriculture* (*USDA Foreign Agricultural Service*) 12(5):91-95. May. Summarized in Soybean Digest, June 1948, p. 32.

• ***Summary:*** A good overview of soybeans and their history in China, Manchuria, Korea, and Japan (the principal regions of world soybean production), plus thoughts on their relatively recent introduction to the Western world.

"In China, the soybean is one of the leading and most ancient of crops, ranking fifth in extent of culture and occupying about 9% of the total cultivated area. Although grown everywhere in China, about 60% of the soybean acreage and production is confined largely to 3 northern Provinces, Shantung, Kiangsu, and Honan. China consumes practically all its production, estimates indicating 55% for food, 27% for oil extraction and other purposes, 10% for stock feed, and 8% of the total cultivated area of Manchuria and is a dominating factor in the life of that country. As a cash crop, it provides fully half the total volume of freight handled by Manchurian railroads. Estimates have indicated that from one-third to two-thirds of the production of soybeans was exported; 15 to 20% utilized for food, feed, and planting; and the remainder processed for oil and oil meal.

"Korea occupies third place among the soybean-producing countries of Asia. Acreage and production are confined largely to the central and northern areas, because southern Korea, growing chiefly cotton and rice, seems less well adapted to soybean-seed production. The entire seed production is used for food, stock feed, export, and planting, none being used for oil extraction.

"Japan, although a large producer of soybeans, has consumed all its own production and imported large quantities of seed from Manchuria and Korea. Since World War I, production of soybeans in Japan has decreased to some extent, more emphasis being placed on the greater production of rice. The proportion of soybeans used by Japan for various purposes was: Miso (soybean-rice fermented paste), 22%; soy sauce, 22%; oil and oil cake, 21.5%; bean curd, 15.5%; confections, 7.2%; forage, 6.2%; green manure, 2.5%; seed, 1.8%; green vegetable beans, 0.8%; and miscellaneous 0.5%.

"In the Soviet Far East the soybean is said to be one of the chief industrial crops and in some districts to constitute 20% of the cultivated area. Acreage and production have increased markedly since 1926, especially in the Khabarovsk territory.

"Previous to 1935 soybean oil in the United States was

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# CANADIAN SOYBEAN PRODUCTION

**PRODUCTION OF SOYBEAN OIL AND OIL CAKE IN CANADA***

| Crop Year Aug. 1-July 31 | Oil Produced | Oilcake Meal Produced |
|---|---|---|
| | —— pounds —— | |
| 1945-46 | 14,665,566 | 72,877,469 |
| 1946-47 | 22,797,939 | 105,072,570 |

*Dominion Bureau of Statistics.

**PRODUCTION OF SOYBEANS IN CANADA 1942-47***

Acreage, Yield and Total Production

| Year | Acreage | Yield per Acre | Production |
|---|---|---|---|
| | acres | bu. | bu. |
| 1942-44 | 38,580 | 18.8 | 725,300 |
| 1942 | 44,000 | 21.0 | 925,000 |
| 1943 | 35,550 | 16.0 | 569,100 |
| 1944 | 36,200 | 18.8 | 681,820 |
| 1945 | 46,200 | 18.3 | 844,000 |
| 1946 | 59,200 | 18.1 | 1,072,000 |
| 1947 | 49,100 | 16.4 | 806,000 |

**Production by Provinces**

ONTARIO

| Year | Acres | Bushels |
|---|---|---|
| 1942-44 | 36,480 | 697,500 |
| 1942 | 41,490 | 871,290 |
| 1943 | 32,150 | 544,600 |
| 1944 | 35,800 | 676,620 |
| 1945 | 46,000 | 842,000 |
| 1946 | 59,200 | 1,072,000 |
| 1947 | 49,100 | 806,000 |

MANITOBA

| Year | Acres | Bushels |
|---|---|---|
| 1942-44 | 1,800 | 26,300 |
| 1942 | 2,510 | 53,710 |
| 1943 | 2,500 | 20,000 |
| 1944 | 400 | 5,200 |
| 1945 | 200 | 2,000 |
| 1946 | ..... | ..... |
| 1947 | ..... | ..... |

BRITISH COLUMBIA

| Year | Acres | Bushels |
|---|---|---|
| 1943† | 900 | 4,500 |

†The only year on record of acreage sown to soybeans in this Province.
*Dominion Bureau of Statistics.

# WORLD SOYBEAN PRODUCTION

**SOYBEANS: ACREAGE, YIELD PER ACRE, AND PRODUCTION IN SPECIFIED COUNTRIES, YEAR OF HARVEST, AVERAGE 1935-39, ANNUAL 1945-47**

| Country | Acreage | | | | Yield per acre | | | | Production | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1935-39 1,000 acres | 1945 1,000 acres | 1946 1,000 acres | 1947* 1,000 acres | Average 1935-39 Bu. | 1945 Bu. | 1946 Bu. | 1947 Bu. | Average 1935-39 1,000 Bu. | 1945 1,000 Bu. | 1946 1,000 Bu. | 1947* 1,000 Bu. |
| **North America:** | | | | | | | | | | | | |
| Canada | †10 | 46 | 59 | 49 | 20.7 | 18.3 | 18.1 | 16.4 | †207 | 844 | 1072 | 806 |
| United States‡ | 3042 | 10661 | 9606 | 10698 | 18.5 | 18.0 | 20.5 | 16.6 | 56167 | 192076 | 196725 | 177379 |
| **Europe:** | | | | | | | | | | | | |
| Bulgaria | 34 | 17 | 44 | ..... | 12.1 | 3.3 | 7.0 | ..... | 416 | 55 | 315 | ..... |
| Hungary | §7 | 6 | 5 | 8 | 16.9 | 8.6 | 10.4 | 11.4 | §125 | 48 | 56 | 90 |
| Italy | ..... | 2 | 2 | 8 | ..... | 15.4 | 15.8 | 27.4 | †1 | 32 | 27 | 210 |
| Rumania | 27 | ..... | ..... | ..... | 12.3 | ..... | ..... | ..... | 332 | ..... | ..... | ..... |
| USSR (Europe and Asia) | §607 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | §5805 | ..... | ..... | ..... |
| **Asia:** | | | | | | | | | | | | |
| Turkey | §1 | 2 | ..... | 4 | 29.0 | ..... | ..... | ..... | §37 | 18 | 16 | 56 |
| China proper (22 provinces)¶ | †12411 | 9967 | 9944 | 9981 | 16.7 | 16.4 | 16.5 | 17.5 | †207666 | 163287 | 163612 | 174257 |
| Manchuria | 8992 | 8167 | 7187 | ..... | 16.8 | 15.6 | 17.1 | ..... | 151294 | 127749 | 122639 | ..... |
| Japan Proper | †812 | 684 | ..... | ..... | 15.4 | 9.6 | ..... | ..... | 12499 | 6540 | 13228 | ..... |
| Formosa | †17 | ..... | ..... | ..... | 8.9 | ..... | ..... | ..... | †151 | ..... | ..... | ..... |
| Korea f/ | †1921 | 661 | 619 | 818 | 10.0 | 7.6 | 7.8 | 13.3 | 17654 | 5007 | 4818 | 10861 |
| Netherland Indies g/ | 889 | 321 | 583 | 700 | 10.9 | 7.0 | 7.6 | 9.6 | 9731 | 2247 | 4406 | 6719 |
| Total World h/ | 29100 | 31400 | 29800 | 31000 | ..... | ..... | ..... | ..... | 464200 | 503800 | 512800 | 490000 |

*Preliminary. †Average of less than 5 years. ‡Acreage harvested for beans. §One year only. ¶Partly estimated. f/ Beginning with 1945 figures represent South Korea only. g/ Java and Madura. h/ Includes estimates for the above countries for which data are not available and for minor producing countries. Source of data: Office of Foreign Agricultural Relations, U. S. Dept. of Agriculture. Table published in **Foreign Crops and Markets**, Vol. 55, No. 25, p. 424. Prepared or estimated on the basis of official statistics of foreign governments, reports of U. S. foreign service offices, results of office research, or other information. Prewar estimates for countries having changed boundaries have been adjusted to conform to present boundaries, except as noted.



utilized chiefly in soap, paint, and varnish. Since that time, however, 70 to 85% of the soybean-oil supply has been used in the food industries... The soybean has become one of the most valuable, if not the most valuable, of China's gifts to

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the Western World."

Photos show: (1) Manchurian soybean in bags being loaded on a freighter at the Dairen wharves for shipment to European oil mills. (2) Two horses pulling a plow, and a 2nd man planting soybeans on ridged rows in Manchuria. (3) Soybean plants growing along the edges of rice paddies, as is common in oriental countries; the green beans will be used for home consumption. (4) Two Korean men threshing soybean plants in a courtyard with bamboo flails. "In Korea, as well as in many other oriental countries, bamboo flails are used in threshing soybeans." (5) A man with a sickle in a field of dried soybean plants. "Soybeans are harvested by hand in all the soybean-producing countries of the Orient." (6) A combine harvesting soybeans in the USA. It has "been one of the important factors in the economic production of soybeans in the United States." (7) "General view of a Chinese oil-mill yard in Manchuria, showing mill, storage of soybeans in osier bins, and steel tanks." Address: Principal Agronomist, USDA Div. of Forage Crops and Diseases, BPI [Bureau of Plant Industry], SAE [Soils and Agricultural Engineering], ARA, Beltsville, Maryland.

504. *Soybean Digest.* 1948. MPF [Multi-Purpose Food] use spreads. May. p. 19.
• ***Summary:*** "Over 10 million meals of Multi-Purpose Food have been shipped to the hungry in this country and abroad, reports Meals for Millions Foundation, Inc., 648 S. Broadway, Los Angeles 14, California, which is in charge of distribution."

"Distribution is worldwide, and has included, according to the Foundation, 'The Arctic to the Congo, from the bombed out East End of London to fareastern Korea, from the Navajo hogans of New Mexico and Arizona to the Villages of India.

"'A boxcar of a half-million meals of MPF rode the Friendship Train to Italy and France; 200,000 meals sailed on the California 'mercy ship,' the Golden Bear, to the Mediterranean;...'"

505. *Soybean Digest.* 1948. On tour of Orient [Dr. A.K. Smith]. June. p. 13.
• ***Summary:*** "To add to this country's knowledge of processing and preparing soybeans for food, Dr. Allan K. Smith of the oil and protein division, Northern Regional Research Laboratory, Peoria, Illinois, has left the United States for a 3-month investigation that will have covered Japan, Korea, and China before he returns next August. This extension of the Northern Laboratory's soybean research program has been made possible through provisions of the Research and Marketing Act [of 1946]. The information obtained will be the basis for studies on making soy food products more acceptable as a high-protein source in the American diet." A portrait photo shows Dr. A.K. Smith.



506. Cohn, Henry I. 1948. The Rickard Koreans. *Soybean Digest.* Aug. p. 13, 28.
• ***Summary:*** In 1941 the Dominion Experiment Station at Harrow, Ontario, received from Asia about 1 pound of seed of each of many traditional soybean varieties for experimental purposes. The station did little or nothing with the sample of one of the varieties that had unusually large seeds, probably thinking that it would require an unusually long maturity period.

W.G. Baldwin of Harrow, Ontario, a Canadian farmer not connected with the Experiment Station, obtained a sample of this large-seeded soybean, planted the seed in 1942, and discovered that it was a variety that yielded well and matured one week ahead of the variety Richlands.

E.T. Rickard of Champaign, Illinois, who owned farms in both Ontario and Illinois, saw the soybean growing in Canada, and brought 1 bushel to Illinois in 1942 and 8 bushels in 1943. Rickard gave three pecks of the original bushel to H.I. Green, a close friend, on the condition that they would be planted nearby where Rickard could observe them. P.A. Stone of Pleasant Plains was given some seed which was planted in 1944. Mr. Rickard first planted these on his farm in Alexander, Illinois, in 1944.

The unfolding story of the Rickard Koreans is told. A portrait photo shows E.T. Rickard in 1942; he died in 1947. Address: Manager Valley Farms, Carrollton, Illinois.

507. Banks, George Heartsill. 1948. South goes east [to Korea]. *Soybean Digest.* Oct. p. 16-18.
• ***Summary:*** Mr. Banks, formerly associated with Ralston Purina Co., recently returned from a governmental mission of almost 2 years in Korea. In this paper, presented at the American Soybean Convention in Memphis, Tennessee, he

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tells of soybeans in Korea, where there is no national debt, no income tax, and where women do all the work. South Korea is about the size of Arkansas. 75% of the land is steep and mountainous, and thus entirely unsuited for crops. On the remaining small area of arable soil struggle about 20 million Koreans. The farms are small; in some provinces they average less than 2.5 acres. In South Korea every farmer grows some soybeans but one has "to look hard and long to find even a small field of soybeans. They are grown in gardens, on the dikes in the rice-paddies, and among the trees. The most widely grown varieties are large-seeded yellow beans with a short, stiff stalk. Almost all of the beans are consumed at home. Soybean processing [i.e., crushing] plants as we know them do not exist... The Koreans eat soybeans in many ways, including soysauce, soy sprouts, soy curd, and green soybeans. They press out some oil in the home or farm village and use the oil for cooking and the meal for feeding farm animals." Rice is the predominant crop. "Korea, along with its neighbors in the Orient, is definitely a 'have-not' nation." They waste nothing, recycle everything, and use human wastes (night soil) for fertilizer. Agriculture is run by hand-power.

A portrait photo shows George H. Banks.

508. Dimmock, F. 1948. Korean soybeans (Letter to the editor). *Soybean Digest.* Oct. p. 7.

• ***Summary:*** Concerns an article titled "The Rickard Koreans" in the August issue of this magazine (p. 13, 28). The writer is interested in the origin of the Early Korean variety insofar as the Dominion Experimental Station at Harrow, Ontario, is concerned. Dimmock writes: "I was in charge of corn and soybean breeding work at this station from 1924 to 1929. In 1924 I received envelope samples of seed of several lots of soybeans and one of them was labelled 'Early Korean,' China. I do not remember how these envelopes came into my possession, but I grew all the seed in short rows in 1924, sufficient to have enough for testing purposes in 1925."

"These tests were run for several years. I left Harrow to come to Ottawa in 1929 and they were still being conducted at that time. During this period, I made two selections which were licensed as varieties in Canada, one from the A.K. variety, which was named A.K. (Harrow) and the other from Mandarin, which was named Mandarin (Ottawa). Both of these varieties are still being grown here.

"Early Korean was among the highest yielders in our tests. It was strong in the straw, but was rather short for a fairly late variety. It was not quite as late as A.K. (Harrow), but neither was it as tall and it did not yield quite as well. I, therefore, selected A.K. (Harrow) as the better variety for southwestern Ontario and Mandarin (Ottawa) as an early variety for central and eastern Ontario, where the season is shorter.

"I had several times thought of releasing 'early Korean' as a variety, but there was practically no interest in Canada in growing soybeans at that time and even until the beginning of the war in 1939 the total acreage did not average more than 9,000 to 10,000 acres annually. During the war period and since its close the acreage of soybeans has shown a steady increase until this year 1948, it is estimated to be about 100,000 acres.

"As your article was not clear on the origin of the Early Korean variety, I thought that you might like to know something of its early history at Harrow, Ontario." Address: Central Experimental Farm, Dep. of Agriculture, Ottawa [ONT, Canada].

509. Kurakake, T. 1948. Japan Association [Japan Soybean Association] (Letter to the editor). *Soybean Digest.* Dec. p. 10.

• ***Summary:*** "The Japan Soybean Association was founded on March 4, 1946 for the purpose of increasing production of soybeans, improving varieties and increasing the rational utilization of soybeans.

"As is well known, soybeans are an Asiatic crop which have been utilized as food for centuries. Before the war, Japan relied on importation from Manchuria and Korea for a major part of its supplies, but since the termination of hostilities, these sources have been cut off. Consequently, Japan has to rely on its own production and also on importation from other sources. This other source is the United States, whose soybean history is relatively new but which has expanded so rapidly that it has become the largest producer in the world. Since the end of the war, Japan has imported 42,569 tons as of October 10, 1948, by which she has been able to fill the minimum requirement.

"The Japan Soybean Association is planning to have a Soybean Exhibition on January 20, 1949 at one of the leading department stores in Tokyo and we would like to have if possible, some exhibits or literature from your Association. Expansion of soybeans in the industrial field in the United States is tremendous and we would like to know as much as possible about the production and use of soybeans in the United States.

"We shall appreciate it if you can help us with this exhibition and also keep in close touch with you." Address: Secretary, The Japan Soybean Assoc., Chuo-ku, Tokyo.

510. Food and Agricultural Organization of the United Nations. 1948. Soybeans: Area, yield, and production. *Yearbook of Food and Agricultural Statistics–Production.* See p. 101-02.

• ***Summary:*** Under soybeans, gives region / continent and country, then statistics for soybean area, yield, and production for each soybean producing country. Statistics show that the following countries produced the following amounts of soybeans (measured in 1,000 metric tons) during the 1934-38 period.

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Europe: Austria 0.2. Bulgaria 11.6. Czechoslovakia 0.9. Hungary 0 (but 1.3 in 1945). Italy less than 50 metric tons (but 0.9 in 1945). Poland 0.5. Rumania [Romania] 11.7, Yugoslavia 1.5. Europe total: 27.0.

USSR: (97.1).

North America: Canada 5.5. United States 1,164.0. Total 1,170.0

Asia: China: China Proper 6,092.7, 3,851.0, Taiwan (Formosa) 4.2. Indonesia: Bali and Lombok 9.0, Java and Madura 236.4. Japan 325.1. Korea 518.6. South Korea 0 (but 122.2 in 1945 and 130.6 in 1946). Philippines 0 (but 0.2 in 1946). Siam [later Thailand] 3.6. Turkey (but 0.4 in 1945). Asia total: 11,070.0.

Africa: Nyasaland 0 (but 0.4 in 1946). Ruanda-Urundi 0 (but 0.9 in 1947). Southern Rhodesia less than 50 metric tons (but 0.2 in 1945). Uganda 0 (but 2.6 in 1946). Union of South Africa 0 (but 1.5 in 1945).

World totals (Excluding USSR): 12,300.0.

Note: This is the earliest document seen (Nov. 2007) that gives soybean production or area statistics for Turkey or for the Middle East. This document contains the earliest date seen for soybean production or area statistics for Turkey or for the Middle East (1945).

511. Japan Year Book 1946-48. 1948. Tokyo: The Foreign Affairs Association of Japan. 614 + 314 p. See p. 291, 367, 376. 22 cm.

• ***Summary:*** See next page. The Preface indicates that this book was published in about Dec. 1948. The editor's name is not given. World War II ended on 2 Sept. 1945.

Page 291. A full-page table shows "Annual yields of cereals and vegetables" (area in *chobu*, yield in *kan*, production in *koku*). For soy beans (dried):

2.299 million koku in 1943
2.072 million koku in 1944
1.321 million koku in 1945
1.565 million koku in 1946.

In 1946 production of azuki beans was 16.7% that of soy beans.

Page 367. "Soy-bean Cake: This is another item of fertilizer which was imported into this country before the war, principally from Manchuria. Of the demand for some 1,000,000 tons, 60 percent was imported in the form of soy-bean cake and 40 percent in the form of soy-bean."

Page 376. "Flavors: Oriental flavors are produced in considerable quantities as indispensable for Japanese cooking, of which soy, or Japanese sauce and miso, or soybean paste are important items.

"The domestic production of soybeans being insufficient, Japan imported before the war or in 1941-45 twice as much soybeans as domestic production from Manchuria and Korea to meet the home consumption of soy and miso."

Three tables (p. 376) show (1) Soybean imports [to Japan] during 1940-1944. These imports are from Manchuria, Korea, Central China, and total. (2) Production of soybeans in Japan 1943-1946, area planted, yield and production of dried soybeans. (3) Soybean allocations by kind [end use] in 1941 and 1944. The end uses are miso, soy sauce, staple food [beans eaten as beans], other food, chemical [industrial], fodder, and others.

512. Smith, A.K. 1948. Microorganisms collected in China, Japan, and Korea. 7 p. Unpublished typescript.

• ***Summary:*** Dr. Smith collected 100 samples in Shanghai (58 samples), Nanking (13), Hangchow, Canton, Tokyo, Noda (near Tokyo, Japan), Korea (7).

513. Smith, Allan K. 1949. Oriental use of soybeans as food: With special attention to farming practices. Notes on Oriental farming practices. I. China. *Soybean Digest.* Feb. p. 15-17.

• ***Summary:*** Contents: Introduction. Farming conditions. Oilseed production. "On a visit to China, Japan, and Korea during the summer of 1948, the author as a representative of the Northern Regional Research Laboratory, was given the opportunity of studying the methods of Oriental people in using soybeans as food and to collect microorganisms used in fermenting soybeans and other fermentable products."

"In Japan, the natural resources and the food processing sections of the Supreme Command of the Allied Powers furnished guidance and transportation in seeking information."

In China, nearly 90% of the people are farmers. "Agriculture is their most important industry." In north China, the crops (including soybeans) are similar to those in the USA. In "south China there is less diversification and the principal crop is rice."

"The high density of population in China dictates a vegetarian diet for most of the people, especially her peasants. I was informed by the best authorities that customarily the peasants of China eat meat only three times a year, on their three great holidays, the Dragon Festival, the Autumn Festival, and their New Year's celebration." The Chinese diet is very well balanced.

Note: This article is the cover story. And this is the first issue of Soybean Digest with a photograph on the cover; it shows a girl selling soy sprouts in Canton, China. Address: Northern Regional Research Lab., Peoria, Illinois.

514. Culbertson, Raymond E.; Smith, Allan K. 1949. Oriental uses of soybeans as food: With attention to fermented products. Notes on Oriental farming practices. V. Korea. *Soybean Digest.* June. p. 15-18, 20, 22.

• ***Summary:*** Contents: Introduction. Breeding work. Topography. Land use. Soybean varieties. Climatic relations. Soils of Korea. Cultural practices. Marketing. Soybeans as foodstuff. Soya sauce. Green pods on the bush. Bean sprouts. Parched beans. Curd (soybean curd [tofu]) and milk.

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SOYBEAN IMPORTS DURING 1940–1944

| | Manchuria | Imports from Korea | Central China | Total |
|---|---|---|---|---|
| 1940 | 526,936 | 35,489 | — | 562,425 |
| 1941 | 566,347 | 27,333 | 9,182 | 602,862 |
| 1942 | 615,274 | 916 | 18 | 616,208 |
| 1943 | 679,500 | 22,012 | — | 701,512 |
| 1944 | 927,358 | 4,266 | — | 931,624 |

Note: Computed at bean fiscal year of from October to September of the following year.

Average domestic output of soybeans in the above years was 300,000 tons.

PRODUCTION OF SOYBEANS

| | Area Planted (1,000 cho) | Soybean Crops (1,000kan) | Dried Soybeans (1,000 koku) |
|---|---|---|---|
| 1943 | 312 | 7,609 | 2,309 |
| 1944 | 296 | 8,072 | 2,072 |
| 1945 | 278 | 11,098 | 1,321 |
| 1946 | 233 | 8,026 | 1,565 |

SOYBEAN ALLOCATIONS BY KINDS IN 1941 AND 1944
(in metric tons)

| | 1941 | | 1944 | |
|---|---|---|---|---|
| Kind | Allocation | Percentage | Allocation | Percentage |
| Miso | 213,464 | 34.8 | 103,981 | 10.3 |
| Soy | 171,796 | 28.0 | 35,928 | 3.6 |
| Staple food | — | — | 785,635 | 78.0 |
| Other food | 140,827 | 23.0 | 34,055 | 3.4 |
| Chemical | 15,000 | 2.4 | 4,901 | 0.5 |
| Fodder | 55,045 | 9.0 | 27,379 | 2.7 |
| Others | 17,600 | 2.8 | 16,098 | 1.6 |
| Total | 613,732 | 100.0 | 1,007,977 | 100.0 |

Kochuchang. Other uses.

"Soybeans have been grown in Korea for many centuries. One can speak in terms of centuries; Korea's calendar year is now 4281 in contrast to our 1949.

"Reportedly, soybeans were brought to Korea from China 2,000 to 3,000 years ago in the customary exchange of gifts between the ruling houses. Furthermore, according to the records, the Pakja Dynasty with its capital at Puyo, Chung Chong Nam-do, compelled the people to harvest and store soybeans for both food and seed.

"Since the high density of population in Korea limits livestock production, it is only natural that soybeans should be grown and utilized in supplying much of the protein needed in the diet of the people.

"At present Korea is divided into two zones separated by the 38ºN Parallel. In the north, with the area occupied by the Russian forces, no recent information on soybeans is available. South Korea is now a republic with the United States occupation forces present for security purposes and the Economic Commodity Administration to assist in rehabilitating the country.

"Korea has the village system of farming. Farmers live in small villages, with their lands within walking distance of their homes. The village system, together with isolation caused by mountains and streams makes transportation and exchange of products difficult, and has contributed to the selection and development of many varieties of soybeans of considerable merit. These varieties for the most part are relatively pure and of many colors and sizes: green, red, brown, black, purple, yellow, cream, and gray, all of which may be found at the same time in one market place in Seoul, the principal market in Korea.

"Production figures for South Korea show that, over the years, 8 to 10 percent of the land is planted in soybeans and

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the yields range from 8 to 14 bushels per acre. These yields appear low but are explained by Korean farming practices. It is the custom to seed small grain in rows in the fall of the year with sufficient space between the rows to permit interplanting with soybeans in May or early June before the grain is harvested.

"Prior to World War II, North Korea planted (1940-44 averages) slightly more than 905,000 acres of soybeans annually which yielded some 7,700,000 bushels. During the same 5-year period South Korea was planting 626,000 acres which yielded a little over 5 million bushels. The latest available figures (1947) for South Korea show a production of 4,480,000 bushels from 662,000 acres.

"Breeding Work: During the period of Japanese control of Korea, much of the breeding work on soybeans was in North Korea. The Japanese built about 15 Agricultural experiment stations throughout the country... As far as can be ascertained, no plant breeding work with soybeans is now being done in South Korea. However, variety testing and selection of good strains is being carried out at several experiment stations at both the provincial and national level.

"The leading varieties in South Korea have resulted from rigorous selection, mostly by farmers, over a long period" [see Table 1].

Concerning food uses of soybeans in Korea: "Soya sauce:... is found on the tables of all Koreans, where it is used quite generally on rice, sukiaki [sukiyaki], fish, chicken, and other meats and for the flavor it adds to the soup. It is a very popular appetizer. Most families make soya sauce and are allocated 2.7 kilograms of salt per person annually for this purpose. Yearly consumption is about 6 liters per person. In addition to homemade soya sauce, a supply is also available from many small factories making it. There are more than 10 plants in Seoul, the capital city. Making soya sauce in the home starts about January or February. It is the custom at this time to take a batch of beans and boil them in water until soft, following which they are mashed and formed into a ball, placed in a rice-straw bag and hung up in a heated room to ferment for a 3-month period. Following fermentation, the ball is cut open, broken into pieces and allowed to dry in the sun. When dry, water and salt are added, inoculant (yeast) introduced and the mixture allowed to stand in an earthen crock 2 to 3 months. The liquid is then poured off, boiled about 2 hours and filtered, following which it is considered to be sauce. The sediment remaining in the crock is known as paste. This is used primarily for making soup. In both home and commercial production of soya sauce parched and browned wheat or barley is frequently used in conjunction with the soybeans.

"Green pods on the bush: It is common practice to market early beans on the bush. The plants are pulled, dirt shaken from the roots and the leaves removed. The braches are tied with a string (usually hemp) and the plants are taken to market where they are sold by the bunch. The housewife prepares them for eating by picking off the pods and boiling, and the plant stem is used for fuel.

"Bean sprouts: Bean sprouts are much in demand especially during the winter months. They are used in combination with meat, Chinese cabbage, spinach, turnips, soups and various other cooked dishes. Sprouts are nourishing and supply much-needed vitamins to the Korean's usual polished rice diet. In some instances the beans are left on the sprouts, in others they are removed. The beans are sprouted in central places and usually peddled in two-wheeled, man-drawn carts. Sprouting requires about a week. They are sold on a weight basis.

"Parched beans: For parching, soybeans are simply placed in a pan over a fire and heated slowly until the skin breaks and part of the beans are slightly blackened. They are eaten like peanuts or mixed with other foods. Most varieties are quite palatable and well liked for parching. Note: The Korean name for parched soybeans is *kong*.

"Curd and milk: Soybean milk is consumed in Korea but not so extensively as in China. The milk is made in a manner similar to the Chinese method which was described in an earlier report.

"A large percentage of the soybeans' growth in Korea are consumed as soybean curd. In addition to the huge quantities made at home, curd is also made in literally hundreds of small factories. In Seoul alone there are more than a hundred. Small units, which on the average employ five men, can work up about 10 bushels of soybeans daily.

"Kochuchang: Practically every Korean family makes kochuchang. Boiled [soy] beans are mashed and hung up in sacks to cure well for 2 or 3 months. This material [meju] is then broken up, dried in the sun, and ground to a fine powder, usually in an old type hand-operated stone mill. Red peppers are ground fine, the lot is mixed and salt and water added, then it is allowed to stand in crocks 2 to 3 months. To prepare kochuchang for the table, it is taken from the crock and boiled with the addition of ground meat and sugar, if the latter is available."

Note: This is the earliest (and only) English-language document seen (April 2021) that uses the word "kochuchang" to refer to Korean-style red pepper and soybean paste (miso).

Photos show: (1) A man standing in a field of sorghum interplanted with soybeans in Korea. (2) A Korean woman examining different varieties of soybeans in woven baskets in the market place in Seoul, Korea (Aug. 1948). (3) A boy carrying a wooden bucket on each end of a wooden shoulder pole. The buckets are used for transporting night soil to the land in Korea. (4) Soybean curd (cut into cakes) and vegetables in the market place at Seoul, Korea (Aug. 1948).

An outline map of South Korea and its provinces shows the principal varieties of soybeans grown, the section where each variety is grown, acreage and production. A chung or chungbo is 2.45 acres, and a suk is 5 bushels. The

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yields appear very low but this may be due to the custom of interplanting soybeans with other crops.

Tables show: (1) The 15 chief varieties of soybeans grown in Korea. For each is given: The name of each variety (romanized, with a translation of each word). Days to maturity. Flower color. Stem length. Color of seed coat and hilum. Weight of 1,000 seeds. Yield per acre (37.7 to 14.0 bu/acre). Rank in test. Year approved (1921-1939). For example: Chang Tan Paik. "Chang Tan" is the name of a town in Korea; Paik means "white."

(2) Analytical data for improved varieties of soybeans on the basis of the size of the bean. The 3 sizes are large, medium, and small. Examples of locations are: Southeast Korea. Northeast Korea. Central Korea. Southeast Korea. Address: Northern Regional Research Lab., Peoria, Illinois.

515. Smith, Allan K. 1949. Oriental methods of using soybeans as food: With special attention to fermented products. Notes on Oriental farming practices. *USDA Bureau of Agricultural and Industrial Chemistry.* AIC-234. June. 40 p.

• ***Summary:*** Page 1 states: "The text of this bulletin, with slight revisions, is as it appeared serially in *The Soybean Digest,* issues of February through June, 1949, although many additional photos appear herein. It is processed with the publisher's permission." Note: An enlarged 65 page edition was issued in July 1961.

Photos show: (1) Nine people in a field cultivating soybean with hoes near Nanking, China. All of these workers but one are women. July 1948. (2) "The three-man shovel, Korean version of the turning plow. The motive power is supplied by the mean holding the ropes." (3) A man and donkey threshing wheat with a stone roller. (4) A water buffalo and man pumping water from the rice fields. All parts of the pump and elevator are made of wood. Near Nanking, China, July 1948. (5) Windmill used for pumping water. The sails or vanes are mats woven from grass. (6) Children with baskets of soybean sprouts and inflated Chinese national currency in the market place at Canton, China. Aug. 1948. (7) Soybean milk for sale on the streets of Canton, China. Aug. 1948. It is in bottles, carried using a shoulder pole. (8) A wedge press for oilseed operations at Canton, China. Preformed disks of the flaked or ground meal are inserted in the slot and turned clockwise in the hollow log; pressure is applied with wooden wedges. July 1948. (9) Equipment for steaming soybeans preparatory to making soy sauce. Steam is passed upward through the wooden tanks from a boiler beneath. Peiping, China. 1948. (10) Soy sauce preparation. Steamed soybeans are placed in woven baskets or trays for 3 to 7 days to permit the growth of the mold *Aspergillus oryzae*. Nanking, China. July 1948. (11) Many earthenware jars for soy sauce production in a courtyard surrounded by houses. "Following the growth of a thick mold on the soybeans, they are mixed with parched and cracked wheat and placed with salt solution in earthenware jars for fermentation, which lasts 3 months to 2 years. Soy paste [chiang] is fermented in a similar manner but it contains less water and the fermentation period is about 3 months. Shanghai, China. Aug. 1948." (12) "Soybean curd and vegetables displayed for sale in market place, Seoul, Korea. Aug. 1948." (13) Squares of soybean curd covered with white mold on round, woven bamboo trays. "This is the first step in making soybean cheese. Canton, China, Aug. 1948." (14) Two rows of large hydraulic presses in the mill of the China Vegetable Oil Company, Shanghai. June 1948. (15) Men loading round, hydraulic-pressed soybean cakes onto a truck, on the Bund. Shanghai, July 1948. (16) Men and an ox preparing a seed bed at a Japanese agricultural experiment station near Tokyo. 1948. (17) "A miso plant in Tokyo. The large tubs [vats] in foreground are used for the fermentation of miso. A part of this plant was destroyed by bombs during the war. Aug. 1948." (18) Three men standing by presses destroyed during bombing raids over Tokyo. These presses formerly were used for filtering monosodium glutamate. July 1948. (19) Many stacked wooden tubs of ajinomoto (monosodium glutamate) ready for shipment at a plant located between Tokyo and Yokohama, Japan. Aug. 1948. This plant had a maximum production of 7.5 million pounds of ajinomoto in 1937. (20) Agricultural Experiment Station near Seoul, Korea. This station was built by the Japanese during their occupation of Korea. Later it was taken over and administered by the newly formed Korean Government. Aug. 1948. (21) A Korean boy standing in a field of sorghum interplanted with soybeans; this is a common practice in Korea. 1948. (22) A boy using a shoulder pole to carry two wooden buckets of night soil to the land. Korea. 1948. (23) A wooden shopper looking over the different varieties of soybeans in the market place at Seoul, Korea. Aug. 1948. (24) Outline map of Korea showing where principal varieties of soybeans are grown, the section in which each variety is found, the acreage, and production. Address: Head of Meal Products Investigations, Oilseed Crops Lab., Northern Utilization Research and Development Div., Peoeia, Illinois.

516. Nagata, Tadao. 1949. Daizu no natsuaki daizu sei ni kansuru kenkyû. I. Natsuaki daizu sei ni yoru daizu hinshu no bunrui [Studies on the growth habit of so-called summer versus autumn soybeans. I. Classification of varieties with respect to said habit]. *Nippon Sakumotsu Gakkai Kiji* (*Proceedings of the Crop Science Society of Japan*) 18(2/4):131-34. Oct. 30. [Jap; eng]

• ***Summary:*** "Abstract: Many varieties, 136 in total, conected [sic, collected] from Japan, Korea, China and U.S.A. were used. Seeds were sown at 6 succeeding periods from April to September. Dates of germination, beginning and end of flowering, and maturity were recorded. With these data, the following 3 duration were calculated; A. Flowering days from germination to beginning of flowering,

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| Types | Classes | (I) | (II) | (III) |
|---|---|---|---|---|
| Summer | S I | < 5.9 | 0.2—0.5 | 2.0—4.0 |
| | SIp | 〃 | 0.5—1.2 | 3.5—4.8 |
| | SII | 6.0— 7.9 | 0.2—0.6 | 2.0—4.0 |
| Inter-mediate | MIII | 8.0— 8.9 | 〃 | 〃 |
| | MIV | 9.0—10.9 | 〃 | 〃 |
| Autumn | A V | 11.0—12.9 | 〃 | 〃 |
| | AVI | 13.0—14.9 | 〃 | 〃 |
| | AVII | >15.0 | 〃 | 〃 |

B. Flowering duration–from beginning to end of flowering, C. Growing duration–from germination to maturity.

"By using the above 3 items (A, B, C), the classification of summer vs. autumn types of varieties were tried in respect to the following 3 ecological characteristics; (I) The rate of shortening of the flowering days due to the delay of seeding periods calculated by assuming the mode of change of the flowering days according to the seeding periods to be 1 linear. (II) Relative length of flowering duration to flowering days, B/A. (III) Relative length of growing days to flowering days, C/A. As shown by the following table we can distinguish firstly 3 types of Summer, Intermediate and Autumn, secondarily 3 classes in Summer type (SI, SIp, SII), 2 classes in Intermediate type (MIII, MIV), and 3 classes in Autumn type (AV, AVI, AVII)."

A large table shows these relationships. Address: Laboratory of Crop Science, Faculty of Agriculture, Kyoto Univ., Japan.

517. Kurakake, T. 1949. Soybeans in Japan. *Soybean Digest.* Oct. p. 18, 20.

• ***Summary:*** "Though soybeans have been grown for centuries in Japan the tendency has been to neglect them due to a lack of ingenuity among farmers in improving varieties, to the fact that government laboratories did not take measures to improve them, and to the fact that growth was rather satisfactory even when they were allowed to grow naturally.

"It is very difficult to find out the number of varieties in Japan, but the Japanese Soybean Association estimates the number at more than 1,000. The reason for this large number is assumed to be that they appeared naturally during the long span of time over which they were grown in the various localities.

"Experiment Stations: In Japan, each prefecture has its own agricultural experiment station, and each experiment station selects varieties that are most suitable for the prefecture and encourages the farmers to grow them. There are about 170 of these recommended varieties. Of the above, about 10 are the result of cross breeding carried out at the experiment stations; about 50 to 60 are by selection and the remainder are produced naturally.

"The characteristics of good varieties in Japan have been: resistance to disease, high yield and a good taste when roasted. However, recently soybeans have been looked on as a source of oil because of the shortage of fats and oils, and soybeans with high oil content are in great demand.

"Japanese soybeans are classed as summer, autumn and intermediate types according to the planting and maturing periods. Summer type varieties are planted in April and May. The flowers bloom with the high temperatures of the early summer, and the beans can be harvested in late July or early August. The period from planting to harvest is from 90 to 100 days.

"It seems that the summer varieties are generally heat-sensitive and have relatively low photo-sensitivity. They are widely grown in the plains of western and eastern Japan and in Hokkaido. Most of the varieties grown in Japan are of this type. Usually they are small-seeded.

"The autumn type soybean in contrast to the summer type is highly photo-sensitive and has almost no heat sensitivity. It is planted from the middle to the latter part of June. Flower bloom is accelerated as day length is shortened after mid-summer. The beans are harvested in November. The time from planting to harvest is more than 130 days. Varieties of this type are usually grown in the western part of Japan where it is relatively warm. But the acreage is comparatively small.

"Varieties of the intermediate type are in between the summer and autumn types. Planting is from May to June. They have photo- and heat-sensitivity to about the same extent, and require from 100 to 130 days to mature. This type is grown widely in northern Japan with the exception of the mountainous districts of eastern Japan and Hokkaido, and the number of varieties is next to the summer type.

"The total soybean acreage and production in Japan has been declining since about 1910, which was the peak. The acreage during the latter part of the 1880's was more

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than 400,000 chobu [1 chobu = 1 chô = 2.45 acres] with a production of over 300,000 tons. Acreage and production gradually increased to about 460,000 chobu and 500,000 tons. However, with this as the peak, acreage and production have gradually decreased so that since the Pacific War acreage has been 220,000 chobu and production 200,000 tons. With the decrease in acreage and production there was also a decrease in yield per area planted.

"During the same period, from the 1880's to just before the Pacific War, the yield of rice, wheat and barley increased from 180 to 200 percent, but that of soybeans fell from 20 to 30 percent from the peak period. The reduction in yield shows to what extent the farmers neglected improvement of varieties, while the government was inactive and without progressive policies.

"Were unprofitable: Another reason for the decline is that soybeans were an unprofitable crop for farmers. Japan began to import large quantities of cheap Manchurian and Korean soybeans during the 1890's. As a result the farmers in Japan were compelled to sell their soybeans at a cheap price. At about the same time the capitalistic economy began to develop in Japan with the gradual evolution of exchange economics. Japanese farmers quit planting unprofitable crops and changed over to more profitable ones. Soybeans were replaced with mulberries for silk raising, orchards, vegetables and sweet potatoes.

"Soybeans were always sold at about 60 percent of the price of rice and at about the same price as fertilizer. Actually much of the soybean crop in Japan was formerly used as fertilizer.

"However, in spite of the fact that soybeans were an unprofitable crop, they did not disappear entirely from the farms in Japan. Farmers continued to plant them not as a commercial crop but for their own consumption. Only the excess above their own needs was sold on the market.

"The districts where soybeans are grown most widely are areas where agrarian economics is most backward–in the mountainous areas of Tohoku, Hokuriku or Kanto and in the Kyushu area. In the advanced agricultural areas they are limited to the banks of rice paddies, roadsides or plots around the houses. In other words, the existence of soybeans indicates feudalism in Japan. Under such conditions there is no opportunity to improve varieties to fit specific farms. Here lies the answer to the question of why the soybean declined in importance year after year but still continued to exist.

"The rise and fall of soybeans in Japan has a very close relation with the importation of foreign soybeans, which has increased six-fold since 1897.

"The principal exporters of soybeans to Japan were Manchuria and Korea. Quantities imported by Japan gradually increased from about 200,000 tons during the 1910's to 800,000 tons following 1928. As a result of this large quantity of cheap soybeans, domestic soybeans were almost neglected.

"However, defeat in war caused a great change in the soybean picture in Japan. Japan lost Manchuria and Korea and the importation of soybeans from these territories was completely cut off. As a result, Japan faced a grave fats and oils and protein shortage.

"Total imports of soybeans since the war have been less than 10 percent what they were before the war.

"Formerly, the greater part of the soybean meal obtained after the extraction of the oil was used as fertilizer or livestock feeds; but soy bean oil meal and soy flour imported from the United States are now used for making miso and shoyu. This indicates the critical shortage of soybeans."

Note: This is one of the most interesting articles we have ever seen on the history of soybeans in Japan from the late 1800s until 1949. Address: Secretary, The Japanese Soybean Assoc., Tokyo, Japan.

518. *Vegetarian News Digest* (*Los Angeles*). 1949. Health in the news: The soy bean–wonder food of many uses. 1(9):21. Sept/Oct.

• ***Summary:*** "Allan K. Smith of the Northern Regional Research Laboratory, Peoria, Illinois, recently returned to the United States from the Orient where he learned of countless uses for soy beans. In China, Japan and Korea he found soy beans being fermented, ground, and processed in various ways. In its motherland, Smith discovered, the soybean is a source of flour and cake, oil, bean sprouts, vegetable milk, various sauces and pastes, curd, cheese, and several other foods." Describes how soy milk is made in China. One restaurant that Smith visited prepared more than 25 different dishes from soybeans.

519. Haswell, James M. 1949. Top farm researcher retires from U.S. post: turned soybeans to gold. *Detroit Free Press* (*Detroit, Michigan*). Nov. 30. p. 13. Wednesday.

• ***Summary:*** "William J. Morse, who made the soybean a source of wealth to America, will retire from the Department of Agriculture Wednesday." For 42 years he did plant research for USDA. "Few men living have contributed more to American farming.

Two decades ago, Morse explored the farming areas of China, Korea, and Japan for almost three years. He returned to the United States with hundreds of new soybean varieties. From among these varieties, Morse supplied researchers and farmers with soybeans adapted to various American localities, soybeans with greater oil content and soybeans that were better to eat.

The soybean was little more than an Oriental curiosity before Morse's trip.

Morse, who now lives in Washington, D.C., has been honored many times for his successful promotion of and research on soybeans. He now plans to use his retirement time to finish a book he is preparing on soybean foods. Address: Of our Washington Bureau.

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520. *Packer* (*The*). 1949. William J. Morse, soybean pioneer, retires from USDA. Dec. 17.

• ***Summary:*** Beltsville, Maryland, Dec. 16–William J. Morse, pioneer in soybean development and a world authority on the crop that now produces 200,000,000 bushels a year, has retired as an active USDA official, but plans to retain his lifelong interest in the subject by finishing another book, this one on soybean foods."

Note: Perhaps this is the book mentioned many times in the Log of the Dorsett-Morse expedition to East Asia, 1929-31.

After 22 years' research with soybeans, Mr. Morse visited China, Japan, Korea and Manchuria about 20 years ago in search of various types of soybeans and other crop plants. He returned after two years with hundreds of varieties, many of which contributed to the improvement of American strains. His research led the way to making it the important food, feed, and industrial crop of today.

"Mr. Morse has received numerous awards for his research, and was given an honorary life membership in the American Soybean Association. He is co-author of the book, 'The Soybean,' written in 1923, and still the standard work on the subject."

521. *Soybean Digest.* 1949. W.J. Morse retires after 42 years. Dec. p. 30.

• ***Summary:*** "William J. Morse, known throughout the world, but particularly in the United States and the Far East, for his work in soybean development here, retired Nov. 30 after 42 years in the U.S. Department of Agriculture. A native of Lowville, New York, and a graduate of Cornell University, he went to the Department in 1907 just at the time the Bureau of Plant Industry was making plans to carry on research in the growing of this crop.

"The plant, introduced from time to time from China, Manchuria, Korea, Japan, and other parts of Asia, had been known here for a century, but had increased to only a few thousand bushels a year. Now, after the long period of search and research, it is highly productive, with varieties suitable for various areas, is grown to the extent of 200 million bushels a year, and is listed on the grain exchanges. Most of the great increase has come in the past 20 years, much since the beginning of the production stimulus of World War II.

"Twenty years ago, after having put in 22 years of research in the Department, Mr. Morse spent 2 years exploring for soybeans and other crop plants, and looking for lore and farming practices, in China, Japan, Korea, and Manchuria. He returned with hundreds of varieties, many of which contributed to the improvement of the strains already here.

"By his development work he supplied the country with varieties suitable for various localities, increased the oil content of some–a big factor in the industrial use of this crop, and made other varieties better for food use. He stimulated the development of the vegetable soybean in this country. The soybean had been little more than a curiosity until research in the Department, largely by Mr. Morse, led the way to making it the important food, feed and industrial crop of today. In 1947 the Department gave Mr. Morse a Superior Service Award and the same year the American Soybean Association, of which he was three times president, gave him an honorary life membership. Mr. Morse has published more than 75 bulletins and articles on soybeans and is co-author of *The Soybean*, published in 1923 and still the standard work on the subject, often referred to as 'the soybean bible.' On his retirement he plans to finish a book on soybean foods.

"The records of the Department provide many statements of his superiors indicating good reasons for the success of his work: 'A most able man, highly efficient and productive–painstaking and industrious'... 'brought about the use of the soybean as human food in this country'... 'has marked ability in obtaining enthusiastic and harmonious cooperation.'

"Mr. Morse and his wife live at 6809 Fifth St., N.W., Takoma Park (Washington) D.C."

Photos show: (1) William Morse (portrait, taken in 1931). (2) Morse and American Soybean Association Director H.I. Cohn standing in a field of soybeans.

(3) An excellent cover portrait photo of Morse.

522. Pando: New U.S. domestic soybean variety. 1949.

• ***Summary:*** Sources: Bernard, R.L.; Cremeens, C.R. 1970. "Evaluation of maturity group 00 to IV named varieties of the U.S.D.A. soybean collection." Urbana, Illinois: United States Regional Soybean Laboratory. iii + 31 p. Dec. RSLM 244. (A revision of RSLM 205, 1960). See p. 12-13. "Variety: Pando. Prior designation: --. Source: Korea, 1947. Year named or released: 1949. Developer or sponsor, year selected: Dept. of Horticulture, Univ. of New Hampshire."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 16-17. Pando is in the USDA Germplasm Collection. Maturity group: 000. Year named or released: 1949. Developer or sponsor: Department of Horticulture, University of New Hampshire. Literature: 18. Source and other information: From Korea by Prof. Meader, University of New Hampshire, in 1947. Prior designation: None.

Letter from Richard Bernard, soybean breeder, Univ. of Illinois. 1999. Sept. 9. "Pando from Korea was apparently released as a vegetable type (see enclosed letter from H.W. Johnson). The only published record I have is Bernard and Cremeens 1970." Address: USA.

523. Lehman, Samuel G. 1950. Purple stain of soybean seeds. *North Carolina Agricultural Experiment Station, Bulletin* No. 369. 11 p. Feb. [5 ref]

• ***Summary:*** "Introduction: The purple stain disease was first

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reported in 1921 in Korea [by K. Suzuki] where it appeared as a purple discoloration of the seeds. A few years later (2) it was shown that this discoloration is the symptom of a disease caused by growth of a fungus in the seed coats.

"In the United States, the disease was first recognized in Indiana in 1924 (3), and North Carolina in 1927 (4). It has since been found in Illinois, Maryland, Delaware, Virginia, South Carolina and probably occurs to some extent in most other states where soybeans are grown. Other names which are sometimes used for the purple stain disease are 'purple blotch,' 'purple speck,' and 'purple seed stain.'"

"Summary: The purple stain disease of soybeans was first recognized in North Carolina in 1927. Since that time it has become much more prevalent and now occurs in harmful proportions in some parts of the state.

"It is caused by a fungus which survives in infected seeds and spreads from plant to plant by means of wind-blown spores. The disease affects seeds, pods, stems, and leaves but is most easily recognized on seeds where it produces a pink or purple stain of the seed coat.

"In all but a very small proportion of infected seeds the fungus is confined to the seed coat. It is doubtful that the disease reduces the value of soybean seed for milling purposes.

"Infected seeds germinate almost as well as normal seeds, but seedlings from infected seeds are likely to be stunted or killed after emergence from the soil. Diseased seedlings are the primary source of spores which infect leaves, stems, and pods later in the season.

"Soybean seed, whether visibly diseased or not, should be treated with a fungicidal seed protectant before planting. Arasan, or Spergon may be used for this purpose. Apply two ounces of Arasan or Spergon to each bushel of soybean seed. Arasan SL and Spergon SL may be applied as a slurry.

"Some varieties of soybeans are more susceptible to purple stain than others. Ogden usually has a much higher percentage of diseased seeds than Roanoke. Farmers who wish to grow the Ogden variety should plant seed that shows no purple stain." Address: Prof. of Plant Pathology, Raleigh, North Carolina.

524. Fletcher, Merna Irene. 1950. Changes in world soybean production in 1949. *Soybean Digest.* June. p. 20-21, 28.
• ***Summary:*** The USA is again the world's largest soybean producer, followed by China and Manchuria. All three countries reported smaller soybean crops in 1949 than in 1948. Production in Canada continues to increase, as it has for the past 6 years. Canada's average yield per acre was 25.1 bushels/acre or nearly 3 bu/acre higher than the U.S. average. Brazil is the only other country besides Canada in the Western Hemisphere with recorded soybean production for 1949. Brazil produced an estimated 1 million bushels in 1949, which is double the figure for 1947. Slightly more than half the 1948 crop was exported. European production continues to decline. The only country reporting during 1949 was Italy, which had only 52,000 bushels, compared with 107,000 in 1948. Production in the USSR is increasing. "The extensive research program begun several years ago is no doubt bearing fruit, particularly in the Soviet Far East where Balzac (*Economic Geography of the USSR*, American edition) reports a big development in the Amur-Ussuri River Valley.

"The major decline in world production occurred in Asia, more specifically in Manchuria and China... No figures have come out of North Korea since 1946. Previously it was the great producing area of the country. South Korean production continues to show marked increase. The 1949 crop of 6,654,000 bushels is 1.7 million bushels more than was produced in that area in 1948. The average production for Korea from 1935-39, when most of production was in the north, was 17,654,000 of which less than 2 million bushels were produced in South Korea."

In Africa, Tanganyika reported only 36,000 bushels, less than half the 1948 crop. The Union of South Africa reported 80,000 bushels, the largest soybean crop ever produced there.

525. Miso Manufacturing Experiment Administration Committee. 1950. Miso jôzô shiken hôkoku [Report of the experiments on miso manufacturing, May 1950]. *Shokuryo Kenkyujo Kenkyu Hokoku* (*Report of the Food Research Institute*) No. 4. p. [iii] + 1-84 + 1-90 + 1-32. Sept. English translation (32 p.) is bound at the end of Issue No. 4. [Jap; Eng]
• ***Summary:*** The first three parts of this article (177 p.) are in Japanese and the last part (32 p.) is a detailed English summary.

Contents (English summary): 1. The circumstances which led to make the miso manufacturing experiments: The general aspects of raw materials for miso, the circumstances which led to set about the experiment work.

2. Experiment methods and experimental results: The experiment methods, marking by means of functional testing (frequency curve, analysis of variance and minimum differences required for significance among average marks, discussion), chemical analysis (raw materials, chemical analysis of defatted soy-beans, non-defatted soy-beans, and corn-meal, denaturation of protein in defatted soy-beans, enzymic digestion of defatted soy-beans), finished goods (miso) (general analysis, correlation between the analytical results and the functional testing results, nitrogenous compounds, judgment for finished goods by dividing into 3 grades, analysis made by excluding the disparity among manufacturing plants, judgment for the results of finished goods, by manufacturing plants (minimum significant difference–2.39)).

3. Conclusions: Premises, 50% koji products, 100% koji products, 150% koji products.

4. Discussion. 5. Appendix–Experiments on a laboratory

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scale: Object of experiments and outline thereof, koji-making experiment, conclusions.

In the years before World War II, annual consumption of soybeans in Japan was not less than 1,000,000 tonnes (metric tons), of which 300,000 tonnes were grown in Japan and the remainder was imported from Manchuria and Korea. Out of this 1,000,000 tonnes, about 700,000 tons are estimated to have been consumed as foods or seasonings; approximately 250,000 tonnes were used as raw materials for miso, which is one of Japan's most important seasonings.

Concerning miso consumption in the years just before World War II, exact figures are not available, but it can be roughly estimated at about 150 million *kan* (1 kan = 8.27 pounds), or a little more than 2 *kan* (ca. 16.5 lb) per person per year.

In those days, miso was made to suit public tastes in the various regions of Japan, and there were various kinds of miso according to the region. Miso can be grouped into three basic types: soy-bean miso (*Mame miso*) salty miso, and sweetish miso. Describes briefly how each of the three types was made. One table (p. 2) shows the ingredients used to make each of these three types: (1) Soy-bean miso: Soy-beans 10 *koku* = 1,800 liters. Salt 110 *kan* = 909.7 lb = 413.5 kg. Ripened miso 1,000 *kan* = 8,270 lb = 3,759.1 kg.

(2) Salty miso: Soy-beans 14.0 *koku* = 2,250 liters. Milled rice or milled barley 7.0 *koku* = 1,260 liters (made into koji). Salt 185 *kan* = 1,530 lb = 695.4 kg. Ripened miso 1,650 *kan* = 8,270 lb = 3,759.1 kg.

(3) Sweetish miso: Soy-beans 12.8.0 *koku* = 2,304 liters. Milled rice or milled barley 15.7 *koku* = 2,826 liters (made into koji). Salt 94 *kan* = 777.4 lb = 353.4 kg. Ripened miso 1,700 *kan* = 14,059 lb = 6,390.5 kg.

As late as 1941, due to food shortages, miso was brought under Japanese government control; from that time until the end of the war, miso production gradually decreased. Starting in about 1944 only one type of miso was made for all the regions of Japan–a type of salty miso. 100 *kan* of miso was made using 34 *kan* of soy-beans, 16 *kan* of milled rice or barley, and 15 *kan* of salt. Efforts were made to shorten the fermentation time by using a quick ripening method [a heated or warm environment].

At the end of World War II, Japan was unable to import soy-beans from Manchuria [and, to a lesser extent, Korea]. This dire soybean shortage led to a sharp decrease in miso production; Japan started to use defatted soybean meal and defatted soy flour (imported from the USA) in place of whole soybeans, and sweet potatoes or imported corn instead of some rice or barley, to make miso. The quality of miso dropped. The experiments described in this report represent an attempt to improve miso quality scientifically, mainly by investigating how to use defatted soybean meal to make better quality miso. Address: Food Research Inst., Shiohama 1-4-12, Koto-ku, Tokyo, Japan.

526. Heller, David. 1950. The rise of the soybean. *Farm Quarterly* 5(3):30-33, 126-27. Autumn.
• ***Summary:*** A good review of soybean production in the USA, past, present and future.

Photos show: (1) "The father of the soybean, William J. Morse, inspecting a large basket of soybeans in a remote Korean village." He is squatting, dressed in a white driving cap and black overcoat. (2) A Michigan farmer holding up two varieties of soybeans. The bushy plant in his left hand is the new Hawkeye, whereas the thin one in his right is Earliana [Earlyana]. Plant breeders have worked with soybeans for half a century to develop beans for every use. (3) Farmers in a village in East Asia; taken by the Dorsett-Morse expedition. After centuries of isolation, each community had its own soybean varieties, and many of these were given to W.J. Morse. (4) Men driving two tractors weeding soybeans planted in long, straight rows like corn. The beans do best when planted like this in fertile soil. (5) Experimental paints are tested on these outdoor panels at the Northern Regional Research Lab., Peoria, Illinois. Soybean oil is less expensive than linseed oil and makes good paint. (6) A combine harvesting a field of soybeans. The mulch it leaves can add as much as 16 pounds of nitrogen to the acre and protect against soil erosion. Address: Washington Post.

527. Burtis, E.L. 1950. World soybean production and trade. In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 61-108. [17 ref]
• ***Summary:*** Contents: 1. Historical summary. 2. The Far East: China, Manchuria, Korea, Japan, Netherland Indies, other countries of Asia, net foreign trade of Asia. 3. Europe: Production, foreign trade. 4. United States: Varietal development, trends in planted acreage, soybeans for seed, acreage and production of soybeans for hay, vegetable-type soybeans, growth of the soybean-processing industry, soybean oil production, trade, and utilization, production and utilization of soybean oil foots (the residue from refining), soybean meal and other soybean protein products (incl. soybean flour, soybean glue, and other industrial soybean products). 5. Minor world areas.

Korea: Soybeans are a major crop, especially in the northern part of the country.

Tables: (2) Soybean production in leading countries and estimated world total, 1922-1948. Statistics are given for China (excluding Manchuria), Manchuria, Korea, Japan, Formosa [Taiwan], Netherlands Indies [Dutch East Indies, later Indonesia], United States, Canada (1936 on), USSR (1928-1938), 5 Danubian countries (Austria, Yugoslavia, Hungary, Rumania, and Bulgaria, 1934 on, partly estimated by author).

(3) Net exports or imports of soybeans (million bushels) by major exporting and importing countries, 1909-1913 and 1922-1948. China and Manchuria (combined) dominate

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world soybean exports from 1910 to 1940, with the peak year being 1929 (100 million bushels) and with more than 50 million bushels being exported every year from 1926 to 1939. But by 1941 exports as fallen to almost zero. The only other exporter was the USA, which had its first net soybean exports in 1932 (4.2 million bu); this rose to a peak of 10.5 million bu in 1939 then dropped to almost zero during World War II. Europe was the largest a net importer of soybeans from 1910 to 1948; the peak years were 1929 and 1933, when 62.6 million bushels were imported. Japan was the second largest net importer of soybeans from 1910 to 1948; the peak year was 1938, when 29.8 million bushels were imported. The Netherland Indies (today's Indonesia) is the only country from Southeast Asia in this table. The country imported 2.0 million bushels in 1913. Imports steadily decreased from 4.2 million bushels in 1922 to less that 50,000 bushels in 1936. Then the country switched to being an exporter, with 400,000 bushels in 1937, and averaging about 300,000 bushels per year from 1937 to 1941. Trade stopped during World War II (1942-1947) then resumed again in 1948 with 200,000 bushels of exports. Other countries mentioned in Table 3 include Korea, Formosa, United Kingdom, Germany, France, Belgium and Luxembourg, Netherlands, Denmark, Norway, Sweden, Italy, Danubian countries (Yugoslavia 1931-39, Bulgaria 1934-45, Rumania 1935-38).

(4) Net exports or imports of soybean oil (million pounds) by major exporting and importing countries, 1909-1913 and 1922-1948. (5) Net exports or imports of soybean cake and meal (thousands of metric tons) by major exporting and importing countries, 1929-1948. (6) Net exports or imports of soybean oil and soybean in terms of oil (million pounds) by major exporting and importing countries, 1909-1913, 1922-1948.

(7) Net exports or imports of soybean cake and meal and soybeans in terms of meal (thousands of metric tons) by major exporting and importing countries, 1929-1948. (8) Apparent consumption of soybean oil and soybean cake and meal by principal European countries, 1929-1938 (based on tables 3-7). (9) Soybean acreage grown in the United States for all purposes (equivalent solid acreage), by states and groups of states, 1924-1948 (1,000 acres).

(10) Soybean acreage harvested for beans in the United States, 1924-1948 (1,000 acres). (11) Soybean production in the United States, by states and groups of states, 1924-1948 (1,000 bushels). (12) Soybean supply and disposition in the United States, 1924-1948 (1,000 bushels).

(13) Acreage and production of soybeans, soybeans processed for oil and meal, and soybean oil produced in the United States, 1924-1948. (14) Soybean oil production, trade, (imports and exports), stocks (crude basis), and domestic disappearance in the United States, 1910-1948 (1,000 pounds; compiled from reports of the Bureau of the Census). (15) Soybean oil utilization by classes of products in the United States, 1931-1948. Food products: Margarine, shortening, other, total. Nonfood products: Soap, paint and varnish, other drying oil products, miscellaneous non-food products, loss, incl. oil in foots, total. Total domestic disappearance. One table is in 1,000 lb.; a 2nd is in per cent of total.

(16) Supply and utilization of soybean protein products (meal basis) in the United States, 1921-1947 (1,000 metric tons). For each year is given: Estimated production, imports or soybean cake and meal, total supply, exports of soybean cake and meal. Domestic utilization in: Full-fat soybean flour, low- and medium-fat soybean flour, soybean glue for softwood plywood, soybean glue for hardwood plywood, other uses (largely feed for livestock).

A map (p. 90) shows soybeans harvested for beans in the USA, 1944. Each dot represents 2,000 acres.

A graph (p. 105) shows tonnage of high-protein feeds fed to livestock, 1926-1947. Within this are four graphs for: Soybean cake and meal, other oilseed cake and meal (mostly cottonseed), tankage and meat scraps, fish meal, dried milk products, gluten feed and meal, and (beginning 1935) brewers' and distillers' dried grains, and total.

A graph (p. 66) shows world soybean production from 1922 to 1949. The data is from Table 2. Within this are graphs for USA and for East Asia (incl. China, Manchuria, Korea, and Japan).

One bar chart (p. 73) shows domestic consumption and net exports of soybeans and soybean oil, in terms of oil (million lb.), by principal consuming countries, annual average, 1929-1938 (Based on tables 2-4. Oil equivalent of soybeans calculated at 8.4 pounds per bushel). By far the biggest consumer is China. By far the biggest exporter is Manchuria. Others: Japan, Germany, United States, Korea, Netherlands Indies, United Kingdom, Netherlands, Denmark, Other Europe (except U.S.S.R.).

Another bar chart (p. 74) shows domestic consumption and net exports of soybeans and soybean meal, in terms of meal (1,000 metric tons), by principal consuming countries, annual average, 1929-1938 (Based on tables 2, 3, 5, and 7. Meal equivalent of soybeans calculated at the rate of 0.02117 metric tons per bushel). The biggest consumer is China, followed by Japan. By far the biggest exporter is Manchuria. Other small exporters: Germany, United States, Korea, Formosa, Netherlands Indies, Denmark, United Kingdom, Other Europe (except U.S.S.R.). Address: Bureau of Agricultural Economics, USDA, Washington, DC.

528. Burtis, E.L. 1950. World soybean production and trade: Historical summary (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 61-63. [17 ref]

• ***Summary:*** "World soybean production and trade have passed through three major stages of development. In the first

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phase, extending from prehistoric times to 1908, soybean production and trade were confined almost exclusively to eastern Asia. Uncultivated species of soybeans still grow wild in North China, Manchuria, and Korea. Apparently culture of soybeans as an agricultural crop originated in that area, and spread first to Japan, Formosa, southern China, Indo-China, Siam, the northern border districts of India, and the Netherland Indies.

"In North China, Manchuria, Korea, and Japan, soybeans have long been a major crop. They are mentioned in ancient Chinese writings as one of the five sacred grains. Farther south, soybeans are less important both in agriculture and in the diet.

"A lively coastwise trade in soybeans, soybean cake, and soybean oil was carried on between Manchurian and southern Chinese ports for centuries before Chinese ports were opened to foreign ships in the mid-1800's. Exports of soybeans and soybean products from Manchurian ports to Japan increased rapidly in the late 1800's, especially after China made special trade concessions at the end of the Sino-Japanese war in 1895. Japanese import demand for soybeans and soybean cake was strong, and the population of Manchuria was growing rapidly. Opportunities in Manchuria attracted a steady stream of agricultural workers from northern China after restrictions on immigration to Manchuria were relaxed by the Chinese government in the third quarter of the 19th century.

"The second stage of development in soybean production and trade, extending from 1908 to 1939, was marked by large exports of soybeans and soybean oil from Manchuria to Europe. The beginning of this trade was an indirect result of the Russo-Japanese War in 1904-1905. Food requirements for Japanese troops stationed in Manchuria had led to an increase in production of soybeans. When these troops were withdrawn, a surplus of soybeans developed. At the same time, the Japanese acquired a substantial interest in the Manchurian export trade through their lease of the South Manchurian Railway and development of the port of Dairen at the southern end of the railway.

"Japanese firms in 1908 made several shipments of Manchurian soybeans to England, where the soybeans were found to be a suitable source of oil for soap manufacture and meal for use in mixed feeds for livestock. Nearly all previous shipments of soybeans from the Orient to Europe had arrived in an unsatisfactory condition largely because of poor shipping practices. Exports of Manchurian soybeans to Europe increased rapidly after 1908. At first these shipments went to England, but by 1910 to other European countries also, especially Germany, Denmark, and the Netherlands. After an interruption during World War I, trade with Europe continued to grow, reaching a peak in the late 1920's and early 1930's. Soybeans were one of the leading materials processed by the expanding oilseed-processing industry in Europe.

"Large exports of soybean oil from Manchuria to Europe also developed, beginning about 1910 and reaching a peak in 1926. Soybean-processing capacity in Dairen grew along with this trade; the oil mills in Dairen produced largely for export and by 1924 accounted for about half the total soybean-processing capacity located along Manchurian railroads. Exports of Manchurian soybean cake also were large in the 1920's and 1930's, but the cake was too high in oil and water content to stand the tropical sea voyage to Europe and therefore went mainly to Japan, Formosa, and Korea.

"The growth of imports of Manchurian soybeans and soybean oil into Europe was the natural consequence of an active European import demand for fats and oils and protein concentrates, and a vast immigration from China into the relatively empty but fertile Manchurian farmlands during the 1920's.

"The third and present stage in the world history of soybeans is marked by the pre-eminence of the United States in production and processing of soybeans for oil and meal. This phase began in 1940 when war disrupted the trade between Manchuria and Europe. Exports of soybeans from Manchuria to Europe had not been resumed by 1948, except for small quantities moving through northern China ports.

"Soybeans were very little grown before 1910 as an agricultural crop in the United States. Production first began to assume commercial importance during World War I; it showed a steady upward trend in the 1920's and early 1930's, expanded rapidly after 1936, and in 1942 rose sharply to a new high level in response to strong wartime demand for domestic sources of fats and oils and oilseed meal. Soybean acreage and production were well maintained through 1948. Soybeans are well adapted to the climate and soils of the Corn Belt and to the crop rotations and mechanized farming practiced in the Corn Belt.

"Since the early 1920's the soybean-processing industry in the United States has actively carried on research to improve methods of processing soybeans and soybean products and to develop new uses and markets. Mill capacity has always been ample for the increasingly large output available for processing, except early in World War II, when steel and other materials needed for new additions were reserved for more urgent war uses. The United States soybean-processing industry now stands first in the world in size and in technical knowledge and ability." Address: Bureau of Agricultural Economics, USDA, Washington, DC.

529. Klose, Nelson. 1950. America's crop heritage: The history of foreign plant introduction by the federal government. Ames, Iowa: Iowa State College Press. x + 156 p. See p. 11-15, 119, 134-36. Illust. Portraits. Maps. 24 cm. [34* ref]

• ***Summary:*** Contents: Foreword, by David G. Fairchild

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(The Kampong, Sept. 1949). Preface. 1. Early American agriculture: Methods and terminology, colonial introductions, introductions of the eighteenth century, contributions of individuals, public experimentation and exploration (Trustee's Garden of Georgia in Savannah laid out in 1733 by General James Oglethorpe to grow silk, rice, and indigo, contribution of Royal Botanic Gardens at Kew–founded in 1760, Sir Joseph Banks director for 48 years, sends first professional plant hunter, Francis Masson, to Africa in 1772 for 3 successive years, plant explorer David Nelson, Captain William Bligh and the mutiny on the *Bounty* intended to introduce the seedless breadfruit tree into the West Indies as a food for slaves, the work of John Ellis). 2. Search for new crops 1770-1840: Introductions by statesmen (Benjamin Franklin, George Washington, Thomas Jefferson), work of agricultural societies, Dr. Henry Perrine. 3. Federal promotion of crops: The Treasury Circular of 1819, the Treasury Circular of 1827, assistance of the Navy (The Perry Expedition to Japan and James Morrow), Diplomatic assistance. 4. Leadership of the Patent Office 1836-62: First agricultural appropriation (Oliver Ellsworth, head of the Patent Office during this period, was instrumental in securing the appropriation of $1,000 in 1839), work of the Patent Office (and Commissioner Ellsworth), agriculture under the Department of the Interior (Ellsworth, Charles Mason, D.P. Holloway, D.J. Browne, distribution of seeds incl. supply of foreign seeds from the seed firms of Vilmorin-Andrieux in Paris [France], Charlwood and Cummings in London [England], Ernst Von Spreckelsen and Co. in Hamburg [Germany], and William Skirving in Liverpool [England], seed distribution curtailed), separate crop histories (tea and Robert Fortune, sorghums for sugar), miscellaneous introductions. 5. The commissionership 1862-69: Aims and methods of the commissioners (Isaac Newton, Horace Capron, Frederick Watts, William Le Duc, Norman Colman), international exchange of plants. 6. Main importations: Wheat and small grains, oats, fiber crops, grapes, citrus fruits, tea. 7. Lesser importations: Sugar crops, fruits, vegetables, tropical plants, pasture and forage crops, trees. 8. Plant introduction under Rusk and Morton: Distribution of seeds and plants, promotion of special crops, the division of pomology, fiber and forage crops. 9. Bonanza years: Problems facing agriculture, work of plant explorers (Fairchild and Lathrop, Niels Hansen, Mark Carleton, Seaman Knapp). 10. Plant introduction of the twentieth century: Search for new crops, introductions by Meyer, significant introductions 1901-13, the war years [World War II], looking to the future.

Benjamin "Franklin's name is linked with the history of three field crops which achieved economic importance: upland rice, broom corn [broomcorn], and soybeans... He became enthusiastic over the soybean as a result of his membership in the French Academy of Sciences. Soybeans sent from China to France as early as 1740 were grown after 1779 in the famous Botanic Garden of Paris. From France, Franklin sent some of the seeds to the United States, but the soybean did not find a favorable reception until the technology of the twentieth century demanded it" (p. 14).

"O.F. Cook, in 1898, began the 'Inventory of Plants Introduced" in which numbers were assigned to each new item and information given on its origin, nature, value, and cultivation" (p. 110).

Chapter 10–"Introductions of the twentieth century. David G. Fairchild took charge of the Office of Foreign Seed and Plant Introduction in 1897, and held that post, except for tours of exploration, for twenty-seven years. Under his leadership the Office set up an efficient system for disseminating plants, and experts in different parts of the country were employed to locate new plant materials. In 1902 Fairchild's division came under the jurisdiction of the new Bureau of Plant Industry. Three other divisions–the Arlington Experimental Farm, Congressional seed distributions, and tea investigations–were established at the same time. When the Bureau of Plant Industry was organized in 1900, it was the first official agricultural organization of its kind devoted exclusively to plant introduction. In addition to the four branches listed above, there were divisions concerned with physiology and pathology, botany, grass and forage plants, pomology, and the experimental gardens and grounds. Under Beverly T. Galloway, the Department's leading plant pathologist, more than two hundred employees were engaged in plant work... The Arlington Farms and Potomac Flats were located in Washington, DC, and an eighty-acre garden at Chico, California" (p. 120).

One of America's outstanding plant explorers, Frank N. Meyer, made four trips to Asia over a period of 12 years (1905-1918) and sent back more than 2,500 introductions. His four trips and important plant discoveries on each are summarized. "On his last trip to China in 1918, Meyer disappeared from the deck of a steamer plying the Yangtze River. There is some indication that he may have committed suicide, for his letters reveal that the mental and physical hardships of his lonely existence may have broken his will to live" (p. 122-23). An excellent photo (facing p. 124) shows Frank Meyer.

There was a shift in emphasis from introduction to breeding, hybridization, and selection after William A. Taylor succeeded Galloway in 1913 and during the 1920s.

"Soybeans from Asia are probably the most outstanding plant introductions since the Kharkov and durum wheats. Economic products of the soybean plant, now a major field crop, include hay, forage, food and feed products, and oil for many industrial uses. Recent introductions of the soybean have been merged by breeding, into new, superior plants with little resemblance of the original.

"Interest in the soybean as a commercial crop began with the introduction of three varieties from Japan in 1900. Nearly three hundred varieties were obtained in China,

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Japan, and India in 1909. The Department recommended soybeans as a crop that could be substituted for cotton in the South.

"In 1910, twenty soybeans from a group of 350 under test were selected for wide distribution. Three hundred varieties received from Korea and northern Manchuria in 1914 were expected to extend soybean cultivation northward in America...

"The distribution of soybeans was a prominent feature of crop seed distribution after 1914, Estimated value of the crop of 2,500,000 acres was $23,917,500. Because of its contributions to the new industry, the Bureau of Plant Industry claimed credit for half its value. Ryerson, in 1933, stated that all but three of the twenty varieties of soybeans then in cultivation were found by the Office of Plant Introduction.

"When it became clear that the soybean would be a major crop, the Department decided to send two explorers to search the soybean areas of Japan, Sakhalin, Manchuria, Korea, and China to make sure our farmers would have the best varieties. After two years of work, P.H. Dorsett, of the Division of Plant Exploration and Introduction, and W.J. Morse, of the Division of Forage Crops and Diseases, returned with almost three thousand varieties" (p. 135).

Table 1 (p. 57) shows seed distributed by the federal government 1862-89. The number of packets grew from 306,304 packets in 1862, to 1.2 million in 1863, to 2.22 million in 1975, to 3.62 million in 1884, to a peak of 4.667 million in 1885. The annual appropriation to fund this distribution work, which began with $25,000 in 1870, grew steadily to $100,000 in 1885. Address: Assoc. Prof. of Social Sciences, Central State College, Iowa.

530. Lautensach, Hermann. 1950. Korea: Land, Volk, Schicksal [Korea: The land, the people and its destiny]. Stuttgart, Germany: K.F. Koehler. 135 p. Illust. Maps (1 folded in pocket). 25 cm. [Ger]*

• ***Summary:*** Hermann Lautensach lived 1886-1971. Address: Prof., Dr.

531. Morse, W.J. 1950. History of soybean production. In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 3-59. [59 ref]

• ***Summary:*** Contents: 1. Origin. 2. Ancient history. 3. Modern history. 4. Description of soybean plant. 5. World distribution. 6. Climatic adaptations. 7. Soil preferences. 8. Soil erosion and practices. 9. Varieties and variety improvement. 10. Fertilizer and lime requirements. 11. Inoculation. 12. Cultural methods: Preparation of seedbed, methods of seeding, time of seeding, rate of seeding, depth of seeding, cultivation. 13. Rotations. 14. Mixture with other crops. 15. Hay production. 16. Seed production. 17. Soil improvement. 18. Diseases. 19. Insect enemies. 20. Other enemies (rabbits, pigeons, pheasants).

This chapter contains many original, interesting photos and a map. Figures (photos unless otherwise indicated) show: (1) Wild soybeans, cultivated soybeans, and *Glycine gracilis.* (2) Unloading soybeans from farm carts and storing the seed in osier bins in a Chinese merchant's storage yard–Manchuria. (3) Map of the principal soybean seed producing areas and countries of the world. (4) A soybean grain market in Korea. (5) "Fertilizer used for soybeans by Manchurian farmers is compost placed in piles in the field and scattered between rows of previous year's crop just before planting soybeans." (6) Roots of soybean plant (2 photos) showing abundant development of nodules. (7) Ordinary grain drill (pulled by a tractor) may be used in sowing soybeans in rows or close drills. (8) Soybeans sown by hand on ridges in rows about 21 inches apart in Manchuria. Two horses pull a wooden plow. (9) Korean woman planting soybeans along ridged rows. (10) Soybeans planted along edges of rice paddies in Japan, China, and Korea are used for home consumption. (11) Cultivating soybeans in rows, using a tractor-pulled rotary hoe, weeder, or harrow, in the Corn Belt. (12) Hand-cultivation of soybeans in Manchuria. (13) A field of plants: "The Korean farmer grows many other crops with soybeans: millet, mung beans, buckwheat, sesame, susu, or castor beans." (14) A field of soybeans and Kaoliang in China planted in alternate hills. (15) The combine has been one of the most important factors in the economic production of soybeans in the United States. (16) Harvesting soybeans by hand methods in Manchuria. (17) Threshing soybeans in Manchuria using a stone roller pulled over the plants by horse or donkey. (18) Primitive wind method of separating soybean seed from threshed plant material in Manchuria. (19) Korean farmers threshing soybeans with bamboo flails on the home threshing ground. (20) Japanese farmers turning under soybeans in a rice paddy for soil improvement. Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

532. Morse, W.J. 1950. History of soybean production: 5. World distribution (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 10-14.

• ***Summary:*** "The production of soybeans, which for many centuries was confined to the countries of Asia, spread rapidly after World War I to the western world, and since World War II practically all leading nations have become more and more interested in the culture and production of the crop. Agricultural experiment stations throughout the world have become engaged in the development of varieties suited to their soil and climatic conditions through introduction, selection, and hybridization. Successful results have been

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obtained in many countries and, in a few, acreage and production have increased to the extent that the crop has become an important factor in that nation's agriculture. This is especially true of the United States, Netherland Indies, Rumania, U.S.S.R., Austria, Bulgaria, and Poland.

"The principal zones of soybean production in the Orient are China, Manchuria, Korea, and Japan. In Manchuria, the soybean occupies about 25% of the total cultivated area and is a dominating factor in the economic life of the country. As a cash crop it provides fully half the farm income in the north and more than half the total volume of freight handled by the railroads. It is estimated that from one- to two-thirds of the production of soy beans is exported; 15 to 20% is utilized for food, feed, and planting, and the remainder is used for oil extraction.

"In China, the soybean is one of the principal and most ancient of crops, ranking fifth in extent of culture and occupying about 9% of the total cultivated area. Although grown everywhere in China, about 60% of the soybean acreage is confined to three northern provinces, Shantung, Kiangsu, and Honan. China consumes practically all of her production, estimates indicating more than 50% for food, 27% for oil extraction and other purposes, 10% for stock feed, and 8% for planting.

"Korea occupies third place among the soybean-producing countries of Asia. Acreage and production are confined largely to central and northern Korea, as southern Korea, which grows principally cotton and rice, seems to be less suited to the successful production of soybeans. The entire Korean production is used for food, stock feed, planting and export, and none is used for oil extraction.

"Japan, although a large producer of soybeans, has consumed all her production and has imported large quantities from Manchuria and Korea. Acreage and production of soybeans in Japan have decreased since World War I and greater emphasis has been placed on increased production of rice. The proportions of soybeans used by Japan for various purposes are: 'miso' (soybean-rice fermented paste), 22%; soy sauce, 22%; oil and oil cake, 21.5%; soybean curd [tofu], 15.5%; confections, 7.2%; forage, 6.2%; green manure, 2.5%; seed, 1.8%; green vegetable beans, 0.8%; and miscellaneous, 0.5%.

"In the Soviet Far East, the soybean is said to be one of the chief industrial crops and in some districts constitutes 20% of the cultivated area. Acreage and production have increased markedly since 1926, especially in Khabarovsk territory, the largest seed-producing area.

"South of China, the soybean is cultivated to some extent in the Netherland Indies, India, Siam, Cochin China, Philippines, and Australia. Until 1932, the production of soybeans in the Netherland Indies was not sufficient to meet the domestic demand. Since then, acreage and production have gradually increased until soybeans began to be exported to Holland about 1936. The soybean has been widely cultivated for a long time by the natives of the hilly regions from the borders of Afghanistan eastward to Burma, to northern Siam, and French Indo-China. The crop in India has been grown for its forage and food value rather than for commerce. Although successful results have been obtained in some of the provinces with varieties of good oil content, the growing of the crop as an oil seed does not appear to have been popular with the native farmers. In Australia successful results with American varieties have greatly increased acreage and production, especially in the states of Queensland, New South Wales, and Victoria.

"Although attempts to grow soybeans in European countries have extended over many years, it is only within the past few years that there has been any appreciable production. At present, production is confined largely to European U.S.S.R., Bulgaria, Yugoslavia, Austria, Rumania, and Czechoslovakia, production being largest in Rumania, Bulgaria, and Yugoslavia. In the development of adapted varieties, some progress has been made in Sweden, Poland, Netherlands, and Hungary. Because of the economic importance of the soybean, scientists of the U.S.S.R. have carried on extensive experiments with it, especially in the development of adapted varieties and utilization. At present, the principal areas of production are Ukraine, Moldavia, and certain regions in the North Caucasus.

"Experiments have been conducted with the soybean in nearly all regions of Africa but as yet it is an unfamiliar crop to the majority of African farmer. It has been grown successfully in the upland, midlands, and coastal districts of Natal [South Africa] and throughout Gambia, Nigeria, Egypt, the Gold Coast Colony, and also in the corn- and cotton-growing districts of the Belgian Congo.

"Although the soybean has been the subject of considerable experimental work in practically all countries of the Americas, little progress has been made in commercial culture except in the United States and Canada."

Note: This is the earliest document seen (Oct. 2010) that clearly refers to soybeans in Afghanistan, or the cultivation of soybeans in Afghanistan. This document contains the earliest clear date seen for soybeans in Afghanistan, or the cultivation of soybeans in Afghanistan (long before 1950). The source of these soybeans is unknown. Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

533. Morse, W.J. 1950. History of soybean production: 20. Other enemies [of the soybean] (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 56-57.

• ***Summary:*** The section rabbits and woodchucks as soybean pests is similar to that in *The Soybean* (Piper & Morse, 1923,

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p. 288). "... dusting or spraying with an arsenical poison (calcium arsenate) has prevented serious damage from rabbits.

"In many sections, deer have done much damage to soybean fields... In many of the localities from Mukden to Harbin and eastward to Antung, Manchuria, and in northern Korea many of the farmers plant hemp or perilla for about 20 to 30 feet at the ends of the rows of the soybean fields to prevent animals from doing injury to the fields.

"Pigeons, when numerous, will cause considerable injury to soybean plantings by picking off and eating the cotyledons just as the seedlings are emerging, or picking out the planted seeds from the rows. In North and South Dakota pheasants have done considerable damage to soybean fields, eating the seedlings as they appear and the seeds as the plants matured." Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

534. Morse, W.J. 1950. History of soybean production: 9. Varieties and variety improvement (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 17-23.

• ***Summary:*** "Varieties of soybeans are very numerous [especially in East Asia], no doubt because of the fact that the soybean seems to be peculiarly sensitive to changes of soil and climatic conditions." Differences in behavior of the same pure-line variety in different locations are often so striking that it is difficult to believe that the variety is the same.

In China, soybean varieties are quite numerous and "are classified according to color, size, shape, time of planting, method of planting and use. The local names of varieties differ in different localities so that it is very difficult to obtain a variety which is widely known." There has not been much organized research on soybean varietal improvement in China. "The University of Nanking has done more work of this kind than any other organization."

Although many soybean varieties are grown in Manchuria, only three types are distinguished: yellow, green and black. This has apparently been found adequate for commercial purposes. In detail, these three groups are:

(1) Hwang Tou–yellow beans. (a) Pei Mei (white eyebrow, pale hilum). (b) Chin Huang (golden yellow or golden round). (c) Hei Chi (black belly), dark hilum. These three varieties are highly prized for the quality of their oil, but Pei Mei and Chin Huang are also valued for the soybean curd [tofu] made from them.

(2) Ching Tou–green beans. (a) Green with yellow germ or cotyledon. (b) Green with green germ or cotyledon. The green bean with the yellow germ yields more soybean curd but of an inferior quality compared to that of the yellow varieties. The green bean with the green germ is preferred for making sprouts.

Hei Tou or Wo Tou–black beans. (a) Ta Un Tou (large, black), green germ. (b) Hsia Un Tou (small, black), yellow germ. (c) Puen Un Tou (flat, black), yellow germ. The Ta Un Tou is used for oil, the Hsia Un Tou for oil and Horse feeds, and the Puen Un Tou for salted fermented soybeans [fermented black soybeans].

"Most of the varieties grown by Manchurian farmers consist of a mixture of varieties of which more than 90% are yellow-seeded types." The distribution throughout Manchuria of the various types is discussed. Native Korean soybean are classified into eight different groups.

Since 1898 the USDA had brought into the United States more than 10,000 introductions from China, Manchuria, Korea, Japan, India, Netherland Indies [Indonesia], South Africa, and several European countries.

Table 1 (two pages) shows the "Characteristics of soybean varieties most generally grown in the United States," arranged into seven groups from very early to very late maturity. For each variety in every group is given: Seed color (black, brown, green, olive or greenish yellow, straw yellow), hilum color (black, brown, dark brown, light brown, pale), seeds per lb., oil %, protein %, iodine value (range: 119 to 140), pubescence color (gray, or tawny), flower color (purple, white, or purple & white), shattering (little, medium, or much), and use (commercial {grain or oil and meal}, forage, or vegetable). The groups are: (1) Very early: Agate, Capital, Cayuga, Flambeau, Goldsoy, Habaro, Kabott, Mandarin, Mandarin 507, Mandarin (Ottawa), Minsoy, Ontario [developed in USA], Pridesoy, Sac.

(2) Early: Adams, Bansei, Earlyana, Hawkeye, Illini, Kanro, Lincoln, Manchu, Manchu 3, Manchu 606, Manchukota, Mendota, Montoe, Richland, Seneca.

(3) Medium Early: Chief, Dunfield, Hokkaido, Hongkong, Jogun, Mandell, Mingo, Mukden, Scioto, Viking.

(4) Medium: Aoda, Boone, Funk Delicious, Gibson, Kingwa, Macoupin, Mount Caramel, Patoka, S100, Virginia, Wabash, Wilson.

(5) Medium late: Arksoy, Arksoy 2913, Haberlandt, Laredo, Ogden, Ralsoy.

(6) Late: CNS, Mamloxi, Mammoth Yellow, Palmetto, Roanoke, Tanner, Tokyo, Volstate, Woods Yellow.

(7) Very late: Acadian, Avoyelles, Gatan, Otootan, Pelican, Seminole, Yelnando.

"Varieties now grown in the United States may be divided into three general groups, namely commercial (grain), vegetable, and forage. Varieties for commercial seed production are preferably yellow-seeded and are used largely for processing for oil, meal, and soybean flour, but these varieties may also be used for forage purposes if heavier rates of seeding are used. The varieties used principally for forage and green manure are the black- and brown-seeded varieties, which for the most part are low in oil but yield a

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finer and heavier forage than the commercial and vegetable varieties.

"The term 'vegetable varieties' has been applied to varieties introduced from oriental countries where they are used solely as green vegetable or dry, edible soybeans. In extensive tests of the quality of the green and dry beans made by the Bureau of Human Nutrition and Home Economics, Department of Agriculture, and by departments of home economics of various agricultural colleges, the vegetable varieties have proved much superior to the field or commercial varieties in flavor, texture, and ease of cooking. Many of these vegetable types have been found through experiments to be superior to commercial types for soybean milk, soybean flour, soybean curd, salted roasted soybeans, and other food products. (See Chapter XXV). The varieties used for processing and forage purposes usually do not cook easily and have a raw 'beany' flavor. Nearly all vegetable varieties cook easily and have a sweet or bland nutty flavor. The most suitable vegetable varieties are those with straw-yellow, greenish-yellow, or green seed, although a few black, brown, and bicolored varieties do have superior qualities as green shelled beans. Vegetable varieties, ranging in maturity from 75 to 175 days, have been developed for all soybean-producing areas in the United States.

"Several commercial companies have canned large packs of the green shelled beans of the vegetable varieties. Quick-frozen green shelled beans alone and in succotash have been placed on the market by several companies, the frozen product being highly satisfactory in color, texture, and flavor. For canning or quick freezing in the green stage, the yellow- and green-seeded varieties make a more attractive product than the black-, brown-, or bicolor-seeded varieties. Vegetable varieties have also become quite popular with the home gardeners and many seedsmen in various sections handle two or more varieties" (p. 22).

Listed from very early to very late, vegetable varieties include: Agate, Sac, Bansei, Kanro, Mendota, Hokkaido, Jogun, Aoda, Funk Delicious, and Seminole. Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

535. Eichberg, Joseph. 1950? The lecithin story–with a moral (Continued–Document part II). [Long Island, New York]. 10 p. Undated.

• ***Summary:*** (Continued): "These are some of the lines along which research can proceed. Another treatment involving hydroxylation has already resulted in a market for considerable quantities of lecithin at prices almost three times more than the same users, namely, bakers or bakery supply manufacturers, pay for the limited quantities of conventional lecithin purchased.

"Hydroxylation enhances the affinity for water, which is impeded in the ordinary commercial grade by the presence of the relatively large amount of carrier oil; however, there is still room for improvement in odor and taste. While special water-dispersible lecithins have been offered on the basis of adding to ordinary lecithin a minor amount of a powerful detergent, wetting agent, an emulsifier or combination of same, it is believed that permanent, substantial progress will more likely come through suitable treatment or modification of the lecithin per se. Not all such treatments involve chemical change for there are many possibilities in solvent fractionations.

"Using water and starting with the undried crude lecithin emulsion, procedures can be applied to cause separation of the bulk of the soybean oil leaving a sort of lecithin hydrate. This de-oiled hydrate appears to provide a valuable emollient action in soaps and shampoos where it does not affect clarity or aggravate rancidity problems (as happens if free soybean oil is present). It is also possible in such a water system to treat the crude lecithin emulsion without removing the oil in such a way as to wash out most of the naturally occurring carbohydrate and thereby materially increase the heat stability. This carbohydrate-reduced lecithin when heated directly or in oil solution does not show the darkening at temperatures around 200ºF. which at times proves a handicap with conventional lecithin.

"Classical solvent fractionation of crude or commercial lecithin preparations involves the use of acetone or alcohol or both.

"Extraction of ordinary soybean lecithin with acetone removes the oil and leaves the insoluble phosphatide complex behind. This process was used commercially as early as 1933 to make a cocoa butter lecithin for the chocolate industry–the natural carrier of liquid soybean oil was replaced by higher melting point cocoa butter. Since then, similar purified grades with other carriers adopted to various purposes have been developed and while the volume is not large as yet, profit margins on these special grades are inherently mere interesting than in the care of the run-of-the-mill lecithin which serves as the starting point.

"It is not necessary to add a carrier to the acetone purified phosphatides. This tan waxy substance may be dried directly [as] convenient in the form of a granule. The cost of producing granular phosphatides in purified form, usually about 95%, is such that use up to now has been limited, for the most part, to dietetic and pharmaceutical applications. Forty or fifty years ago in Europe, there was a vogue in lecithin for therapeutic purposes for a time but it seems to have been based more on wishful thinking than on sound clinical data. It is to be hoped that this mistake is not repeated here in attempting to exploit the interesting possibilities held out by the nutritive and physiological properties of soybean phosphatides–indeed, this is not likely in view of the rather strict regulation enforced today by the Food and Drug Administration and the Federal Trade

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Commission.

"Already a not inconsiderable volume of purified granular phosphatides is being sold in retail packages through drug channels, health food stores and most of these over-the-counter sales have resulted more from popularization than from any recognition of the virtues of lecithin by the medical profession; if lecithin is to have a real future in this field it is essential that the work already done on specific problems–such as skin disorders, fatty infiltration of the liver and vitamin A metabolism be greatly extended by fundamental clinical research under competent medical direction in conditions such as arthritis. The early hopes for lecithin in high blood cholesterol (hypercholesterolemia) atherosclerosis and cardio-vascular disease have not yet been realized and call for more study, much more, and perhaps a new approach in view of the fact that lipotropic agents, generally have not proved their value in practice and do not appear to be much used by cardiologists, while internists have reported that a diet adequate in protein does not benefit particularly by supplementation with lipotropic agent (such as choline, methionine, betaine or inositol) in liver insufficiency. It is important to remember that while the soy phosphatide complex possesses lipotropic activity of a high order, it is much more than a mere lipotropic agent.

"Future studies in the medical field should include an evaluation of the component fractions, essentially lecithin 'cephalin' and phosphoinositide, of the natural phosphatide complex. Such fractions. will undoubtedly also find commercial use and at prices reflecting a legitimate margin of profit. Extraction of ordinary commercial (oil-containing) lecithin with acetone can be followed by extraction with ethanol to produce alcohol soluble and alcohol insoluble fractions. Nearly all of the inositide goes into the alcohol insoluble while the soluble fraction is richer in phosphatidyl choline (lecithin). The two fractions, like the acetone insoluble complex, can be conveyed in different carriers depending on the end use. Furthermore, the chemically treated or water treated modifications above referred to can be subjected to these solvent purifications.

"Much applied research will be needed to develop data on new grades and find applications, but investment in this research is justified by the profits to be made. For example, enough glamour surrounds lecithin for the most poetic advertising man, but no soap manufacturer would feature lecithin unless supplied with some positive claim to make and evidence to back it up. A start has been made in recent laboratory tests, with animals where the skin was examined microscopically after treatment with standard soybean phosphatides and two specially prepared grades and decided differences were observed. There is a need in the cosmetic field for fewer generalizations on the subject of lecithin and more experimental data, but considering the relatively small volume no one is willing to make the outlays if all he can expect is to sell some thousands of pounds of conventional lecithin at virtually no profit.

"A processor cannot fix the price at which he buys his beans or sells his meal and oil and he is governed as much or more by forces without than within his industry. But in the case of lecithin, he could figure his cost on it in a normal way as one of the three primary products of processing, add a reasonable markup and then try to merchandise his product. However, as long as some processors are willing to sell on price and without regard to profit, the sale of conventional lecithin will continue to be pretty much of a 'rat-race' relieved occasionally by an unexpected external event such as the temporary shortage created by the Korean war [1950-1953]. There is the hope that demand for ordinary lecithin will increase, even though the present economics predict little promotion by the industry, as where a new or wider uses is found involving large quantities. Several occurrences of this sort simultaneously can soak up the existing surplus and firm up prices, although the industry has a lecithin production potential of about [?] lbs.

"There is reason to believe that applications for a large tonnage of regular commercial lecithin can still be found in the petroleum industry and that an increasing tonnage can be channeled into the feed industry and that these consumers are able and willing to pay a cent or two a pound more for lecithin to make the business profitable to the producers and distributors. The value of lecithin in milk replacers for young animals and in facilitating the absorption and utilization of vitamin A may be cited. The experimental demonstration that higher melting point fats are more digestible when lecithin is added should interest the Armed Forces in adding lecithin to emergency rations containing fats melting above body temperature (incidentally, commercial lecithin costs a good deal less than these hydrogenated fats).

"In fine, it can be said that we in 'lecithin' need morale as well as morals and that as for a moral we must realise that the future lies in imagination and scientific research and development rather than in chance and serendipity, always remembering that in spite of the accomplishments of the past 25 years, we have only scratched the surface."

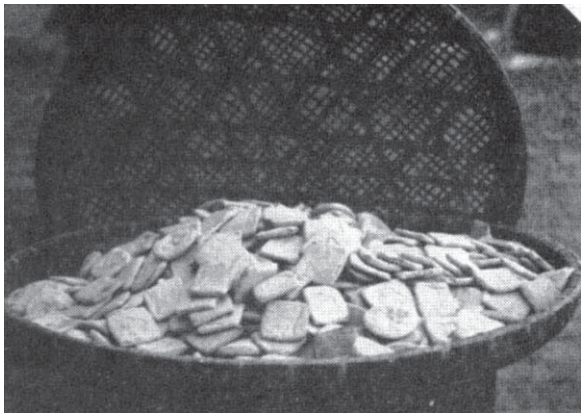
Note 1. At the end of the document is written in by hand: "Obtained from his son, Joe Eichberg junior, Nov. 1999."

Note 2. The date of this undated document must be 1950 or later due to mention of the Korean War [1950-1953]. Address: President, American Lecithin Co, Inc., Elmhurst, Long Island, New York.

536. Morse, W.J. 1951. What's in a name? *Soybean Digest.* Jan. p. 22-24.

• ***Summary:*** "Ancient Chinese literature recording the advice of agriculturists on the best varieties of soybeans to plant under different soil and climatic conditions and the utilization of certain varieties for specific purposes, indicates that the soybean was perhaps one of the oldest crops grown by man [sic]. Varieties of soybeans are very numerous

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in oriental countries, especially Korea. There during agricultural explorations by the United States Department of Agriculture in 1929 to 1931 more varieties showing a wider range of color, size, and shape of seed and plant characters were found than in China, Manchuria, and Japan.

"The soybean is peculiarly sensitive to changes of soil and climatic conditions and this explains undoubtedly to a very great extent why practically every locality in the soybean regions of eastern Asia has its own varieties. Explorations in small villages in China and Korea revealed that nearly every family had its own favorite varieties for different uses.

"It is noteworthy that of the large number of varieties introduced into the United States from the Orient the same variety has rarely been secured a second time unless from the same locality. Obviously, centuries of experience aided by natural crossing and selection have brought about the development of the vast number of varieties for special purposes under local conditions in China, Korea, and Japan.

"Prior to the introduction of numerous varieties of soybeans by the Department in 1898, not more than eight varieties had been grown in the United States. The culture of these was limited to a few well-defined areas. During the past 50 years the Department has made several thousand introductions of soybeans from China, Korea, Manchuria, Indonesia (Java), and India, representing many hundreds of distinct types.

"This large collection, ranging in maturity from 75 to 200 or more days, has shown wide differences in color, size, shape, composition and quality of seed, plant characters, utilization, and in adaptation to the various soil and climatic conditions in the United States.

"In a recent review of all introductions received from eastern Asia, it was noted that a large number of those from China, Korea, and Japan were sent in under their native varietal names, the translation of which revealed some very interesting and perplexing names. It was interesting to note among the oriental names three–Chief, Chestnut, and Hawkeye–that breeders in the United States have assigned to varieties developed for their own local conditions.

"The many peculiar oriental varietal names of soybeans suggested the title of this article. It was thought that American soybean breeders and growers would be interested in knowing the sort of varietal names soybeans have in other parts of the world.

"It is obvious that the oriental breeder or grower, in naming some of the varieties, must have been in a poetic frame of mind in assigning such names as 'Heaven's Bird,' 'White Spirit of the Wind,' 'Flower Garden,' and 'Clasped Hands.'

"The large number of varietal names is quite understandable as they indicate various seed and plant characters, temples, villages, prefectures, animals, birds, uses, and occasionally a breeder's name. This will be noted in the following lists and selected classification of varieties.

"It is not to be assumed that these lists of names represent all of the varieties grown in these countries. In fact, they are only a selected number from the varieties introduced into the United States during the past 50 years. It was interesting to note that some of the Chinese varietal names were the same as those in Chinese literature dating back 100 years ago."

"Selected classification of Chinese soybean varieties:

"Seed Color: Black Belly, Chicken's Foot Yellow, Crow's Eye Yellow, Crow's Skin Green, Flesh Yellow, Musk Deer's Skin Yellow, Parrot Green, Raven's Eye Yellow, Tiger Skin.

"Seed Size: Great White, Large Black, Large Green, Large White Eyebrow, Small Golden.

"Seed Shape: Flat Black Golden Round, Large Round Black, Pearl Shape, Round Pearl, Small Round Green.

"Hilum (Seed scar): Flowery Eyebrow, Large White Eyebrow.

"Maturity: August Green, Autumn Azure, Burst Pods in Six Months, Eighth Month White, Fifth Month Yellow, Melon Ripe, Midsummer Yellow.

"Pods: Five Month Broad Pod, Four Grain Green, Four Grain Yellow, Iron Pod Green, Three Bean Pod, White Podded Green.

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"Leaf: Long Large Green Leaf.

"Pubescence: Hairy Green, Red Hair Green, Sixth Month White Hairy, Yellow Hair Green.

"Utilization: Black Curd, Follow Rice, Round Cattle Feed, Vegetable.

"Odd Names: Entwined Silk, Moon Tooth, Sparrow's Cackling, Unknown Water."

"Selected classification of Korean varieties:

"Seed Color: Barbarian Blue, Black Chestnut, Castor Bean Skin, Golden, Indigo, Lacquer Black, Red Striped, Rich Black, Widower (Black and White), Yellow Dragon's Eye.

"Seed Size: Big Green, Large Black, Small Blackeye, Small Blue.

"Flower: Early White Flower, Large White Flower, White Flower Pure Yellow.

"Hilum: Chotan White Eye, Green Eye, Purple Mouth, Rensen Brown Eye, Small Blackeye, White Eye.

"Maturity: Aid For New Land, Black Sprout, Black Vegetable, Edible, Millet Friend, Plant In Millet, Plant in Wheat, Plant Between Crops, Rainy Season, Roasting, Sprout.

"Habit: Climbing.

"Leaf: Bamboo Leaf.

"Birds: Crow's Early, Domestic Geese, Pigeon, Skylark, Swallow, Water Rail.

"Animals: Deer, Horse, Mouse, Red Rat, White Horse.

"Village: Anpen, Chotan, Tansen.

"Superior Varieties: Great Happiness, Plentiful, Prolific, Rich, Rich and Virtuous.

"Odd Names: Beheaded, Clasped Hands, Cow's Knee, Flying Fish, Flower Garden, Peaceful, South Sea, Spirit of the Wind, Turtle Nest, White Priest's Foot, Wild Boar's Hip."

"Selected classification of Japanese varieties:

"Seed Color: Black Autumn, Black Saddle, Brown Spotted, Green Fool, India Ink, Mink Skin, Pretty Flesh Color, Silver White, Yellow Jewel, Yellowish White Blackeye.

"Seed Size: Large Green, Large Jewel, Large White, Large White Ring, Small Blackeye, Small Bullet, Small White.

"Seed Shape: Gingko Seed Shape, White Ball, Water Caltrop Shape.

"Hilum (seed scar): Blackeye, Green Eye, No Eye, White Eye, White Mouse Eye.

"Pods: Black Eye Long Pod, Black Pod Gold, Four Seeded Yellow, Fox Pod, One Seed, Red Pod, Three Seeded Pod, Two Seeded Pod, Yellow Pod, White Pod.

"Pubescence: Early Smooth, Green Non Hairy, Half Smooth, Middle Season Smooth, Naked Devil, Non Hairy, Smooth White, Smooth Devil, White Hair.

"Stems: Fan Shape Stem, Red Stalk, Single Stalk, White Stem.

"Leaf: Five Leaf Saddle, Monbetsu Long Leaf.

"Habit of Growth: Akita Bunch, Bunching Maiden, Doesn't Touch The Earth, Dwarf, Very Bunched Pods.

"Maturity: August, Black Autumn, Early Gold, Middle Season, October, Very Early Abundant, Yellow Fall, Midseason Fox, Through Frost, White Autumn.

"Utilization: Devil Chaser [for roasted soybeans–irimame], Forage, Miso, Natto, Paddy Field Boundary, Produces in Shady Places, Soy Sauce, White Sprout.

Superior Varieties: Abundance, Abundant Pods, Brings Treasure, Early Increase, Excessive Yield, Fortune, Heavy Yield, One Hundred Percent Good, Small, Fortune, One Thousand Pod.

"Animals: Early Fox, Mink, Mouse, Small Donkey, Tiger.

"Birds: Crane's Friend, Dove, Dove Killer, Sparrow, Wild Duck, Wild Goose, Young Crane.

"Persons: Bingo's White, Chichanari, Hachiya.

"Prefectures (states): Aizu, Chiba, Echigo.

"Shrines: Goshanari, Miyashiro, Zankonji.

"Villages: Chizuka, Hachirihan, Iwakiri.

"Odd. Names: Covered with Frost, Bright Country, Elder Brother, Enter Priesthood, Heaven's Bird, Old Woman's Cane, Pretty Girl, Through the Water, Under The Snow, White Dog's Foot."

Photos show: (1) Bean curd [tofu] cakes being sold by vendors on streets in Peking, China. In the Orient special varieties of soybeans are used in the manufacture of bean curd and many other soy products. (2) Korean farmers' market day held weekly in the small villages. This offers a rich source of soybean varieties. (3) Japanese farm girls planting seed of the Azemame (Paddy Field Boundary Soybean) variety on the land bounding a rice paddy. The beans are used in making miso (salty soy paste), soy sauce, and other foods for human consumption.

Note 1. This is the earliest English-language document seen (April 2021) that uses the term "salty soy paste" to refer to miso.

Note 2. This is the earliest English-language document seen (Nov. 2020) that mentions Azemame. Address: Retired Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S. Dep. of Agriculture, USDA.

537. Stuart, John. 1951. Korean develops food supplement: High-protein and cheap soya mix is called essential to Far Eastern diet. *New York Times.* Oct. 21. p. 133.

• ***Summary:*** Kim Mix is a low-cost soya food supplement of high protein value, based on soybean flour or meal, now being manufactured by the Soya Corporation of America, as was announced yesterday. It was developed by Dr. Ho Jik Kim while working for his doctoral degree at Cornell University in New York. Dr. Kim, himself, lived on this food for two months after satisfactory completion of extensive

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experiments with it in animal diets. Dr. Kim, who is now an advisor to the Syngman Rhee Government in Pusan, Korea, has recommended that the government make "large purchases to supplement the desperately protein-short diets of his countrymen" as Korea recovers from World War II.

In addition, according to Dr. Armand Burke, president of the Soya Corporation, several governments in the Near East are experimenting with the soy product in mass feeding trials, while in the United States institutional and school nutritionists have been experimenting with "its inclusion in the diets of their charges to supplement short supplies of high cost meat."

"Dr. Burke describes the product as one built on the Horvath patents which his company owns and on which it has spent years of development." The process improves the flavor, stability, and shelf life of the product.

538. Riley, John W., Jr.; Schramm, Wilbur. 1951. The Reds take a city: The Communist occupation of Seoul, with eyewitness accounts. New Brunswick, New Jersey: Rutgers University Press. xiv + 210 p. See p. 82-83. Index. 21 cm.
• ***Summary:*** Narratives by eminent Koreans, translated by Hugh Heung-wu Cynn (of New York City). In the chapter titled "Treatment of reactionaries" (p. 80+), the personal story of Chul-Hoe Koo (one of Korea's best-known newspaper reporters) explains that a Communist functionary from the Police Office had come to his house and told him to come with to the Security Police Office, where he was questioned and accused of being a reactionary and a "traitor to the nation." After taking him down to the basement, his examiner wrote up his case (p. 82-83). "Breakfast had been skipped, but after a while we were given a ball of bean and barley and a chestnut-size doen-jang [bean cheese {sic, soybean paste} of salty taste]. Suddenly, while we were eating, an examiner got up and savagely slapped the face of the man next to me. 'Aren't you going to tell the truth, you scoundrel?' he yelled."

Note: This is the earliest English-language document seen (March 2009) that uses the word "doen-jang" (or doen jang) to refer to Korean-style soybean jang (miso). Address: 1. Sociologist, Rutgers Univ., Air Force team.

539. Morse, W.J.; Cartter, J.L. 1952. Soybeans for feed, food, and industrial products. *Farmers' Bulletin* (*USDA*) No. 2038. 41 p. Feb. Supersedes Farmers' Bulletin No. 1617 (Morse 1930, 1932).
• ***Summary:*** Contents: Importance of the soybean and its byproducts. Direct use of soybeans on the farm: Soybean hay (for dairy cattle, beef cattle, horses and mules, sheep, swine, poultry), soybeans for pasturage (hogging down soybeans, sheep, beef and dairy cattle, poultry on soybean pasturage), soybean for soilage, for silage, for soil improvement, for livestock feed (feed for swine, dairy cattle, beef cattle, horses, sheep, poultry, wild game {quail, pigeons}), soybean straw (feeding value, fertilizing value).

Soybeans processed for meal and oil: Processing methods, meal for livestock (for dairy cattle, beef cattle, poultry, swine, sheep, dogs {in dog-food industry}, rabbits, fur-bearing animals, quail and pheasants), meal as fertilizer, for industrial purposes, in food products, use of oil (in food products, industrial uses such as paints and varnishes). Soybeans and products for human consumption: Vegetable soybeans, dry soybeans ("Other uses of the dry soybean {principally of oriental origin} are in the preparation of soybean milk, soybean curd, soybean sprouts, beverages, salted, roasted soybeans), soy flour, grits, and flakes, Oriental soybean foods, soy milk, soy curd, soy sauce, soy sprouts, soy beverages. Miscellaneous uses of the soybean: Honey production (the soybean as a honey plant, soy flour for honey bees), soy flour and grits in dog food, soy flakes in brewing beer, soy flour for insecticides.

Under "Soybean utilization," page 3 notes: (1) The roots and coarse stems are used as fuel in China, Manchuria, and Korea. (2) In many parts of China the plants, when 3 to 4 inches high, are used as greens. (3) In Manchuria and Korea, the leaves are cured and smoked as tobacco.

Under "Soy milk," page 38 states: "The ground soybean pulp or mash [okara] left after separating the liquid from the solid material is still of good nutritive quality, but it has very little flavor. It can be dried and made into flour for human food, combined with foods of more pronounced taste, or used for animal feed."

Under "Soy curd" [tofu], page 38 states: "Chinese and Japanese markets and restaurants in many cities in the United States sell fresh soy curd. Several firms in the United States can soy curd."

Under "Soy sprouts," page 40 states: "Soybeans and several other species of beans, especially the mung bean, are sprouted and used as a green vegetable in the Far East. Soy sprouts (fig. 18, D) can be produced successfully in the home, and a year-round fresh vegetable that may be used raw or cooked can be obtained by sprouting soybeans in a flower pot, a glass fruit jar, or a strainer.

"In producing sprouts, select a stock of clean, bright beans of the latest crop. Any of the field varieties may be used, but the yellow-seeded varieties have less conspicuous skins, though black-seeded varieties, such as the Cayuga, Peking, Wilson, and Otootan, seem to germinate more quickly and uniformly. Carefully hand-pick the seed, discarding everything except the clean, whole beans. Wash the beans thoroughly, cover with lukewarm water, and allow them to soak for a few hours (or at most overnight) until they are swollen. Place the beans in a container and cover them with dampened cheesecloth. Rustproof wire-mesh screening or cheesecloth can be used to cover the bottom of the container to allow for drainage. In using a glass fruit jar, cover the top with a piece of cheesecloth and tie it on securely. Invert the jar and place it in a dark spot at room

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temperature.

"Tilt it slightly so that excess water can drain away promptly. Pour plenty of water on the beans 3 to 4 times a day, thereby insuring thorough washing. The beans may be sprinkled each evening with chlorinated lime solution (1 teaspoon of calcium hypochlorite dissolved in 3 gallons of water) to keep down mold growth and spoilage. Chlorinated limewater is not needed to kill fungus growth if the seed is of good quality. In 3 to 4 days the sprouts will be 1 to 2 inches long and ready to use. Bean sprouts increase about six times their original volume. The commercial production of soy sprouts proceeds along the same, lines, except that larger sprouting tanks or trays are used and the process is more carefully controlled.

"Soybean sprouts can be used in many ways and are cooked and served with the bean attached. They are a fair source of thiamine, riboflavin, and ascorbic acid. The sprouts may be served raw in salads, cooked in various ways, and used in such dishes as omelets, stews, fricassees, and chop suey. They are very tender and lose their crispness if put into hot dishes more than a few minutes before serving.

"A few companies have successfully canned soy sprouts [in the USA]. The New York (Cornell) Agricultural Experiment Station found that sprouts lend themselves admirably to quick-freezing." Address: USDA.

540. Fukui, J.; Ono, H. 1952. Nihon ni okeru daizu [Ecological studies on Japanese soy-bean varieties. II. Relationship between the ecological types and other characters]. *Kanto Tosan Nogyo Shikenjo Kenkyu Hokoku* (*J. of the Kanto-Tosan Agricultural Experiment Station*) No. 3. p. 49-73. May. [10 ref. Jap; eng]

• ***Summary:*** Experiments were carried out in 1946 and 1947 to clear up the varietal distinctions of soy-beans. The number of varieties used as material were 204 collected from Manchuria, Korea, America and different localities of Japan. These varieties were grown in the Konosu Agricultural Experimental Farm. Studies were made on the variations among the varieties as regard to various characters bearing on the selection and classification of varieties, and on the relationship between 9 ecological types classified from the standpoint of the periods from germination to blooming and from blooming to ripening (as shown in Table A) and other characters. In this study, it was observed that there was a close relation between these ecological types and some other characters. In 1a type, the culmweight, culm-length, culm-diameter, location of the lowest node setting flower-bud, number of branches, branch-length and blooming period show the smallest, and these gradually increase following the order Ib, IIa, IIb etc. The 100 seed-weight was the smallest in the type of the short period from blooming to ripening, and it shows larger values in the types of the longer period. Furthermore, it was found that in Ia type, there are many varieties of weak vegetative growth, but varieties of strong vegetative growth increase following the order Ib, IIa, IIb etc.

"The reason why such results occur seems to be concluded as follows; in Ia and Ib types showing low sensibility to short-day treatment, a conversion from vegetative growth to generative growth arises more rapidly than in IVc and Vc types showing high sensibility." Address: Konosu, Saitama, Japan.

541. Hirano, Mitsuo. 1952. Using American soybeans in the Japanese economy. *Soybean Digest.* Sept. p. 28-29.

• ***Summary:*** Contents: Introduction. The soybean situation and its supply and demand in Japan. The soybean oil milling industry in Japan. The Japanese soybean industry and American soybeans. Conclusion.

The main purpose of the writer's present trip to the USA is to make a careful study of the American soybean market.

Soybean production in Japan gradually increased from 210,000 metric tons in 1880 to a peak of 540,000 tons in 1921. Thereafter production declined as imports from Manchuria rapidly rose. In 1945, the year that World War II ended, production in Japan was only 180,000 tons, but as a result of government policy aimed at increasing food production, it had risen to 440,000 tons by 1951. However most of this production is transformed into foods, so Japanese oil mills have had to depend almost entirely on exports for their raw material. In 1952 exports are expected to be about 350,000 tons.

The earliest Japanese government records of soybean imports show that in 1897, 131,000 tons were imported from Manchuria. That amount increased each year, reaching a peak in 1944 when approximately 930,000 tons were imported. However since the end of World War II, the pattern of Japanese soybean imports has changed dramatically. The United States and the West replaced Manchuria as the main source of Japanese soybean imports. At first, imports were made by the Japanese government from China and by the Occupation Forces from the USA under the GARIOA program. But imports from China was made increasingly difficult by the expansion of the Communist sphere of influence. Finally, in 1950, with the outbreak of the Korean War, soybean imports from China came to a complete stop. Since then, American soybeans have dominated the Japanese market.

From the late 1800s, the Japanese oil milling industry used mostly Manchurian soybeans. From the end of World War I (in 1918) until about 1925, many large soybean crushing mills were constructed in Japan. Just before World War II, in about 1940, the nine large solvent plants in Japan had a crushing capacity of 970,000 tons/year. World War II reduced this to six mills with a capacity of 490,000 tons. Since 1948, many smaller mills have been constructed; in 1951 there were 38 soybean oil extraction mills with a total capacity of about 1.2 million tons.

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"I believe that the phenomenal increase in the production of soybeans in the United States is an accomplishment unequalled by anything in the agricultural history of the world... I firmly believe that it could not have been attained without the untiring efforts of the American farmers, agriculturists, government agents, and the American Soybean Association." With Communist forces entrenched in China, Manchurian soybeans are unavailable to Japan at the present time. So Japan is very grateful for this in U.S. production. However there is one problem–quality. Although Japanese oil millers buy Yellow No. 2 grade, the soybeans that arrive in Japan are of much inferior quality. The main problem is that they contain much more foreign material than is allowed–4 to 6% rather than 3% of pebbles, weeds, pebbles, sand, and dirt.

"American soybeans will continue to play as important role as a source of supply for the Japanese oil industry." However there will soon be growing competition from China. A portrait photo shows Mitsuo Hirano. Address: Managing Director of Hohnen Oil Co., Ltd. and President, Assoc. of Oil and Fat Manufacturers, Japan.

542. *Changing Times: The Kiplinger Magazine.* 1952. Meals for the hungry, 3 cents each. 6(10):28. Oct.
• ***Summary:*** "When you see pictures of miserable little waifs in Korea, or of the bare-boned hungry in India, you get a little twinge. You wish there were something you could do to help, something you could afford.

"There is, indeed–thanks to the efforts of a nonprofit organization called Meals for Millions, which has devised a wonderful and inexpensive way for you to provide a person with a meal. Three cents buys a packet of Multi-Purpose Food–MPF–a dry soybean meal product that has been enriched with vitamins. It provides all the nutritive and bulk requirements of a full meal (excluding vitamin C, which is unstable when cooked).

"MPF can be cooked with water in 10 minutes and eaten plain, or added as a nutritious food stretcher to stews, soup, meat loaf, and other dishes.

"More than 20 million meals have been distributed throughout the world since Meals for Millions was set up six years ago by Clifford E. Clinton, Los Angeles restaurant man, as a 'practical challenge to world hunger.'

"The address of Meals for Millions Foundation, Inc., is 648 Broadway, Los Angeles 14, California."

543. Morse, W.J. 1952. Some export history (Letter to the editor). *Soybean Digest.* Nov. p. 30, 32.
• ***Summary:*** "I have read with interest your editorials on the export beans." During the 1930s, American soybeans were cleaner, of better color, and better quality than Manchurian soybeans. This was one reason that European mills preferred to buy soybeans from the USA rather than from Manchuria, and "would pay 5 cents more per bushel for American soys."

During the early 1930s: "In Japanese-held Manchurian territory and Korea, the Japanese soybean inspectors did a pretty thorough job of inspection. All of the beans I saw from those places–and I saw plenty–were clean and seemed to be of good quality. Of course these beans were taken largely by the Japanese mills and the Chinese mills in Manchuria. The Korean beans all went to Japan and were mostly used for food products. The Japanese soy sauce factories used the Manchurian beans."

Now Mr. Morse laments: "I just cannot see why with all our good modern machinery we send such trashy beans abroad. Must be a colored gentleman in the woodpile somewhere!" "It is quite obvious that if America wants to hold the European market they must ship something beside trashy beans."

Note: Tuckahoe, N.Y. was just a mailing address. Before Eastchester got its post office, W.J. Morse resided on Interlaken Drive, Tuckahoe 7, New York. Both Tuckahoe and Bronxville are villages in the town of Eastchester, New York. Address: Tuckahoe, New York.

544. INEAC. 1952. Soja [Soybeans]. *Institut National pour l'Etude Agronomique du Congo Belge, Rapport Annuel* (*Gembloux, Belgian Congo*) 436 p. For the year (l'exercice) 1951. See p. 188, 286, 318-19, 335, 348, 362, 371, 381-82, 403-04, 413. [Fre]
• ***Summary:*** In the section on Division of Food Plants (*Plantes Vivrières*) (p. 177+), the subsection on improvement of soybeans (p. 188) discusses collections of varieties (84 total), and hybrids. A table gives details on 11 selections, including genealogical number, origins, color of seed coat, weight of 100 seeds (in gm), and yield (in kg/ha).

In the section on the Lower Congo, Experimental Station of Vuazi (p. 277+), the subsection on soybeans (p. 286) notes that the 16 varieties in the collection, originating in Yangambi, are well adapted to the ecological environment of the Station. Varieties C 2126 and K 92/6222 yielded 629 and 523 kg/ha of seeds respectively (99 days of vegetation).

The section on the Cotton Selection and Experimentation Service, Experimental Station of Bambesa (p. 309+), the subsection on soybeans (p. 318-19) states that the vegetative development of these soybeans does not seem to have been affected by the lack of rain; in soils of average fertility, they gave excellent yields. Also discusses the collection of varieties and varietal trials; from seven varieties, the highest yield was 1,741 kg/ha of seeds.

In the section on the Center of Boketa (Ubangai), also in the Cotton Service (p. 331+), the subsection on food plants (p. 335) discusses soybeans (yields of two late and two early varieties), peanuts, and rice.

The section on the Experimental Station of Gandajika, also in the Cotton Service, in the edible plants group (p. 342+) has a subsection on soybeans (p. 348) states that from a collection of 22 white seeded and 7 black seeded soybeans,

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the highest yield was 1,420 kg/ha. Bambarra groundnuts are also mentioned.

The section on the Sector of the South, Experimental Station of Keyberg (p. 363+), the subsection on industrial crops–soybeans (p. 371) states that the varieties Otootan, Otoxi, Bilton, and Biloxi gave low yields in four repetitions.

The section on

The section on the Cotton Selection and Experimentation Service, Experimental Station of Bambesa (p. 309+), the subsection on soybeans (p. 318-19) states that the vegetative development of these soybeans does not seem to have been affected by the lack of rain; in soils of average fertility, they gave excellent yields. Also discusses the collection of varieties and varietal trials; from seven varieties, the highest yield was 1,741 kg/ha of seeds. the Station of Trials at Kiyaka (Kwango), also in the Sector of the South (p. 375+), in the subsection on soybeans (p. 381-82), has a table showing the yields of 5 varieties in two seasons; the highest was 1,067 kg/ha.

The section on the Stations of Ruanda-Urundi [Rwanda-Burundi], Station of Trials at Rubona (p. 397+), the subsection on Food Plants–soybeans (p. 403-04) shows modest results. A tables shows yields (in kg of dry seeds per ha) of the following, in descending order of yield: Jogun (1.486), Imperial, Dixie, Easy Cook, Palmetto, Tokyo Vert, Hahto Vert, Chosen Yoshin (1.255 [Chosen = Korea]), Nanda, Emperor, Wood's jaune, Illini, Jaune d'Eala, Hollybrook, Harbinsoy, Huang Tou (1.026).

The section on the Station of Trials at Kisozi, also in Ruanda-Urundi (p. 411+), in the subsection on soybeans (p. 413) states that there are 31 varieties in the collection. Yields were (kg/ha of seeds): Mansoy 647, Haberlandt 630, Tokyo Yellow 550, Harbinsoy 324, and Mukden 220.

Peanuts (*Arachides*), bambarra groundnuts (*Voandzou; Voandzeia subterranea*), rice, maize, and Job's tears (*coix*) are also discussed in this annual report.

545. *Soybean Digest.* 1953. 23 million meals of Multi-purpose food. March. p. 19.
• ***Summary:*** "Nearly 23 million 3-cent meals of the 'Multi-Purpose' food have been distributed on the hunger fronts of the world, according to a report issued by the non-profit Meals for Millions Foundation, Los Angeles...

"More than 1¼ million meals, the report states, have gone to feed Korean refugees (813,000 meals since last June). Shipments to India total 3,880,000 meals of which nearly a million have been shipped since June. Popularity of the food has been enhanced by development of special native recipes printed in the Korean and Tamil languages.

"Significant shipments have gone to the Middle East, Hong Kong, Formosa, Burma, Africa, Arabia, Japan, Philippines, Latin America, Europe, and Caribbean and South Pacific Islands.

"World-wide distribution has been through 133 American relief and religious agencies and health departments of foreign governments...

"For further information or to make contributions contact Meals for Millions Foundation, 648 South Broadway, Los Angeles 14, California."

Note: This is the earliest document seen (Dec. 2007) concerning soybean products (soy flour) in Arabia [this term usually refers to the Arabian Peninsula, but in this case it may well refer to Saudi Arabia]; soybeans as such have not yet been reported. This document contains the earliest date seen for soybean products in Arabia (March 1953); soybeans as such had not yet been reported by that date.

546. *Soybean Digest.* 1953. The cover picture: Soy sauce popular. June. p. 9 + cover.
• ***Summary:*** About La Choy soy sauce. La Choy Food Products (Archbold, Ohio), a division of Beatrice Foods Co., states that its "Chinese foods have approximately tripled in volume since World War II, and soy sauce has more than kept pace."

"People are not only using soy sauce on their Chinese foods and in various Chinese recipes, but are also finding that it makes a delicious sauce on steaks, chops, roasts, and hamburgers. Many people like to marinate their steaks in the sauce before cooking as well as use the soy sauce in gravies, stews, and chops."

La Choy is now in the midst of the largest advertising campaign in the company's history. It includes over 50 radio stations, plus *Saturday Evening Post* and four national women's magazines.

Photos show: (1) Cover: A bottle of La Choy Soy Sauce in the midst of a table set with both Chinese and American dishes (chop suey), ingredients (sprouts, mushrooms), and utensils (knife, fork, and small wok). (2) A small photo of a small dispenser of soy sauce with egg foo yong [egg foo young] (p. 9).

547. Costello, Michael. 1953. Meals for Millions: This crusading Californian is showing how the problem of world hunger can be licked. *Reader's Digest* 63:126-28. July. Condensed from *The Christian Century,* 70:602-04, May 20,1953.
• ***Summary:*** The colorful story of Clifford Clinton (an illustration shows his portrait), Henry Borsook, Multi-Purpose Food (based on soybean grits), and Meals for Millions Foundation, Inc. To aid the Foundation and its humanitarian work, "Clinton donates office space in one of his Los Angeles cafeteria buildings (located at 648 S. Broadway, Los Angeles 14, California). To reach it one passes through a dim 'landscaped' dining room with pools, grottos, singing birds and organ music, then up innumerable stairs, through a bakery and a carpentershop, and arrives finally in a bustling, crowded office. Here orders come from individuals, churches, social and governmental agencies.

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The Multi-Purpose Food business is handled by a small staff headed by a bouncy, enthusiastic woman named Florence Rose."

"Four million Multi-Purpose meals have gone to India, three million each to China and Japan, two million each to Germany and Korea, one million to France." Some 333,000 people in Lebanon, 250,000 people in the Philippines, and several hundred thousand in Austria and Greece have been saved from hunger by Multi-Purpose meals. Shipments have gone to the Vatican for distribution to Italian poor, to migrant labor camps in California and Arizona, to the Navajo and Hopi Indian reservations. The largest buyer and distributor is the Roman Catholic Church, followed by the Friends Service Committee.

Note: This is the earliest document seen (Feb. 2001) concerning soybean products (Multi-Purpose Food containing soy grits) in the Vatican; soybeans as such have not yet been reported.

548. Cowan, J.C. 1954. Soybeans. In: Raymond E. Kirk and Donald F. Othmer, eds. 1947-60. Encyclopedia of Chemical Technology. 1st ed. New York. Chichester, Brisbane, Toronto: John Wiley & Sons. See Vol. 12, p. 689-701. A Wiley-Interscience Publication. [32 ref]

• ***Summary:*** Contents: Introduction: composition, standards and trading rules. Handling and storage. Processing: preparation, screw press operations. solvent extraction. Soybean products: Oil (Crude oil comes from the stripping columns in the extraction process; phosphatides and lecithin), meal and products (three reasons for crushing for animal feed, toasting, preferred source of protein in animal feeds), soy flour and related food products (the 3 types of soy flour are full-fat, low-fat, and defatted; the defatted is made from flakes obtained by solvent extraction of the oil), soy sauce and other food specialties (soy sauce {which has become an important condiment in the U.S., and which is also used in Worcestershire sauces, which contain 10-30% soy sauce}, soybean milk, tofu or soybean curd, miso {a fermented mixture of soybeans plus rice or barley}, natto, sprouted soybeans [soy sprouts], and green vegetable varieties of soybeans {which are grown in the U.S. "for the manufacture of food specialties and for combination with corn as a succotash which is marketed in both the canned and frozen states}). Production (in the USA and worldwide. "The growth of soybean production in the U.S. between 1940 and 1952 has been phenomenal").

Figures: (1) Two views of a Lincoln soybean seed, with exterior parts labeled: h = hilum or seed scar, which is linear-elliptical. c = chalaza, located at one end of the hilum where the seed coat joins the body of the ovule. m = micropyle, the minute opening at the other end of the hilum where the primary root of the germinating seed emerges. h = outline of the hypocotyl, which can be seen beneath the seed coat. The seed consists primarily of hull (seed coat) and embryo, but it has a very elementary endosperm. Source: L.F. Williams 1950 (in Markley).

(2) Cross section of the soybean coat and section of the cotyledon. Source: L.F. Williams 1950 (in Markley).

(3) Expeller plant flow sheet. Source: Langhurst 1950 (in Markley).

(4) Typical flow sheet for solvent extraction of soybeans, with each part labeled. Courtesy French Oil Mill Co. 1. Soybean storage. 2. Soybean cleaner. 3. Magnetic separator. 4. Surge bin. 5. Scale. 6. Cracking roll. 7. Soybean heater. 8. Flaking rolls. 9. Elevator to extractor. 10. Extractor filling hopper. 11. Extractor [vertical, counter-current type]. 12. Extractor baskets. 13. Spent flake conveyor. 14. Desolventizer toaster. 15. Flake cooler. 16. Solvent pump. 17. Half miscella pump. 18. Full miscella pump. 19. Miscella filter. 20. Heat exchanger. 21. Pre-evaporator. 22. Entrainment separator. 23. Condenser. 24. Vacuum stripping column. 25. Finished oil pump. 26. Solvent work and water separation tank. 27. Waste water evaporator. 28. Cyclone. 29. Rotary valve. 30. Meal screen 31. Meal grinder. 32. Solvent surge tank. 33. Half miscella surge tank. 34. Hydraulically operated valve.

Tables: (1) Proximate composition of soybeans and derived products (cotyledons, hull, hypocotyl, extracted meal, full-fat flour, defatted flour). (2) Inorganic constituents of soybeans: ash, potassium, sodium, calcium, magnesium, phosphorus, sulfur, chlorine, iodine, iron, copper, manganese, zinc, aluminium.

(3) Numerical (1-4) and sample grade requirements of all classes of soybeans.

(4) Effect of moisture content of soybeans stored at 38ºC for 11 days on respiration, acid value of oil, germination, and mold growth. Moisture (%) ranges from 11.8 to 18.3. The lower the moisture, the better.

(5) Amino acid composition of soybean oil meal from Lincoln variety soybeans. (6) World production of soybeans: Average yield (bu/acre) and production (millions of bushels) in 1935-39, 1945-49, 1952. In United States, China (proper), Manchuria, Japan, Korea, Brazil, USSR, Yugoslavia, Italy, rest of Europe, Indonesia, world total. Before 1941 Manchuria was a major world producer and exported large quantities of soybeans to Europe. Because of unsettled conditions in China and Manchuria during and shortly after World War II, the U.S. has supplied a large portion of the soybeans imported into Europe. Address: Northern Regional Research Lab., Peoria, Illinois.

549. Thrapp, Dan L. 1955. Chaplain returns from Korean duty: Year at Taego gives priest vivid impression of ill and underfed hordes of refugees. *Los Angeles Times.* March 13. p. A10.

• ***Summary:*** In Taegu 14 out of 15 people are refugees, fleeing the advancing Communist armies.

"Among the most effective charity programs available

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to Koreans, the priest said, was the Meals for Millions Foundation, Inc., 648 G. Broadway, which prepared and ships a concentrate that may be mixed with any available food–without altering its taste–or used separately as a nourishing, strength-producing and stomach-filling substance."

This food is especially helpful because it enables individuals to eat the foods they are accustomed to, but it stretches scant supplies. Special recipes are available for most parts of the world.

Americans can help by making donations to Meals for Millions and other similar organizations.

550. Oyenuga, V. Adenuga. 1955. Nigeria's foods and feeding-stuffs: Their chemistry and nutritive value. *Univ. of Ibadan, Faculty of Agriculture, Technical Bulletin* No. 1. 53 p. March. 2nd ed. 1959 (65 p.). 3rd ed. 1968 (vi + 99 p.). [64* ref]

• ***Summary:*** The Introduction begins: "There are more than eight million head of cattle and approximately the same number of sheep and goats in Nigeria." There is also a large and rapidly increasing number of pigs, donkeys, asses, horses and camels, and a large number of fowl, ducks, turkeys, guinea-fowl and other domestic birds.

A table (p. 12-13) gives the average chemical composition (per cent. of dry matter) of various feeding stuffs used in Nigeria, including the scientific name of the feed, the calculated digestible nutrients, and various values calculated from the digestible nutrients (per 100 lb. of dry food). For example: Soya bean: *Glycine max,* Merr. (see Errata), 93.23% dry matter, 44.08% crude protein, 40.81% true protein, 19.10% ether extract [oil], 5.71% crude fibre, 26.05% nitrogen free extract, 5.06% total ash, and 4.40% silica free ash. 39.23% digestible crude protein, 36.32% digestible true protein, 16.81% digestible (oil) ether extract, 4.17% digestible fibre, 17.45% digestible nitrogen free extract. Nutritive ratio 1.54. 'V' correction factor 98, protein equivalent 35.22, starch equivalent 90.46, total digestible nutrient 91.99.

The section (p. 44-46) titled *"Glycine max* Merr. (The soyabean)" states: "Soyabean has not been successfully in Nigeria or in any other part of West Africa, where its cultivation in native agriculture seems totally unknown."

Footnote: "Within the past few years, however, soyabean has become fairly well established in Nigeria. Just under 9,000 tons of soyabeans were exported in 1953-54 (*Nigeria Trade Journal,* Vol. 3, No. 1. 1955)."

"Climatically West Africa would appear a suitable area for soyabean production and the importance of the crop in commerce as well as its high nutritive value seem sufficiently great to justify the amount of labour and money that may be necessary in any determined attempt for its successful establishment. China (particularly Manchuria), Korea, Japan and the United States are the world's leading producing countries. The crop is also grown in the Philippines, Siam [Thailand], and the East Indian islands [probably today's Indonesia]."

Discusses the use of soyabeans for food, feed, and as a forage crop (including soilage and hay crop), its chemical composition (see table 8, p. 45), and the biological value of the protein of soyabean oil meal. Conclusion: "Soyabean and soyabean oil meal." Address: B.Sc., Ph.D., A.R.I.C. [Associate of the Royal Inst. of Chemistry?], Lecturer in Animal Nutrition, University College, Ibadan, Nigeria.

551. *Soybean Digest.* 1955. 1954 world [soybean] crop hit new record. April. p. 20. [1 ref]

• ***Summary:*** See next page. A large table shows soybean "acreage, yield per acre, and production in specified countries of the world, averages 1945-49 and annual 1953-54."

According to the 2nd estimate of USDA's Foreign Agricultural Service, world soybean production established a new record in 1954; 742.8 million bushels were harvested, up 14% over 1953. Over 80% of the increase was accounted for by the United States. Most of the remaining increase occurred in China-Manchuria. In 1953 China produced 198 million bushels and Manchuria produced 134 million. In 1954 Manchuria's production statistics were included with those of China, the total being 350 million bu. Canada also set a new record with 5.065 million bu harvested. Also mentioned (with production statistics for 1953 in bushels) are Italy (35,000), Yugoslavia (155,000 avg. 1945-49), Other Europe (565,000) USSR (NA), Turkey (125,000), Indonesia (10,839,000), Japan (15,777,000), South Korea (4,995,000), Taiwan (Formosa) (640,000), Thailand (743,000), Brazil (3,242,000), Tanganyika (25,000), Nigeria (the biggest producer in Africa with 140,000 to 150,000 bu for export), and the Union of South Africa (68,000).

In Brazil, soybeans are produced in the states of Rio Grande do Sul and Sao Paulo. Average soybean acreage (harvested acres) in Brazil: 1945-1949: 23,000 acres. 1953: 148,000 acres. 1954 (preliminary): 162,000 acres. Average soybean yield in Brazil: 1945-1949: 19.0 bu/acre. 1953: 21.9 bu/acre. 1954 (preliminary): 22.7 bu/acre. Average soybean production in Brazil: 1945-1949: 446,000 bushels. 1953: 3,242,000 bushels. 1954 (preliminary): 3,674,000 bushels. "Brazil's harvest at 3.5 million bushels was up 13% from the year before. Some 2.6 million bushels were expected to be available for either crushing or export. The much-publicized program to increase soybean planting in Sao Paulo has so far met with discouraging results. This reportedly is due to the farmers' dissatisfaction with the earnings derived from soybeans compared with cotton and some other crops and to a shortage in Sao Paulo of combine harvesters."

Note: This is the earliest document seen (Jan. 2005) that gives soybean production or area statistics for Brazil.

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**SOYBEANS: Acreage, yield per acre, and production in specified countries and the world, averages 1945-49 and annual 1953-54 (1)**

| Continent and country | Acreage (2) | | | Yield per acre | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Average 1945-49 | 1953 | 1954 (3) | Average 1945-49 | 1953 | 1954 (3) | Average 1945-49 | 1953 | 1954 (3) |
| | 1,000 acres | 1,000 acres | 1,000 acres | Bu. | Bu. | Bu. | 1,000 bushels | 1,000 bushels | 1,000 bushels |
| NORTH AMERICA | | | | | | | | | |
| Canada | 73 | 216 | 254 | 20.5 | 20.4 | 19.9 | 1,491 | 4,406 | 5,055 |
| United States (5) | 10,649 | 14,679 | 17,037 | 19.6 | 18.3 | 20.1 | 208,885 | 268,528 | 342,795 |
| EUROPE | | | | | | | | | |
| Italy | 4 | 1 | ..... | 17.8 | 25.4 | ..... | 74 | 35 | 26 |
| Yugoslavia | 15 | ..... | ..... | 10.1 | ..... | ..... | 155 | ..... | ..... |
| Other Europe | 70 | 95 | 90 | ..... | ..... | ..... | 455 | 565 | 500 |
| U.S.S.R. (Europe and Asia) | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ASIA | | | | | | | | | |
| Turkey (4) | 4 | 10 | 12 | 10.9 | 12.6 | 11.9 | 45 | 125 | 147 |
| China | 11,256 | ..... | ..... | 16.9 | ..... | ..... | 190,248 | 198,000 | 350,000 |
| Manchuria (4) | 7,048 | 8,200 | ..... | 16.5 | 16.3 | ..... | (4) 116,475 | 134,000 | * |
| Indonesia (7) | 872 | 1,161 | ..... | 11.2 | 9.3 | ..... | (7) 9,736 | 10,839 | 11,200 |
| Japan | 612 | 1,041 | 1,063 | 12.1 | 15.1 | 13.0 | 7,432 | 15,777 | 13,815 |
| Korea (9) | 583 | 617 | ..... | 8.5 | 8.1 | ..... | 4,984 | 4,995 | ..... |
| Taiwan (Formosa) | 32 | ..... | ..... | 9.4 | ..... | ..... | 297 | 640 | 698 |
| Thailand (4) | 17 | 54 | ..... | 10.1 | 13.9 | ..... | (4) 167 | 743 | ..... |
| SOUTH AMERICA | | | | | | | | | |
| Brazil (10) | 23 | 148 | 162 | 19.0 | 21.9 | 22.7 | 446 | 3,242 | 3,674 |
| AFRICA | | | | | | | | | |
| Tanganyika | ... .... | ..... | ..... | ..... | ..... | ..... | 40 | 25 | ..... |
| Union of So. Africa (4) | 10 | 8 | ..... | 5.2 | 8.2 | ..... | (4) 54 | 68 | ..... |
| Total excluding "Other Europe," U.S.S.R., Chinese Mainland and No. Korea | 12,960 | 18,080 | 20,545 | ..... | ..... | ..... | 234,395 | 310,215 | 383,840 |
| World total (11) | 32,670 | 39,625 | 42,385 | ..... | ..... | ..... | 551,530 | 651,040 | 742,800 |

(1) Years shown refer to years of harvest. Southern Hemisphere crops which are harvested in the early part of the year are combined with those of the Northern Hemisphere harvested the latter part of the same year. (2) Figures refer to harvested areas as far as possible. (3) Preliminary. (4) Average of less than 5 years. (5) Acreage harvested for beans. (6) Less than 500 acres. (7) One year only. (8) Java and Madura only. (9) Beginning with 1948 figures represent South Korea only. (10) Rio Grande do Sul and Sao Paulo. (11) Includes estimates for the above countries for which data are not available and for minor producing countries. *Included with China. Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, reports of agricultural attaches and other United States representatives abroad, results of office research, or other information. Prewar estimates for countries having changed boundaries have been adjusted to conform to present boundaries, except as noted.

552. Owen, June. 1955. News of food–Chinese dishes: Oriental foods are now being prepared for take-home trade. First supermarket that features Chinese items opens its doors. *New York Times.* June 15. p. 27.

• ***Summary:*** A good, early history of Jeno Paulucci and his company Chun King Sales. "Several years ago, when Jeno F. Paulucci was traveling about the country as sales representative for a food company, he noted that virtually every city and town of any size had a Chinese restaurant or one that claimed a Chinese cuisine."

Mr. Paulucci, age 37, is a native of Minnesota. Growing up in Hibbing, Minnesota, he helped his mother with her Italian catering business.

Eight years ago, in an improvised Quonset hut in Duluth, Minnesota, Mr. Paulucci and 20 employees started canning chow mein. Today his company, Chun King Sales, produces twenty products and is the largest plant for the production of oriental foods in the country.

Mr. Paulucci's products are meant for Americans. not for people of Chinese ancestry.

Another young man with a commercial interest in Chinese foods is Raymond C. Tong. He recently opened China Food Fare, the first supermarket in New York City dealing in oriental groceries (at 20 East Broadway, Chinatown). His customers are mainly those of Chinese ancestry; his store sells "bean curd and what may be the widest selection of soy sauces" in New York City. These sauces are made in Hong Kong, Japan, Korea, and the USA. The two basic types are light and dark. "The light is used in cooking and in marinating foods." The dark is meant to be used at the table, to be sprinkled on dishes as each person desires. Mr. Tong says that a fine soy sauce is neither too bland nor too salty. It should have a good savory or meaty flavor.

553. Chung, T.S. 1955. [Enzymological studies on the fermented soybean products. I. On the protease activity of natto]. *Bulletin of the Scientific Research Institute* (*Seoul, Korea*) 1:19-23. [Kor]*

• ***Summary:*** Optimal pH and temperature for natto protease was found to be 7.0 to 8.0 and 45ºC respectively. Address: Section of Food and Nutrition, The Scientific Research Institute M.N.D. Korea, Seoul, Korea.

554. Chung, T.S. 1955. [Enzymological studies on the fermented soybean products. II. Differential inactivation of alpha-amylase and beta-amylase in natto and malt]. *Bulletin of the Scientific Research Institute* (*Seoul, Korea*) 1:24-30. [Kor]* Address: Section of Food and Nutrition, The Scientific Research Institute M.N.D. Korea, Seoul, Korea.

555. Park, I.H.; Kim, C.J. 1955. [Food chemical studies on the soybean sprout. I. Food chemical consideration on the cultivation of soybean sprouts]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 1:32-39. [Kor; eng]*

556. Johnson, Herbert W. 1956. Re: Soybean variety Pando. Letter to Mr. R.L. Bernard, Urbana, Illinois, and Dr. C.R. Weber, Feb. 6. 1 p. Typed, with initials on letterhead.

• ***Summary:*** "Dear Dick and Bob: I am sending you under separate cover some seed of the Pando variety named by the Horticultural Department of New Hampshire in 1949. The original seed was brought from Korea in 1947 by Professor Meader of the Hort. Dept. at New Hampshire.

"I supposed Dick will want to add this variety to his variety collection and Bob may wish to evaluate it for vegetable purposes. It is reportedly quite similar to Sac. If either of you grow this variety in 1956, I shall appreciate your opinion as to how closely it resembles Sac."

Handwritten note by Richard Bernard (Sept. 1999) on letter in pencil: "This is all that is in the 'Pando' folder. Probably the same as PI 159764." Address: Research Agronomist, Forage and Range Section, United States Dep.

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of Agriculture, Agricultural Research Service, Field Crops Research Branch, Beltsville, Maryland.

557. Lee, T.Y.; Chung, K.S. 1956. [Research on soybean paste. II. Effect of moisture content on quality of soybean paste during its storage]. *Bulletin of the Scientific Research Institute* (*Seoul, Korea*) 2:67-72. [Kor]*
• ***Summary:*** The soybean paste should contain less than 30% moisture. Address: Section of Food and Nutrition, The Scientific Research Institute M.N.D. Korea, Seoul, Korea.

558. INEAC. 1956. [Soyabeans]. *Institut National pour l'Etude Agronomique du Congo Belge, Rapport Annuel* (*Bruxelles*) 567 p. For the year (l'exercice) 1955. See p. 113-14, 400, 414, 444-45, 514-15, 525. [Fre]
• ***Summary:*** All these soybean trials were conducted in the Belgian Congo (today's Zaire). In Part 3, the Research Center at Yangambi, under 4. Division of Food Plants (p. 113-15) the early soybean varieties Otootan, Palmetto, and SH162 yielded over 1,200 kg/ha of soybeans, but the more productive, late-maturing variety trials were complicated by soil fertility variations.

In Part 6, the Northern Sector, under 1. Experiment Station at Gandjika (p. 400) SHE81, Otootan, and SHE35 yielded about 800 kg/ha, while under 2. Experiment Station at Kiyaka (p. 414) 8 Java 3334 and K92/6/2/2/3 outyielded Otootan 70.

In Part 8, the Katanga Sector, under 1. Experiment Station at Keyberg (p. 444-45) soybean varieties 34 S 51 and SH 031 had yields of 1,073 and 1,071 kg/ha respectively.

In Part 10, the Ituri Sector, under 2. Experiment Station of Mt. Hawa (p. 514-15), yields of 1,046 to 1,167 kg/ha were obtained at two seasons for several varieties, while yields of up to 9,300 kg/ha of green forage were collected in other trials from Haberlandt, Mammoth, etc.

In Part 11, the Ruanda-Urundi [Rwanda-Burundi] Sector, under Part 1, the Agronomic Research Station at Rubona (p. 525-26), soybean yields of over 2,000 kg/ha were recorded in the first season (trial 1) for 7 varieties, while in trial 2 the varieties Dixie, Easy Cook, Nanda, Palmetto, Imperial, Yogun [Jogun] and Chosen Yoshin [Chosen = Korea] gave yields of 1,854 to 1,431 kg/ha. In the second season, yields ranged from 1,976 kg/ha to 1,104 kg.

Also discusses: Peanuts (*Arachides*), bambarra groundnuts (*Voandzou; Voandzeia subterranea*), rice, maize, and Job's tears (*coix*) in this annual report.

559. *Times of India* (*The*) (*Bombay*). 1957. Confectionery & foodstuffs. Aug. 20. p. 18.
• ***Summary:*** The foods of Japan have changed noticeably since World War II. The islands of Japan, whose combined area is 15% smaller than that of California, are much much too small to grow enough staple food crops (such as rice) to feed the 80 million inhabitants. So Japan, which has been shorn of its overseas empire (Korea, Taiwan, Manchuria, etc.) has now become a major importer of wheat flour, and the number of bread eaters has been rapidly increasing.

Great efforts have also been made to incorporate more protein into the daily diet. "Scientists today have begun to view time-honored seasonings like miso and soy sauce, made largely from soybeans, from a new angle."

The most popular confections are *namagashi* which are traditional Japanese. They include *yokan* (hard red bean paste) [made from azuki beans].

560. Choi, S.H. 1957. [Biochemical studies on Korean fermented foods. VI. The variation of nitrogen content during the fermentation of Kanjang (Korean soy sauce)]. *Report of the National Chemical Laboratory, Seoul, Korea* 6:2-3, 36-38. [Kor; eng]*

561. Choi, S.H. 1957. [Biochemical studies of Korean fermented foods. VI. On the changes of nitrogenous compounds during soy-sauce fermentation]. *Report of National Chemistry Laboratories* (*Korea*) 6:36-38. [Kor]* Address: National Chemistry Laboratories, Seoul, Korea.

562. Chung, T.S.; Kim, C.J.; Hwang, K.S. 1957. [Enzymological studies of the fermented soybean products. IV. Amino acid composition of natto proteins]. Seoul, Korea. [Kor]*
• ***Summary:*** Mimeographed. Address: The Scientific Research Institute M.N.D. Korea, Seoul, Korea.

563. Hahn, Y.S.; Park, B.D. 1957. [Studies on the manufacture of soy sauce. I. On *Aspergillus oryzae* in Korean bean meju and wine kokja mould cultured with wheat bran]. *Report of the National Industrial Research Institute* (*Seoul, Korea*) 7:51-55. [Kor]*
• ***Summary:*** Two kinds of *Aspergillus oryzae* were isolated from Korean soybean meju and wine kokja. Microscopic and physiological characteristics were investigated. Five kinds of powerful amylolytic moulds and four kinds of powerful proteolytic moulds were isolated.

Note: This is the earliest document seen (May 2021) with the word "meju" in the title or in the document. Address: National Industrial Research Institute, Seoul, Korea.

564. Hong, S.S. 1957. [On the amino acid composition of Korean soy sauce]. MSc thesis, Seoul National University. [Kor]*
• ***Summary:*** Soysauce is one of the important condiments used by oriental peoples. There are various types of soy-sauce, such as Chinese, Korean, Japanese and amino acid soy-sauce. The author has detected the kinds of amino acids contained in the Korean soy-sauce by means of paper chromatography. The result of qualitative analysis

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of amino acids of Korean soy-sauce by means of paper chromatography led to the following conclusion.

1. The amino acids found in the Korean soy-sauce are as follows: alanine, arginine, aspartic acid, glutamic acid, leucine, lysine, phenylalanine, proline, serine, threonine and valine.

2. The amino acids found in the amino acid soy-sauce are as follows: alanine, arginine, aspartic acid, cystine, glutamic acid, leucine, lysine, phenylalanine, proline, serine, threonine, tyrosine and valine.

3. The 11 types of these amino acids found in the Korean soy-sauce are similar to the kinds of amino acids found in the Japanese soy-sauce. Address: Seoul, Korea.

565. Lee, T.Y. 1957. [A study on carotene. II. Variation in carotene content of red pepper and its processed foods (kochojang) during storage]. *Bulletin of the Scientific Research Institute* (*Seoul, Korea*) 2:15-22. [Kor]*

• ***Summary:*** Red pepper sauce can retain as much as 90% of its carotene content after one year storage. This may be due to the presence of antioxidants in the sauces. Address: Section of Food and Nutrition, The Scientific Research Institute M.N.D. Korea, Seoul, Korea.

566. Pohjakallio, O.; Antila, S. 1957. Eräiden soijalajikkeiden fotoboilogisista ominaisuuksista [Photoperiodic characters of some bred strains of soyabeans]. *Maataloustieteelinen Aikakauskirja* 29(3):113-20. [3 ref. Fin; ger]*

• ***Summary:*** Two Swedish soybean varieties (Fiskeby 843-15-4 and Fiskeby 846-2-1) and one Korean variety (Pando) were studied for their response to different photoperiodic treatments. All proved to be approximately neutral in relation to daylength. With low light intensity, there was considerable etiolation, especially in the Fiskeby varieties, but the time at which flowering occurred was only slightly affected by changes in light intensity. Even with very little light (only 25% of the light outdoors), ripe seeds developed. On the basis of these experiments, and of others conducted at the Wiik Experiment Farm, Helsinki (Tables 6-7) it is concluded that in the south of Finland, light conditions have hardly any effect upon success in growing the almost daylength-neutral soybean varieties concerned. Results confirm Rudorf's finding that the northern limit for growing the Fiskeby soybean varieties is governed by low temperature.

Note 1. Criswell and Hume (Oct. 1972, p. 657) state that Pohjakallio and Antila (1957) have "presented evidence that at least some early maturing soybean varieties tested were nonsensitive to photoperiod."

Note 2. This is the earliest document seen (Aug. 2018) that (in translation) contains the term "daylength-neutral" or the term "almost daylength neutral" in connection with the soybean. Address: Phytopathological Inst., Univ. of Helsinki.

567. Miyamoto, Kazuo. 1957. A nisei discovers Japan. Tokyo: Japan Times. [x] + 282 + [4] p. See p. 181. Illust. Port. No index. 20 cm.

• ***Summary:*** The author, a physician and American citizen, lived with his wife and two children for two years in Japan between 1937 and 1939 "just after the beginning of the China Incident." He spoke and wrote Japanese fluently.

Page 7: On 29 Sept. 1937, after just arriving in Japan, they enter Tokyo. He notes that prices are high, protein consumption is therefore insufficient, and the general population seems undernourished. Beans, including soya beans, ought to be used more extensively. Except for misoshiru [miso soup] and natto, they are apparently not widely used. He suggests that the government welfare department develop and publish soy recipes for the health of the people.

Page 48: On 8 Feb. 1938 on a trip into Yusawa, Niigata, in northeastern Japan, he went skiing. For lunch at a inn he had "natto with lots of onions to erase the odor."

On a train from Ueno station, Tokyo, he has breakfast in the diner of miso-shiru [miso soup], tsukemono [pickled vegetables], and rice for 25 *sen.*

Page 129: In Aomori at the hotel for breakfast they enjoy delicious eggplant fried in butter with shoyu, pepper, and pieces of chiso [beefsteak leaves].

Page 171: At Aoyama hot springs in Hokkaido, caught in a blizzard, he has a bento [Japanese box lunch] from the hotel that includes miso-shiru.

Page 181: On 21 March 1938 they are at the port of Shimonoseki, Japan (in southwestern Honshu, just north of Kyushu, in Yamaguchi prefecture, facing the Tsushima Strait). He notes that many people pass through this port on their way to Chosen [Korea] and Manchukuo [Manchuria].

Shimonoseki is known for its *fugu* or balloonfish (also called globefish or swellfish) for it is here that the largest catch in Japan is taken each year.

They found an eating place, Fujitomo, that served the delicacy. The raw sliced meat was arranged on a huge platter in three rows of semi-circles, so thinly sliced that it was transparent. "The above were dipped in a sauce prepared with murasaki, lime and onions. Tai, considered the king of fishes, must be allotted second place to this delicacy..."

Note 1. The word "murasaki" means purple in Japanese, and is still used in sushi shops and other specialty eating places to refer to soy sauce.

Note 2. This is the earliest English-language document seen (April 2012) that uses the word "murasaki" to refer to soy sauce.

The balloonfish is so poisonous it can kill a person; the toxin is contained in the ovaries. "At Shimonoseki, the season comes to an end at the end of March for then the spawning season begins and the danger of poisoning becomes greater."

Page 201: On a trip to Korea he enjoys *manul zany,*

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garlic pickled in shoyu.

In April 1955, the family returned to Japan to visit new relatives. Near Furukawa, in northeastern Japan, they inspected a "miso and shoyu factory."

Also discusses: Nori (p. 128). Wakame (seaweed, near Idzu / Izu) (p. 276). Address: Honolulu, Hawaii.

568. Smith, Allan K. 1958. Use of United States soybeans in Japan: Hamanatto (Document part). *USDA Agricultural Research Service*. ARS-71-12. iii + 36 p. April. See p. 29-31. April. Illust. 28 cm.

• ***Summary:*** "Hamanatto: Hamanatto, sometimes spelled hamananatto, is made by fermenting whole soybeans. Hamanatto is produced in a limited area in Japan in the vicinity of Hamanatsu [sic, Hamamatsu in Shizuoka Prefecture, central Japan]. Hamanatto should not be confused in any way with natto. The only resemblance between the two products is that both are made by fermenting whole soybeans. Hamanatto has a pleasant flavor resembling miso or shoyu but is sweeter. Factors unfavorable to the popularity of hamanatto seem to be its very dark color (black) and its rather high cost. Hamanatto is said to cost four times as much as miso.

"Hamanatto is reported to have come to Japan by way of Korea about 350 years ago at the time of the Japanese invasion of that country. Natto means 'contributed beans' and hamanatto was contributed to the Japanese warriors. The process is reported to have originated in Buddhist temples where it was developed as a source of protein. The ancestors of the people owning the Yamaya Brewery and the Saito Mido Plant of Hamanatsu [sic] are said to have inherited the process from the Buddhist monks.

"In making hamanatto the beans are soaked in water for 4 hours and steamed without pressure for 10 hours. The cooked beans are spread on the floor for cooling to 30ºC. Koji prepared from roasted wheat or barley is sprinkled over the beans to cover their surface. The Japanese are very particular to cover the entire bean surface. The inoculated beans are placed in trays in a fermenting room for about 20 hours; during the fermentation the beans acquire a good coating of green mold. When taken from the fermenting room they are covered with a sticky material and must be separated and dried in the sun to about 12 percent moisture. This can be accomplished in one day if the weather is warm and sunny. At one factory the beans are carried to the roof for drying.

"The dry beans are placed in wooden buckets [kegs, bound with bamboo hoops] that have a capacity of about 15 gallons. Strips of ginger are placed in the bottom of the buckets before adding the beans and the salt water to cover them. A [wooden] cover that fits inside the bucket is placed over the beans and a very heavy weight placed on the cover. Rough stones estimated to weigh about 100 pounds are used for weights. Figure 18 [a photo] shows the buckets with the stone weights used during fermentation, which requires 6 to 12 months and must include one full summer. During fermentation the beans acquire a dark reddish color that is not unpleasing. After fermentation is completed and the beans are dried in the sun, they turn black. Hamanatto contains about 11 percent salt, said to be the cause of their turning black. Hamanatto will keep at room temperature for 1 year or longer.

"The makers of hamanatto, now using only Japanese soybeans, prefer a very select grade grown only in Hokkaido because they are large, are uniform in size, and are free of foreign matter. They claim to pay ¥4,500 for 60 kg. of specially selected beans; an equal quantity of U.S. [soy] beans would cost them ¥3,000. On this basis the relative cost per 60-pound bushel of Hokkaido and U.S. soybeans is $5.65 and $3.80, respectively.

"An analysis [of Hamanatto] supplied by the Yamaha Brewery is as follows: Water 39 percent, total nitrogen 3.8 percent, water-soluble nitrogen 2.6 percent, reducing sugars 7.0 percent, total sugars 10 percent, crude fiber 12.5 percent, ash (including 11 percent sodium chloride) 12 percent, volatile acids 0.015 percent, total acids 1.2 percent, and pH of water suspension 5.1. The composition of hamanatto probably varies considerably.

"If hamanatto could be produced in dark red rather than black color and the process modernized to bring the cost more in line with other fermented soybean products, it should have much wider acceptance and use."

Note 1. This is the earliest document seen (Nov. 2011) stating that Hamanatto [fermented black soybeans] were made at Yamaya temple in Hamamatsu.

Note 2. This is the earliest document seen (Jan. 2012) that uses the word "sticky" (or "stickiness," etc.) to describe Hamanatto. Address: Head of Meal Products Investigations, Oilseed Crops Lab., Northern Regional Research Lab., Peoria, Illinois.

569. Choi, S.H.; Haw, K. 1958. [Biochemical studies on Korean fermented foods. VII. A study on biochemical process during the fermentation of "kanjang"]. *Report of the National Chemical Laboratory, Seoul, Korea* 7:11. [Kor; eng]*

570. Choi, S.H.; Haw, K. 1958. [Biochemical studies on Korean fermented foods. VII. A study on biochemical process during the fermentation of kanjang]. *Report of National Chemistry Laboratories* (*Korea*) 7:11-13. [Kor]*

• ***Summary:*** In order to confirm the biochemical process of the fermentation from soybean to Maiju [Meju; soybean koji] and of the fermentation from Maiju to Kanjang and Dainjang [Doenjang], the nitrogen distributions of soybean, Maiju, Kanjang, and Dainjang are studied on protein nitrogen, peptide nitrogen, amino nitrogen and volatile nitrogen. And the contents of amino nitrogen, peptide nitrogen, and true

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protein nitrogen to the total nitrogen of soybean, Maiju, Kanjang, and Dainjang are shown in table I and the ratios are shown in table 2 and the figure. According to the results indicated in the tables and figure, the following conclusions are summarized:

1. The main biochemical process at the fermentation from soybean to Maiju would be the degradation from protein in soybean to peptide compounds in Maiju.

2. The main biochemical process at the fermentation from Maiju to Kanjang and Dainjang would be the degradation from peptide compounds in Maiju to amino nitrogen compounds in Kanjang and Dainjang.

3. However, because the protein nitrogen indicated as the ratio of protein nitrogen to total nitrogen content is higher in Dainjang, it is assumed that there might be two kinds of proteins in soybean; one is the protein which could be converted to peptides at the Maiju fermentation and to amino nitrogen compounds lastly at the Kanjang fermentation. The other is the protein which would not be affected at these fermentations at all, remaining as the protein nitrogen in Dainjang, one of the finished products.

4. It can be indicated that the process from Maiju to Kanjang and Dainjang would be due to the fermentation as indicated by Haw and Choi. Address: National Chemistry Laboratories, Seoul, Korea.

571. Chung, T.S.; Kim, C.J.; Whang, K.S. 1958. [Enzymological studies of the fermented soybean products. IV. Amino acid composition of natto proteins]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 3(1):83-87. [Kor]*

572. Chung, T.S.; Kim, C.J.; Yoon, D.S. 1958. [Enzymological studies of the fermented soybean products. III. Isolation of B. natto and their classification]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 3(1):75-82. [Kor]*

573. Hahn, Y.S.; Park, B.D. 1958. [Studies on the manufacture of soy sauce. II. On *Aspergillus oryzae* in Korean soybean meju and wine kokja mould]. *Report of the National Industrial Research Institute* (*Seoul, Korea*) 8:75-82. [Kor]*

• ***Summary:*** In a previous paper, pioneer work with the genus *Aspergillus* in Meju [Korean soybean koji] and wine Kokja was reported. This is a continuation of that work. 24 kinds of long-type conidia head and 21 kinds of round-type conidia head were isolated in the genus *Aspergillus* from Kokja. Five results are given.

1. The long type has longer sporangiophores and smaller vesicles than the round type, and the former's sterigmata is in a single line, while the latter is in a double line.

2. The propagative velocity of the round type is faster than the long type, and spore formative velocity of the long type is faster than the round type.

4. In general, the amylolytic power of the long type is stronger than the round type, therefore the researchers the molds distributed in Kokja consist of almost entirely the long type. They obtained 4 superior round types and 6 superior long types.

5. The proteolytic power of the round type is generally stronger than that of the long type. They obtained superior round types. Address: National Industrial Research Institute, Seoul, Korea.

574. Cowan, J.C. 1958. Progress in the technology of soybeans. In: R.T. Holman, W.G. Lundberg, and T. Malkin, eds. 1958. Progress in the Chemistry of Fats and Other Lipids. London, New York, Paris, Los Angeles: Pergamon Press. Vol. 5, p. 51-90. [70 ref]

• ***Summary:*** Contents: 1. Introduction (During the past 20 years, the USA has become the world's leading producer of soybeans. In the USA, soybean production has come in three stages, starting in the 1930s). 2. Soybean production (In the 1920s, development of new soybean varieties led to a major increase in soybean production). 3. Storage and handling of soybeans. 4. Grading. 5. Removal of oil from the soybean: preparation of flakes, solvents, extraction equipment and processing, filtration-extraction, pre-pressing of soybeans.

6. Removal of solvent from flakes: desolventizer toaster, flash desolventizing, cost of processing soybeans. 7. Edible soybean oil: Refining, bleaching, cavitation in the processing of soybean oil, hydrogenation of soybean oil, flavour reversion of soybean oil. 8. Other soybean products: phosphatides, polyamide resins (contains many chemical formulas), epoxy soybean oil, fatty alcohols. 9. Analysis of soybeans: oil colour, oil content of soybeans, effects of heat treatment. 10. Future possibilities.

Note: This article was written before the widespread interest in low-tech East Asian soyfoods (such as tofu, miso, soy sauce, tempeh, soymilk, natto, etc. at Peoria and in the USA).

Tables: (1) World soybean production, acreage and yield (1945-1955). Countries included: Canada, United States, China (estimate), Manchuria (estimate), Indonesia, Japan, Korea (South), Brazil.

(2) Soybean grades: No. 1, 2, 3, 4 and sample. These grades were established by an Act of Congress in 1949.

(3) Characteristics of soybean oil extracted by different solvents.

(4) Effect of flash desolventizing on loss of nitrogen solubility.

(5) Cost of processing soybeans in cents per bushel, itemized for the various steps, and with 3 different mill sizes (the bigger the mill, the lower the processing cost).

(6) Pressure refining.

(7) Results of comparative tests with different bleaching processes with soybean oil. Three methods are analyzed:

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Batch open kettle, batch vacuum, and continuous countercurrent. AOM = Active Oxygen Method.

(8) Characteristics of refining with Sepratron. (9) Effect of metal-inactivating agents when added to hydrogenated oil.

(10) Metal contents and stability evaluations of soybean oil sampled from units of two commercial extractors.

(11) Metallic impurities and their effect on flavour score and AOM stability of soybean oil. The two metallic impurities are iron and copper, which (if not removed) lead to undesirable flavors in soybean oil.

(12) Production of soybean lecithin in pounds [in the USA]. Increased from 8 million lb in 1947 to 26.1 million lb in 1954. "Until 1945 or 1946 soybean phosphatides were expensive and used in relatively small quantities. With the use of centrifuges to separate the phosphatides from the oil [during the degumming step], production became much larger than consumption, and prices dropped to oil prices or lower. The drop in price fostered new uses."

(13) Properties of soybean fatty alcohols. (14) Effect of chlorophyll on colour of oils as measured by Wesson and spectro methods.

(15) Hemagglutinating and chick growth data of soybean oil meal samples subjected to heat treatment. At atmospheric pressure 90 minutes is optimum; at 15 lb. pressure 20 minutes is optimum.

Figures: (1) Map: Best adapted soybean varieties for individual states (east of the Rocky Mountains. 36 varieties are listed). (2) Schematic diagram for the extraction of soybeans with ethyl alcohol. Alcohol gives better flavour of the extracted flakes for food use. (3) Schematic diagram showing operating parts of the process for filtration-extraction.

(4) Photo: Desolventizer-toasted showing three of the seven steam-jacketed compartments (Courtesy of Central Soya Company, Inc.).

(5) Microscopic study of soybean flakes; semi-dark field illumination of 9x with particles from desolventizer-toaster at the upper left; atmospheric toaster at the upper right, and pressure toaster at the lower center (Courtesy of Central Soya Co.)

(6) Diagram of flash desolventizer. (7) Sectional view of pressure separator (Courtesy of De Laval Separator Company).

(8) Schematic diagram of continuous countercurrent vacuum bleaching system (Courtesy of Girdler Corporation).

(9) Photo: Cavitation device with attached direct drive motor (Courtesy of Sepratron Corporation).

(10) Four photos: Typical action of turbine and gas-dispersion agitators (laboratory scale).

(12) Graph: Absorption spectra of lecithin solutions in carbon tetrachloride (5 g/100 ml), measured in 1 cm in Cary recording spectrophotometer. Graphs for dried gums, single bleached lecithin, and double bleached lecithin are given.

(13) Viscosity of gel of alkyd modified with polyamide resin dissolved in hydrocarbon solvent. (Courtesy of T.F. Washburn Company).

(14) Graph: Increase in log specific conductance with the increase in urease activity.

Series edited by R.T. Holman, W.O. Lundberg and T. Malkin; London: Pergamon Press. Address: Head, Oilseeds Section, Northern Utilization Research and Development Div., Peoria, Illinois.

575. Motoyama, Tekishu. 1958. Inshoku jiten: Miso [Encyclopedia of food and drink: Miso (Document part)]. Tokyo: Heibonsha. 604 p. [Jap]

• ***Summary:*** Miso is a fermented soybean seasoning which is an indispensible food in every Japanese kitchen. Miso is prepared by mixing soybeans, polished rice or barley and salt, and subjecting them to the fermentation action of koji and the propagation of salt-resistant micro-organisms.

Origins: In ancient Chinese records dating about 200 B.C. it is recorded that miso's predecessor was called "kuki" and originated in the western provinces of China. Kuki was transmitted to Japan via the Korean peninsula and arrived during the Yamato period (300 to 645). By the year 701, the first year of the Emperor Monmu, the regulations for the government "Bureau of Sho" had already been established and both the administrative staff and the materials to be provided had been chosen.

Miso also has a deep historical relationship with Buddhism and the original kuki is the present day Temple Nattô (*tera nattô*). When direct communications were opened between Japan and China, the great Chinese Zen master Ritsuzo Ganjin brought a type of black kuki to Japan in the year 753. Afterwards, this became known as Asuka Miso or Horo Miso. When miso first came to Japan, it was called both *komabishio* (literally: "high. elegant soy sauce") and miso (literally: "secret ancestor") however it was apparently not clearly distinguished from soy sauce as it is at present.

Before the Heian period (794 to 1185) it was written as *mi-hishio* meaning "pre-hishio" or "pre-soy sauce." Future generations added the symbol meaning "mouth" to the left side of the character meaning "pre" to make the present character "mi" of miso which has the general meaning "flavor." They then changed the character pronounced *hishio* meaning "soy sauce" into the present character "so" of miso which has the general meaning "throat."

576. *FAO Production Yearbook.* 1958--. Serial/periodical. Rome, Italy: Food and Agricultural Organization of the United Nations. Yearly. ca. 350 p. Supersedes the Yearbook of Food and Agricultural Statistics, Part I (1947-1957), which was superseded by Production Yearbook (1958-1975).

• ***Summary:*** Under soybeans, gives region/continent and nation, then statistics for soybean area, production, and yield for each soybean producing nation during the following time periods: 1948-1952, 1955, 1956, 1957. Regions and nations

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listed in the 1958 edition are: Europe: Czechoslovakia, Hungary, Italy, Romania, Yugoslavia.

U.S.S.R.

North and Central America: Canada, United States.

South America: Argentina (in 1948-52 1,000 hectares produced on average 1,000 metric tons of soybeans per year. This remained unchanged in 1955-1957), Brazil (in 1948-52 53,000 hectares produced on average 57,000 metric tons of soybeans per year. Production rose to 115,000 metric tons in 1955, 122,000 in 1956, and 132,000 in 1957).

Asia: Cambodia, China-Mainland, China-Taiwan, Indonesia-total (Java and Madura, Other islands), Japan, Korea-South, Philippines, Ryukyu Islands, Thailand, Turkey.

In 1948-52, Turkey produced 2,000 metric tons of soybeans on 2,000 ha; yield: 860 kg/ha. Production in Turkey increased to 4,000 metric tons in 1955, then 5,000 metric tons in 1956. Note: This is the earliest document seen (Dec. 2007) that gives soybean production or area statistics for Turkey or for the Middle East. This document contains the earliest production or area statistics seen for Turkey or the Middle East.

Africa: Belgian Congo (production in villages), Ethiopia and Eritrea (Fed. of Ethiopia) (starting with 5,000 tonnes {metric tons} in 1948-1952), Nigeria (Fed. of), Rhodesia and Nyasaland (Fed. of Nyasaland), Ruanda-Urundi (production in villages), Tanganyika, Uganda (recorded sales), Union of South Africa (farms and estates).

World total (excluding U.S.S.R.). Regional totals: Europe, North America, Latin America, Near East, Far East, Africa.

Note that statistics for given years (e.g. 1948-52) may change as time passes; apparently this yearbook is periodically updating its statistics.

577. Callan, Mary Ann. 1959. Meals–Aid to millions. *Los Angeles Times.* June 7. Part IV. The Family. p. 1, D. Sunday.
• ***Summary:*** A dynamic little woman, Miss Florence Rose, operating with a small work force out of an unpretentious office on 7th street in Los Angeles, is busy making friends overseas for the United States. Miss Rose is the executive secretary of the Meals for Millions Foundation, and she works at their national headquarters. In 12 years the Foundation has shipped more than 56 million 3-cent meals to 100 countries abroad.

Multipurpose Food, developed by Caltech is now produced in the USA in Oxnard, California, primarily from soybean meal. The funds for sending the food abroad now comes from donations. India has produced MPF from peanut meal.

"Overseas women's groups in Brazil, Ethiopia, Greece, India, Japan, Korea, the Philippines, Taiwan, and Viet-Nam have received the friendship food for distribution–in quantities from 500 to 100,000 tons."

Note: This is the earliest article on soy seen (Aug. 2002) in the *Los Angeles Times.* Address: Times staff writer.

578. Williams, Robert R.; McGanity, William J.; Combs, Gerald F.; Kertesz, Z.I. 1959. A nutrition survey of the armed forces of the Republic of Korea. *J. of Nutrition* 68(1 Suppl):1-80. June. See p. 12-13. [42 ref]
• ***Summary:*** An endless variety of soups (which are thick like U.S. stews) are served, mostly in winter; they usually contain some soy products. Seaweed is a delicacy, used in cooking or served with soy sauce. A recent survey based on food disappearance, conducted by the USDA Foreign Agricultural Service, calculated average civilian calorie intake at about 2,058 per day, of which 81% comes from cereals, 5% from meat, fish, eggs, and milk, 4% from oilseeds, oils and fats, 4% from white and sweet potatoes, 2% from fruits and nuts, 1.6% from vegetables and seaweed, and 1% from sugar (p. 8).

The typical formula for Korean Army soup, in grams per man for one meal, is: Cabbage 70, soybean curd [tofu] 30, soybean mash [probably soybean paste, doen jang] 30, large white radishes [*daikon, Raphanus sativus*] 30, red pepper mash [kochu jang] 10, salt 10, onion 3, melchi (small dried fish) 2, and red pepper powder 1 (p. 9).

The section titled "Soybeans and soybean products" (p. 12-13) states: "Soybean products are extensively used in the Korean diet and by the ROK Armed Forces." Soybean curd (Japanese: tofu), which is precipitated with calcium or magnesium salts, is used almost daily in making thick soups. It is also "fried in deep fat and used in a composite ROK Army food called 'seasoned vegetable and bean curd' containing small fish (12%), soy sauce (23%), bean curd (25%), seaweed (16%), dry radish (14%), and red pepper, sugar, and cottonseed oil. This latter product was observed in one ROK Army mess only."

Soybean sprouts are a favorite and very nutritious civilian food in Korea, but their "use in troop feeding is limited, presumably because of the low germination of the soybeans available at the time of our visit."

Fermented soybean sauce is a widely used and nutritious seasoning.

"Seasoned soybeans are a delicacy much liked by Koreans and obtained by boiling soybeans in sweetened soybean sauce. The weight proportions used in the preparation are said to be cooked and roasted soybeans 70%, soybean sauce 25%, and sugar 5%.

"Soybean mash [*doen jang*] and pepper mash [*kochu jang*] are fermented foods popular in this part of East Asia. Barley is cooked. allowed to cool and then treated at about 90ºF for one day with a commercially prepared enzyme made from *Aspergillus oryzae.* [i.e., barley koji is made]. The barley is then milled together with cooked soybeans and salt, and fermented in concrete tanks for about 3 months. The finished paste-like product is rich in amino acids and protein and is extensively used directly and in cooking. Pepper

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mash is a similar preparation which contains in addition 10% powdered red pepper." Address: National Institutes of Health, Bethesda, Maryland.

579. Lee, K.Y.; Lee, C.Y.; Lee, T.Y.; Kwon, K.W. 1959. Chemical changes during germination of soybean. II. Carbohydrate metabolism. *Seoul University Journal, Biology and Agriculture Series* (*Seoul, Korea*) 8:35-44. Sept. (Chem. Abst. 54:697d). [12 ref. Eng; kor]
• ***Summary:*** When soybeans germinated (sprouted), the oligosaccharides stachyose and raffinose, which existed in the dormant seed and which contain galactose, disappeared rapidly. The sucrose content also decreased. A paper chromatogram of the sugars in a soybean hydrolysate (stripped of fats and free sugars) gave six spots, identified as ribose, arabinose, fructose, glucose, galactose, and maltose. Fig. 8 shows postulated carbohydrate metabolism in a germinating soybean.

Note: This is the earliest English-language document seen (Oct. 2020) that contains the word "oligosaccharides" (or "oligosaccharide"). Address: Dep. of Biochemistry, College of Medicine.

580. Nagata, Tadao. 1959. Studies on the differentiation of soybeans in the world with special regard to that in Southeast Asia. II. Origin of culture and paths of dissemination of soybeans as considered by the distribution of their summer vs. autumn soybean habit and plant habit. *Nippon Sakumotsu Gakkai Kiji* (*Proceedings of the Crop Science Society of Japan*) 28(1):79-82. Sept. Summarized in Soybean Digest, Feb. 1962, p. 26. [24 ref. Eng]
• ***Summary:*** Contents: Introduction. Clines established on combination of the summer vs. autumn soybean habit and plant habit. Ecotypes identified by the habits and their distributions in the world. A consideration on the origin of soybean culture. Some considerations on the paths of dissemination.

To illustrate the soybean's paths of dissemination, the author first establishes a system of four clines, based on the assumption that origin of soybean culture was in north and central China and moved into Manchuria, Japan and Southeast Asia (fig. 1). Each cline is identified by including summer vs. autumn soybean habit and plant habit (vining vs. nonvining). (1) The Manchurian cline (soybeans moved northward from China into Manchuria) is characterized by an increasing occurrence of special nonvining types which have a long relative flowering period and long relative growing period. (2) The Japanese full-season crop cline (soybeans moved from north China into Korea, and from there they were subsequently disseminated to central and northern Japan) is characterized by soybeans of the normal type having a short relative flowering period and a long relative growing period. Called *Aki-daizu* (autumn type), these soybeans are cultivated as a full-season crop in these regions and belong, more or less, to the short-day type. Historically we note that Korea had direct contact with China Proper, and especially with North China, during the Han dynasty (200 B.C. to the 3rd century A.D.). (3) The Japanese short-season crop cline (soybeans moved from central and south China, through Formosa [Taiwan] and Loochoo [Ryukyu Islands, incl. Okinawa]) is characterized by soybeans of the normal type having a short relative flowering period and short relative growing period. These short-season soybeans are designated as *Natsu-daizu* (summer type), since they are sown in the spring, mature early, and occasionally show very high protein content. However another (and more likely) path of introduction of short season crop soybean to Japan would have been directly from central China to south Japan, especially to Kyushu. Historically, we note that Japan had frequent contact with China before and during the Nara period (6th to 8th century A.D.). Recently soybean seeds were found in the *Shôsô-in*, which was established during the Nara period to store important materials (including medicinal herbs introduced from China). Moreover, these soybeans were identified as the short-season summer type akin to those grown in Kyushu and the Ryukyu Islands. (4) The Indo-Chinese cline (soybeans moved from central and south China, down through Southeast Asia [Vietnam, Laos, Thailand, Cambodia, Malaysia] to Indonesia) is characterized by an increasing occurrence of consistent vining types. Address: Hyogo Agricultural College, Japan.

581. *Soybean Digest.* 1959. Father of U.S. soy crop passes. W.J. Morse. Sept. p. 75.
• ***Summary:*** "William J. Morse, age 75, who had better claim than any other man to the title of founder of the soybean crop industry, died of a cerebral hemorrhage early in the morning of July 30 [1959] at his home in Eastchester, N.Y.

"Mr. Morse was known throughout the world and particularly in the United States and the Far East for his work in soybean development in the U.S. Department of Agriculture.

"He was one of the founders of the American Soybean Association and three times president. He was one of the first men to be elected an honorary life member of the Association.

"He was born in Lowville, N.Y., and attended Lowville Academy, then received his BSA from Cornell University [Ithaca, New York].

"Mr. Morse went to USDA in 1907 just at the time the Bureau of Plant Industry was making plans to carry on research in the growing of soybeans.

"The plant, introduced from time to time from China, Manchuria, Korea, Japan, and other parts of Asia, had been known here for a century, but had increased to only a few thousand bushels a year. Now, after the long period of search and research, it is one of the nation's leading crops, totaling over half a billion bushels a year.

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"Thirty years ago, after having put in 22 years of research in the Department, Mr. Morse spent 2 years exploring for soybeans and other crop plants in China, Japan, Korea, and Manchuria. He returned with hundreds of varieties, many of which contributed to the improvement of strains already here.

"By his development work he supplied the country with varieties suitable for various localities, increased the oil content of some–a big factor in the industrial use of this crop–and made other varieties better for food use. He stimulated the development of the vegetable soybean in this country. The soybean had been little more than a curiosity until research in USDA, largely by Mr. Morse, led the way to making it the important food, feed, and industrial crop of today.

"In 1947 USDA gave him a Superior Service Award.

"He published more than 75 bulletins and articles on soybeans and was co-author of The Soybean, published in 1923 and in print until very recently.

"Burial was at Mt. Hope Cemetery, Hastings-on-Hudson, N.Y. He is survived by a sister, Gladys H. Morse, Lowville, N.Y.; a daughter, Mrs. Walter A. Thalman, Eastchester, N.Y., and three grandchildren.

"Mrs. Morse died last Dec. 23."

A large, excellent portrait photo (taken in the 1940s) shows William Morse in his later years.

582. Nakano, Masahiro. 1959. FAO Ajia chiiki shokuhin kakô kaigi ni shusseki shite [Attending the FAO Asian food processing conference]. *Nosan Kakko Gijutsu Kenkyu Kaishi* (*J. for the Utilization of Agricultural Products*) 6(6):292-302. Dec. [Jap]
• ***Summary:*** Discusses Korean meju and soy sauce, Indonesian tempeh (tenpe), ontyom (onchom) and pongrek [sic, bongkrek], and Vietnamese nuoc-mam. Address: National Food Research Inst., Shiohama 1-4-12, Koto-ku, Tokyo, Japan.

583. Cheong, T.S.; Ke, S.Y.; Yoon, D.S. 1959. Studies on the nutritive value of natto and heated soy-bean products. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 4(1):41-45. *
• ***Summary:*** Fermented soy products are reported to be more digestible and of higher nutritive value than the raw beans.

584. Choe, C.E.; Kim, C.H.; Song, P.S.; et al. 1959. [Variations of vitamin in soybean during germination. I. Formation of vitamin B-1 and B-2]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 4(2):181-83. [Kor]*

585. Hahn, Y.S.; Park, B.D. 1959. [Studies on the manufacture of soy sauce. III. On the genus *Rhizopus* and *Mucor* in Korean wine kokja]. *Report of the National Industrial Research Institute* (*Seoul, Korea*) 9:147-61. [Kor]*
• ***Summary:*** Fourteen kinds of genus *Rhizopus* (G.R.) and 16 from the genus *Mucor* (G.M.) were isolated from Korean wine Kokja; their properties were examined morphologically and physiologically.

1. Extinctive temperature: The G.R. was 65ºC to 75ºC. The G.M. was 65ºC to 70ºC.

2. Propagative optimum pH. The G.R. was 4.0 to 6.6. The G.M. was 3.5 to 6.6. Address: National Industrial Research Institute, Seoul, Korea.

586. Park, T.W.; Whang, K.S.; Lim, S.U.; et al. 1959. [Studies on the soybean moromi (mash). III. Studies on the variation of the free amino acids content in soybean moromi during its fermentation]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 4(1):31-34. [Kor]*

587. Bush, Lewis William. 1959. Land of the dragonfly. London: Robert Hale. 224 p. Illust. Index. 23 cm.
• ***Summary:*** Chapter 20, titled "Mainly About Food," notes (p. 162-63) that sukiyaki is "cooked with soy, water, sugar, vegetables, bean curd..." And sashimi is "dipped in soy..."

"Miso is indispensable in Japanese cookery and is a paste made from beans and fermented rice, used for soups–particularly at breakfast, for preserving, and also as a condiment."

Buddhism was well established in China and Korea by the fourth century and was introduced into Japan between A.D. 500 and 600. Note: It may very well be that the cultivation of soybeans and their use in food, including fermented foods, were then introduced into Japan.

588. Thompson, Edna. 1959. The yoga cook book. New York, NY: Philosophical Library. 156 p. Index. 19 cm.
• ***Summary:*** The Yoga diet, as presented here, is not vegetarian. This book contains recipes for meat (liver, heart), fish, and shellfish. "Yogans" are said to eat at least some food each day which carries the life principle (fresh, raw food), to prefer whole foods in modest amounts, to avoid inert demineralized foods (such as white flour and white sugar), and alcohol. Yoga is not a religious movement; its followers practice self discipline in eating, without fasting. The rear dust jacket states: "This book banishes the idea that the modern Yogin as an ascetic with caveman dietary habits." The true Yogin regards his food as sacred and has heightened powers.

Soy-related recipes include: Soybean soup (p. 18). Shoyu sauce (soy sauce, p. 26). "Auxin" salad (freshly sprouted mung beans sprinkled with soy oil, etc., p. 48). Eggs foo yung (with bean sprouts, water chestnuts, green onion, celery, 4 beaten eggs, salt to taste. "Brown desired size patties of the mixture in soy oil." Serve with a brown sauce made with cornstarch, soy sauce, monosodium glutamate, sugar, and salt. p. 58-59). Vegetable sukiyaki

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(with Tofu {bean curd} and shoyu sauce, p. 65). Soyburgers (with mashed cooked soybeans, p. 66). Vegetable chop suey (with soy oil, bean sprouts, and soy sauce, p. 68). Korean soybean noodles (made with soybean flour, p. 72). Soy spoon bread (with soy flour and soy oil, p. 97-98). Making soy bean cheese (tofu, coagulated with vinegar, p. 104). Yoga puddings and desserts (white flour is replaced by soy flour and lard is replaced by soy oil, p. 114). Chinese sweet soy beans (p. 122). Manchurian soy bean milk drinks (p. 136).

Also discusses: Japan yokan cakes (with red beans [azuki], p. 116-17). Oat peanut butter wafers (p. 123). Red bean cake (Korea, with red kidney beans [azuki], p. 131-32).

589. Spears, Robert G. 1960. Nature's miracle bean. *Times of India* (*The*) (*Bombay*). Feb. 14. p. 7.

• ***Summary:*** "The author is a member of the Agricultural Mission at the U.S. Small Industries Exhibition now on view in Bombay. The Soyabean Council of America, Inc. has a very interesting section at this Exhibition."

The article begins: "The soyabean is among the most valuable foods known to man, because of its high protein and fat content." The USA is the world's largest producer and exporter of soyabeans. Most of the soybeans produced in the USA are yellow in color. The protein quality of the soyabean is higher than that of other legumes.

"Body-building: It is well known that soyabean eaters [such as Japanese, Chinese, and Koreans] are of greater stature and have more stamina than people who subsist largely on rice, millet, or other grains."

In many countries soyabean curd [tofu] and milk furnish good nutrition. The soyabean can be fermented to yield various sauces and seasonings, pressed to yield oil for cooking, sprouted to furnish a fresh green vegetable that is rich in vitamins, only ground dry to make a flour (soyaflour) that is used in baked goods and confections. During the early 20th century the soyabean first became important and popular in the Western World.

Many countries now buy U.S. soyabeans and make them into "their own soya foods."

Note: This is the earliest article or ad seen (Aug. 2010) in *The Times of India* that contains the term "soya foods." Today soya bean oil is used in the manufacture of more than 50 food products in the United States.

590. Nagata, Tadao. 1960. Studies on the differentiation of soybeans in Japan and the world. *Memoirs of the Hyogo University of Agriculture* (*Agronomy Series 4*) 3(2):63-102. March. Agronomy Series No. 4. [101 ref. Eng]

• ***Summary:*** In these pioneering, innovative, and fascinating studies, the author uses mainly physiological and morphological data to point out the paths of dissemination of the soybean from China to the rest of the world. He has been studying the subject since 1944 and this is his most definitive publication to date.

Nagata shows that two morphologically different ecological clines can be distinguished in the population of cultivated Japanese soybean varieties: a full-season crop cline and a short-season crop cline.

Note: Clines consist of ecotypes or forms of species that exhibit gradual phenotypic and/or genetic differences over a geographical area.

He also shows that these two clines were introduced separately into Japan from different geographical regions. The full-season cline from north-central China through Korea and the short-season cline from central-south China through Taiwan, the Ryukyu Islands, and into southern Japan.

Contents: Introduction. 1. Classification of soybeans by their degree of summer vs. autumn habit: Reduced rate of period of flowering by delay of time of planting, relative flowering and relative growing period in comparison to the period of flowering. 2. Classification of soybeans by their plant habit [e.g. vining and twining, transmitted from the wild form; determinate vs. indeterminate]: Vining habit affected by the time of planting, determinate vs. indeterminate growth habit and the relation to the vining habit. 3. Interrelation among the summer vs. autumn soybean habit, plant habit and other characters: Interrelation between the summer vs. autumn soybean habit and the plant habit, interrelation of the relative flowering period and relative growing period to the determinate vs. indeterminate growth habit and seed size. 4. Geographical distribution of soybeans in Japan: Distribution of summer vs. autumn soybean habit, distribution of relative growing period of summer soybean and intermediate types, distribution of plant habit.

5. Geographical distribution of soybeans in the world: Distribution of summer vs. autumn soybean habit, distribution of the relative flowering period and relative growing period of summer soybean and intermediate types, distribution of plant habit. 6. The clinal tendencies of soybean distributions and genecological differentiation occurring along with the spreading: Clines established with summer vs. autumn soybean habit, clines established with plant habit, clines established on combination of the habits and their ecotypic significance. 7. Some considerations on the origin and dissemination of cultivated soybeans: Origin of culture, paths of dissemination. General conclusions: Origin of soybean culture, dissemination of soybean, ecological differentiation of soybeans.

The distinction between summer and autumn soybeans is an old one in Japan, dating back to the Edo period (1600 to 1868); it seems to have originated from analogous terms used in old China. The summer soybean is planted early, in April, and harvested in July to August, as a short-season crop in southwestern Japan, including the islands of Kyushu and Shikoku, and in the Kinki district [around Kyoto, Osaka, Nara, and Wakayama]. By contrast, the autumn soybean type is planted later, in June or July, and harvested in November

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to December in southwestern Japan. However a reliable criterion for distinguishing summer and autumn types has not been established to date (p. 65). The author believes one criterion is the rate of reduction of the number of days to flowering by the delay of planting time. This is shown clearly by the graph in figure 1. When autumn, intermediate, and summer soybeans are planted on April 5, they take about 102, 68, and 43 days to flower respectively. However when they are planted on Aug. 13, they take about 32, 22, and 25 days to flowering. Thus the change in the number of days to flowering is largest in the autumn soybean and smallest in the summer soybean.

Although maturity is the most important character dividing soybeans into maturity groups in the USA, this system is not used much in Japan since it is difficult to distinguish there between the many varieties of soybeans differing from one another in earliness or lateness.

The author divides all Japanese soybeans into four main types and ten sub-types: Summer soybean type (with 3 sub-types), intermediate type (with 2 sub-types), autumn soybean type (with 3 sub-types), and tropical soybean type (vining).

"Relative flowering period" and "relative growing period" are two key concepts that are hard to understand. Each can be calculated by dividing (1) the number days from the beginning to the end of flowering, or (2) the number of days from emergence to maturity, by (3) the number of days from emergence to flowering. Summer soybeans have relatively long lengths of both periods and autumn soybeans have relatively short lengths.

Concerning vining habit, soybeans may be divided into 3 types: Consistent vining, variable vining, and nonvining. The earlier the first two types are planted, the greater the degree of vining they show. Plants with a consistent vining habit are always indeterminate, whereas those with a variable vining habit are always indeterminate. Those with a non-vining habit are usually determinate, but about 10% may be indeterminate. Summer soybean rarely show vining. Indeterminate growth habit is accompanied by stem elongation after the beginning of flowering.

Table 9 shows that summer soybeans have a longer relative flowering period and longer relative growing period than autumn soybeans. Yet (contrary to the text) table 10 seems to indicate that summer soybeans have smaller (lighter weight) seeds than intermediate or autumn soybeans. Thus large-seeded soybeans are most likely to be of the autumn type.

Table 11 shows that the soybeans grown in Hokkaido (Japan's northernmost main island) are mostly summer soybeans; they are planted in early May and harvested in October. No autumn type soybeans are grown in Hokkaido. In the nearby northeast prefectures (Tohoku) intermediate type soybeans predominate. Autumn type soybeans are most widely grown in the Kinki and Chûgoku regions of central and south Japan. In the far south of Japan, summer- and intermediate type soybeans predominate.

Table 13 shows regional distribution of soybeans with respect to their seed sizes. The largest soybean came from Kantô; 60 gm per 100 seeds. The next two largest came from Tohoku and Kinki; 35 gm per 100 seeds.

Figure 9 (p. 82) shows that worldwide (especially in the USA, Europe, and East Asia), the soybeans grown at far northern latitudes (above 40º north latitude) tend to be summer soybeans (short season crop) with a long relative flowering period, a long relative growing period, and a special non-vining habit or normal habit. Autumn soybeans tend to be grown at more southerly latitudes. Most soybeans grown between the equator and 20º north latitude are tropical or autumn type soybeans with a vining habit.

Note: The author makes no attempt to correlate edamame (green vegetable soybeans) with a certain type, habit, or seed size. Address: Sasayama, Hyogo-prefecture.

591. Tiner, Hugh M. 1960. Meals for Millions: A 3-cent 'lunch' fights hunger and malnutrition. *Rotarian* (*The*) 96(5):51. May.

• ***Summary:*** Tells the story of Clifford Clinton, Meals for Millions, and MPF (Multi-Purpose Food). Describes how many different Rotary Clubs in the USA have sent MPF overseas for use in relief and rehabilitation projects in Costa Rica, Portugal, Greece, Korea, Mexico, Ceylon, Hong Kong, and India. "Last year $247,000 poured into the Foundation's headquarters on Seventh Street in Los Angeles and sent 'meals' on their way to the hungry.

"But the chief aim of the Foundation is to aid Governments in developing their own versions of MPF, using food products of their regions. An Indian version, based on peanuts, is already in production, and the building of nine plants has been authorized for this purpose. A soy-based MPF is being produced in Brazil. Research is going ahead in the Philippines to develop MPF-type food with fish and coconut meal, in Mexico with soy, in Iraq with sesame and dates, and in the South Pacific with coconuts. Independent, self-supporting Meals for Millions affiliates are active in Brazil, Burma, Ceylon, Formosa, Hawaii, India, Israel, Japan, Mexico, Pakistan, the Philippines, and Thailand, studying, interpreting, and expanding the program." Address: Former president, George Pepperdine College; Past Distirct Governor, Rotary International; Rotarian, San Diego, California.

592. Choe, C.E.; Song, P.S. 1960. [On the biogenesis of riboflavin in soybean fermentation products]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 5(1):29-35. [Kor]*

593. Choe, C.E.; Song, P.S. 1960. [Fermented soybeans of Korea]. *Kwayon Huibo* (*Bulletin of the Scientific Research Institute, Korea*) 5(1):29. [Kor]*

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• ***Summary:*** Mentions *meju*–fermented soybean koji from Korea.

594. Korea: Its land people, and culture of all ages. 1960. Seoul, Korea: Hakwon-Sa, Ltd. 718 p. See p. 114, 602. Illust. (part color). No index. 26 cm.

• ***Summary:*** This large book contains a comprehensive view of Korean history and culture, with each chapter written by one or more Korean specialists and illustrated by hundreds of photos. Unfortunately, the book has no index.

A photo on an unnumbered page inserted 2 pages after p. 112, titled "Jars for food storage" shows a Korean woman with several of these jars. The caption reads: "Every home prepares such various earthenware jars for storing food such as soy-bean-sauce, doenjang (soy-bean-paste), kochujang (pepper sauce) and kimchi.

Note 1. This is the earliest English-language document seen (April 2021) that uses the word "doenjang" to refer to Korean-style soybean jang (miso).

In the section on "Agricultural products," table 3 (p. 246), titled "Food supply and demand schedule for Fiscal 1959 throughout South Korea" gives the requirement for "Soybean sauce and cakes" as 768,000 *sok.* Under supplies, the "Bean crops of 1958, estimate, were 1,291,000 *sok.* An Appendix, (p. 714) shows that 1 *sok* (a unit of capacity) = 180.391 liters or 47.600 gallons.

Title 12, "Manners and customs" notes (p. 600): "... the farmers' wives in the country still know nothing more than the traditional *kimchi* and rice with some inexpensive fish cooked with home-made soybean sauce... The unique Korean foods–the *kimchi*,... soybean sauce and soybean mash are still the most important diets of both the rural and urban people and they are still prepared at home by the housewives despite the possibility of more efficient factory mass production."

The section titled "Food and dwelling," under "The main and side dishes" states (p. 602): "Other essential foods are bean paste and soybean sauce, both of which are used to make soup and flavor other side dishes of all kinds. The bean paste and the soybean sauce are as a rule prepared at each home. The beans are first cooked, then mashed and rolled into balls about 5 inches in diameter. The balls are then fermented for several days, finally to be immersed in salt water, to turn the salt water into soybean sauce. The residue balls of the fermented beans, an the other hand, become the soybean paste. Being for the most part prepared at home, rather than mass produced in factories on a commercial basis, the soybean sauce and bean paste of each house taste different. Since the two home-made foods find their way into almost all kinds of side-dishes, to be mixed with meat, seafoods, and vegetables, the soybean sauce and [soy] bean paste have a decisive say in the taste of all the foods prepared at each particular home."

*Kong-namul* and bean sprouts are mentioned on p. 606. Nori (*kim*) is called "paper food."

Chapter 17, "Literature: An outline of Korean literature, its heritage," includes a discussion of many early works.

An excellent "Chronology chart of Korean history compared with world history" appears on pages 715-18. At the rear is a color fold-out map of Korea.

In the section on "Proverbs" we read (p. 660): In Korea, "reservation is more frequently encouraged, and especially volubility is strictly warned against as in the sayings: 'Talkative families turn their sweet soybean sauce into bitters.' 'Go to the home of sweet soybean sauce, but not to the home of sweet words.'"

Note 2. This is the earliest English-language document seen (April 2012) that contains the term "sweet soybean sauce."

595. Meals for Millions Foundation. 1960. Friendship Food for a Hungry World: Distribution summary. Los Angeles, California. 29 p. Undated. 28 cm.

• ***Summary:*** See next page. "The world-wide travels of the '3 cent meal' of Multi-Purpose Food, September 1946 to June, 1960 [13 years and 9 months]: 62 million meals [distributed] including 3,429 relief shipments to 127 countries through 210 cooperating agencies."

This 29 page typewritten booklet contains a complete listing of all the shipments of MPF over 14 years, from September 1946 through June 1960. However no dates are given for shipments to individual countries.

Contents: What is the Meals for Millions Foundation? Multi-Purpose Food (MPF): What it is, what it does. Index of countries. Distribution totals (Sept. 1946–June 1960). Acknowledgment.

The index of countries lists the "Country," the "American Agencies or Denominations Cooperating and/or Served," the "Number of Lbs." and the "Distributing and Recipient Agencies." Under each country is the number of shipments and the number of pounds shipped.

In the Index, the countries are listed alphabetically by region and within each region alphabetically by country, as follows (however in the body of the booklet they are listed alphabetically by country name). Countries receiving more than 50,000 lbs. (25 tons) will be noted: Africa: Angola, Belgian Congo (52,657 lb), Camerouns [Cameroon], Egypt, Eritrea, French Equatorial Africa, Ghana, Kenya, Liberia, Libya, Mauritius Is., Morocco, Mozambique, Nigeria, Republique du Congo [Congo-Brazzaville], Rhodesia, Sierra Leone, South Africa, Tanganyika, Tunisia, Uganda.

Asia–Near East: Iran, Iraq, Israel, Jordan, Lebanon (56,910 lb), Oman, Persian Gulf, Turkey.

Asia–Far East: Afghanistan, Borneo (divided among Indonesia {73%} to the south, Malaysia, and Brunei), Burma, Cambodia, Ceylon, China (358,957 lb; 1946-1951), Goa, Hong Kong (238,760 lb), India (1,394,707 lb; 742 shipments. Note: Indian MPF became available in 1956,

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# FRIENDSHIP FOOD

FOR A

# HUNGRY WORLD

***DISTRIBUTION SUMMARY***

**The World-Wide Travels of the *"3 CENT MEAL"* of Multi-Purpose Food**

**September, 1946 to June, 1960**

**62 MILLION MEALS**
**including**
**3429 relief shipments to**
**127 countries through**
**210 cooperating agencies**

*Meals for Millions*

FOUNDATION, INCORPORATED

**115 West 7th Street • Los Angeles 14, California**

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and shipments from the USA were discontinued; 558,072 lb of Indian MPF were made; 410 shipments), Indonesia, Japan (535,250 lb), Korea (1,254,225 lb; 489 shipments), Laos, Macao, Malaya, Nepal, Okinawa (20,616 lb), Pakistan (83,292 lb), Philippines (122,103 lb), Taiwan (46,089), Thailand, Vietnam.

Asia–Pacific Islands: American Samoa, Caroline Islands, Fiji Islands, Guadalcanal, Hawaii, Marshall Islands, New Hebrides.

Europe: Austria (82,159 lb), Belgium, Czechoslovakia, England, Finland, France (124,996 lb), Germany (206,185 lb), Greece, Hungary, Italy, Luxemburg [Luxembourg], Netherlands, Poland, Rumania, Spain, Switzerland, Trieste, Yugoslavia.

Europe–North Atlantic Islands: Cape Verde Islands, Madeira Island.

Latin and Central America: British Honduras, Canal Zone, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama.

South America: Bolivia, Brazil (198,581 lb), Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela.

Caribbean Area: Cuba, French West Indies, Haiti (110,231 lb), Jamaica, Puerto Rico, St. Lucia, Virgin Islands.

North America: Alaska and Aleutian Islands, Canada (51,836 lb), United States (146,635 lb; American Indian relief, Migrant relief, School lunch and institutional projects {Clifton's Golden Rule Cafeteria donated 12,500 lbs}, Miscellaneous).

Additional countries reached through overseas parcels only: Argentina, Cyprus, Denmark, Malta, New Zealand, Norway, Nyasaland, Pitcairn Island, Saudi Arabia, Scotland, Sudan, Sweden, Trinidad.

At the end of all the countries (p. 28) is a box titled "Total Relief Distribution": 3,249 shipments [or perhaps 3,429], 6,412,256 pounds [3,206 tons, or 229 tons a year average for 14 years], 51,298,048 "meals" of MPF. On the next page are the details of the "Distribution totals."

There is also a special acknowledgment at the back to the U.S. Navy and the U.S. Naval Air Reserves "for their cooperation in transporting approximately 200,000 lbs. of M.P.F. during 1959-1960. Operation Handclasp, a people-to-people project of the U.S. Navy, originating in San Diego, has carried shipments to the Far East and to South America. Planes of the U.S. Naval Air Reserves have carried emergency supplies of MPF to disaster areas, such as flood victims in Nagoya, Japan, and to earthquake victims in Agadir, Morocco."

Note: The countries receiving the most MPF by weight are (in descending order of amount) are: India, Korea, Japan, China, Germany, France, Philippines, and Haiti.

A photo shows the cover of the 29-page summary document. This photo and photocopy of the document were sent to Soyinfo Center by Chris Dodson of Freedom from Hunger Foundation, Davis, California (Nov. 2010). Address: Los Angeles, California.

596. Reischauer, Edwin O.; Fairbank, John K. 1960. East Asia: The great tradition. Boston, Massachusetts: Houghton Mifflin Co. xiii + 739 p. Illust. Index. 23 cm. First published 1958. [150+* ref]

• ***Summary:*** A masterful history of the subject, focusing on political history. Contents: 1. The setting of East Asian history. 2. Early China: The birth of a civilization. 3. Classic China: The golden age of Chinese thought. 4. The first Chinese empire: The Ch'in and Han dynasties. 5. The "barbarian" challenge and the regeneration of the empire. 6. The late T'ang and Sung: The golden age of Chinese culture. 7. China and the "barbarians": The Mongol empire. 8. State and society under the Ming. 9. Traditional China at its height under the Ch'ing (incl. Manchu Conquest, Tibet). 10. Traditional Korea: A variant of the Chinese cultural pattern. 11. Early Japan: The absorption of Chinese civilization. 12. Feudal Japan: A departure from the Chinese pattern. 13. Tokugawa Japan: A centralized feudal state. 14. East Asia on the eve of modernization.

Page 12 states that "many of the principal crops and animals of East Asia, notably rice, the soy bean, the chicken, the water buffalo and the pig, seem to have come from hot and humid Southeast Asia." Note: As of 1995 the soybean is thought to have originated in northeast China, not in Southeast Asia. Address: Harvard Univ.

597. Smith, Allan K. 1961. Oriental methods of using soybeans as food. With special attention to fermented products and notes on Oriental farming practices. *USDA Agricultural Research Service.* ARS-71-17. 65 p. July. Illust. 27 cm.

• ***Summary:*** Contents: Part I: China. Introduction. Farming conditions in China. Oilseed production. Soy sauce in China. Sweet flour paste–Tien mien chang [chiang]. Soybean or vegetable milk (incl. Willis Miller and the Henningsen Produce Co. in Shanghai). Yuba. Soybean curd or tofu. Soybean cheese [fermented tofu]: Chee-fan ("cheese" + "small cube"), tsüe-fan ("drunken cheese"), hon-fan ("red cheese"). Fen-T'iao from mung beans. Fermented soybeans [fermented black soybeans]. Vinegar fermentation process.

Note: This is the earliest document seen (Oct. 2011) that uses the term "tsüe-fan" ("drunken cheese") to refer to a type fermented tofu.

Part II. China–Chinese Institutions. Henry Lester Institute (in Shanghai; Dr. Bernard Read). Academia Sinica (headquarters in Nanking). China Vegetable Oil Corporation (CVOC, Shanghai). The China Oils and Fat Industries Ltd. (Shanghai). National Bureau of Industrial Research. Catholic University (Fu Jen, at Peiping). Yen Ching University (Peiping). Agriculture Experiment Station (Peiping).

Part III: Japan. Introduction. Production of miso in Japan. Soy sauce in Japan. Trends in soy sauce

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production. Part IV: With Raymond E. Culbertson. Korea. Introduction. Breeding work. Soybean varieties. Climatic relations. Soils of Korea. Topography. Land use. Cultural practices. Marketing. Soybeans as foodstuff. Soy sauce. Acknowledgment.

Page 19 states: "The China National Government has taken an active interest in soybean milk for use by its army. Mr. Willis Miller, with offices and business connections with the Henningsen Produce Company in the Dollar Building (7th Floor) at 51 Canton Road, Shanghai, had just completed, at the time of my visit, the building of a soybean milk plant for the Chinese Government. The process is patterned after that of the International Nutritional Laboratories at Mt. Vernon, Ohio, for making a powdered or spray-dried milk. Mr. Miller also was supervising the installation of a vegetable canning plant for the same purpose."

The text of this bulletin was previously published, serially, with slight revisions, in *Soybean Digest,* from Feb. to June 1949. Address: Northern Utilization Research and Development Div., Peoria, Illinois.

598. Cho, H.O. 1961. [Studies on the increased production of amylases and proteases by combination of raw materials of koji for soy sauce and soy bean paste]. MSc thesis, Graduate School, Seoul National University. [Kor]*
• ***Summary:*** Previous studies of the koji starter for soy-sauce and soybean paste, which are the main condiments in Korea, indicated that the amylases and protease activities of the koji differ by that kind of substrate, whether soybean or barley.

In order to try to increase those enzyme activities, koji was prepared by various combinations of soybeans and barley with the following results.

1. Koji prepared from the combination of soybean, barley and wheat at the ratio 4-6 to 6-4 to 2 was greatly superior to that prepared from a single substrate with respect to alpha-amylase, saccharifying and protease activities.

2. Variation of alpha-amylase, saccharifying and protease activities depending on the combination of raw materials, showed similar tendencies on the whole.

3. The possibility of improving the processing of soysauce, and soybean paste by the use of koji prepared from different substrates was discussed. Address: Seoul, Korea.

599. Food and Agricultural Organization of the United Nations. 1961. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook* (*Rome, Italy*) 15:116.
• ***Summary:*** Name changes: "Korea, South" is changed to "Korea, Republic of." "Congo (ex-Belgian)" is changed to "Congo (Leopoldville)."

600. Chang, K.H.; Lee, K.H.; Park, S.O. 1962. [Studies on koji for soy sauce brewing. I. Isolation of *Aspergillus* species]. *Report of the Army Research and Testing Laboratory* (*Seoul, Korea*) 1:40-45. [Kor]*
• ***Summary:*** 1. Four hundred eighty species of *Aspergillus* were isolated from koji, Meju (fermented soy bean) and soil which were collected from 56 sources / locations in South Korea.

2. Four hundred eighty strains of *Aspergillus* were screened for protease, saccharogenic amylase, and dextrinogenic amylase productivity and activity.

3. Three strains of *Aspergillus oryzae*, S56-9, S-10, and M17-2, were selected as having the best enzyme activity among all of these. Address: Army Research and Testing Laboratory, Seoul, Korea.

601. Chung, Y.S. 1962. [Microbiological studies on soysauce: Isolation and identification of bacteria from soysauce brewed by the conventional process]. *Misaengmul Hakhoe Chi* (*Korean J. of Microbiology*) 1:30-37. [Kor]*
• ***Summary:*** Ten strains of aerobic bacteria and two strains of microaerobic bacteria were isolated from soy sauce which had been brewed by the conventional process. The following bacteria were identified by studying their morphological and physiological characters. *Bacillus punillus* R-2; *Bacillus subtilis* var., *aterimus* S-1, *Bacillus licheriformis* var-S-2, *Bacillus subtilis* T-1, *Sarcina maxima* T-2, *Pediococcus acidi lactici* Z-2, *Bacillus citreus* var., *soya B* Z-5, T-2 and Z-5 of the isolated bacteria were found to grow well even in the 24% salt medium, and Z-5 was more vigorous than T-2 though stinking. S-1 produced black-brown pigment from the medium containing various kinds of carbohydrates and the medium of soysauce which are available to S-1. Address: Army Research and Testing Laboratory, Seoul, Korea.

602. Hahn, Y.S.; Park, B.D.; Chun, K.S. 1962. [Studies on the manufacture of soy sauce. IV. On the genus *Rhizopus* and *Mucor* in Korean wine kokja]. *Report of the National Industrial Research Institute* (*Seoul, Korea*) 11:52. [Kor]*
• ***Summary:*** As part of these ongoing studies on Korean wine kokja, the researchers isolated 15 kinds of the genus *Mucor* and 16 kinds of the genus *Rhizopus* from other regional wine kokja by the same methods used previously. A detailed discussion of similar variables is given. Address: National Industrial Research Institute, Seoul, Korea.

603. Hahn, Y.S.; Kim, K.J. 1962. [Studies on the manufacture of soy sauce. V. On the genus *Rhizopus* and *Mucor* in Korean soybean Meju]. *Report of the National Industrial Research Institute* (*Seoul, Korea*) 11:140-52. [Kor]*
• ***Summary:*** As part of these ongoing studies on the same subject, the researchers isolated 8 kinds of the genus *Rhizopus* 25 kinds of the genus *Mucor* from Korean soybean Meju. Their properties were examined morphologically and physiologically.

1. Extinctive temperature: Most of the genus *Rhizopus* were 60 to 70ºC and most of the genus *Mucor* were 70 to

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75ºC.

2. Propagative optimum pH: The genus *Rhizopus* were 2.5 to 7.0 and the genus *Mucor* were 4.0 to 6.5.

3. The multiplication of the genus *Mucor* in carbohydrates as a nutrient source was weak or did not occur, but the genus *Rhizopus* were good in all kinds of carbohydrates and R-32 [*Rhizopus*], R-36, and R-37 were especially superior. On many nitrogen compounds, genus *Rhizopus* multiplied well, and always better than the genus *Mucor.*

4. Liquefied action of gelatin: M-37 [*Mucor*], M-38, and M-52 finished the reaction in the short time of 25-30 minutes. Address: National Industrial Research Institute, Seoul, Korea.

604. Meals for Millions. 1962. People to people (Color motion picture). Los Angeles, California: Meals for Millions. 16 mm. Summarized in Soybean Digest, June 1962, p. 28. *

• ***Summary:*** According to Soybean Digest: "After a year of film making in Africa, India, Korea, Hong Kong, Hollywood and Pasadena, the Meals for Millions 16-mm motion picture in color, 'People to People,' has been completed. Narration is by film star Eddie Albert and the theme song by Peggie Lee.

"The film tells the history and scope of the Meals for Millions program in feeding hungry people with the 3¢ meal, MPF. The film presents in person sequences showing Dr. Albert Schweitzer at his African hospital at Lambarene [Gabon], and the late Dr. Tom Dooley relating his experience in Laos with Multi-Purpose Food.

"Available without fee to any group choosing a Meals for Millions project or for $10 rental including surface mail delivery. For further information write Soybean Digest 6c, Hudson, Iowa."

Note: Also shows Clifford Clinton, Dr. Henry Borsook, Florence Rose. As of March 1984 the film is still available from Meals for Millions. Address: Los Angeles, California.

605. Cartter, Jackson L.; Hartwig, Edgar E. 1962. The management of soybeans. *Advances in Agronomy* 14:359-412. [174 ref]

• ***Summary:*** Contents: I. Introduction: World production (958,275,000 bushels in 1960), United States production trends, utilization (processing to obtain oil and meal, hay and green manure). II. Soil and climatic adaptation: Areas of production in the United States, soil requirements, climatic adaptation (effect of temperature on plant growth, effect of temperature on composition of seed, effect of light on plant growth, effect of photoperiod on flowering and maturity, effect of soil moisture on growth). III. Time of planting and varietal adaptation: Effect on plant characters (maturity, plant height, lodging, seed quality, size of seed, seed yield), effect on composition of the seed. IV. Planting methods and equipment: Seedbed preparation (conventional, minimum tillage, deep tillage), row width and planting rate (row width, planting rate), double cropping (after fall-sown grain crops, after peas), special methods of planting, types of equipment. V. Rotation practices and erosion control: Effect on soybean yields, effect on the following crop, effect on weed population, soil residues from herbicides, erosion control. VI. Weed control: Effect of planting time on plant growth and weed competition, methods of cultivation, chemical weed control (pre-emergence herbicides, post-emergence herbicides). VII. Seed quality and seed treatment: Factors affecting seed quality and germination, seed treatment. VIII. Nutrient requirements: Nitrogen requirements and nodulation (effectiveness of nodulation as a source of nitrogen, methods of inoculation, survival of bacteria in the soil, effect of seed treatment on inoculation, effect of nitrogen applications), liming and pH levels (pH and plant development, calcium and magnesium requirements), phosphorus, potassium, trace elements, fertilizer practices and recommendations. IX. Water requirements and utilization: Water needs in relation to plant growth and development, irrigation and soil management. X. Growth-regulating chemicals. XI. Harvesting: When to harvest, harvesting methods. XII. Seed storage. XIII. Discussion.

The USA now produces about 57% of the world's soybeans, followed by China (PRC; about 33%), Indonesia, Japan, Korea, USSR, Brazil, and Canada, in that order. By 1920, U.S. production was 3,000,000 bushels and the leading states were North Carolina, Virginia, Alabama, Missouri, and Kentucky–North Carolina producing 55% of the total. By 1931, the center of production had shifted to the North Central States, where it is at present.

Note: According to Google Scholar, this is the 3rd most widely cited article (cited by 172) of which E.E. Hartwig is an author. Address: 1. United States Regional Soybean Lab., Urbana, Illinois; 2. Stoneville, Mississippi.

606. Kitamura, S. 1962. [Applied botany]. Tokyo: Asakura Book Co. See p. 261. [Jap]*

• ***Summary:*** Soybeans were introduced to and grown in Korea sometime between 30 B.C. and A.D. 70.

607. Miller, Harry W. 1962. Traditional methods of processing and use of soy liquid and powdered milk. In: USDA Northern Regional Research Laboratory, ed. 1962. Proceedings of Conference on Soybean Products for Protein in Human Foods. Peoria, IL: USDA NRRL. iii + 242 p. See p. 149-56.

• ***Summary:*** "It is a new day when so many important sponsoring organizations join in evaluating the suitability of the protein of the humble soybean to meet the nutritional needs of the human subject, and to study practical ways of extending its benefits in protein deficient diets.

"In August 1940, I presented a paper entitled 'The Role of the Soybean in Human Nutrition' before the American Soybean Association at Dearborn, Michigan, and predicted

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that the day would come when we would find an awakened interest in this country in utilizing soy products as a part of the American menu. I believe we are rapidly approaching that goal, There is now an awakening in many lands to the needs of better nutrition, and it is timely that study and research be given to how we can utilize the values of the soy protein for universal race betterment.

"Soybeans have for centuries been the chief protein supplier in the heavily populated areas of Southeast Asia. It is well to examine methods of processing and utilization as practiced in the Orient. However, the per capita utilization of soybeans has been far below their needs, ranging from 15 to 50 pounds per annum in countries like China, Japan, and Korea, largely due to the inability of agriculture to keep pace with population.

"It was in these soy-producing and-utilizing countries that I had the opportunity over more than half a century to observe their methods of preparation, and to check the results in the feeding of soy products. Considerable leafy vegetables, stems and 'roots' have to a certain extent supplemented the diet with protein, so that adults of mature age probably get adequate protein. However, the appalling infant mortality and adolescent protein deficiency diseases have stressed the need for increased rations such as may be supplied by the soybean.

"Protein has its greatest contribution during the growing years of life. Three times the amount of protein per unit of body weight is needed the first year of life compared with the adult. During adolescence and the teenage years twice the amount of protein is required till they attain their normal body weight as in after life. If individuals are well grown with ample biologic protein their chances for long life expectancy are enhanced.

"With the infant's short intestinal tract and its immature digestive juices, foods have to be reduced to liquids to be usable. Consequently, a liquid food beverage, if supplied in sufficient quantity and quality, enables normal growth to proceed rapidly. Without it, growth is stunted; anemia, infection follows and many do not survive these years of inadequate food intake. Those that survive childhood often die early in life of degenerative diseases.

"The need of liquid nourishment following birth is evident from the fact that all mammals, including the human, have no provision for taking solid food, so as a starter food a lacteal secretion is by nature supplied, and to meet the need of the growing years of the human, various animal milks have been used. However, the supply is meager in the Afro-Asiatic countries.

"My attention was called to soybeans as a dietary food upon reaching China and living on Chinese cuisine. It was some 20 years later, in 1925, that I embarked on the development of a liquid beverage from the soybean. Considerable progress has since been made in improvement of such a food beverage and its use. However, it is only a few areas where nutritional use is made of soy milk, and much remains to be done in its improvement and distribution to combat malnutrition.

"The Oriental approach to processing the soybean is entirely opposite to that of the west. Western countries process the soybean by grinding it into fine flour after dehulling, and screening through very fine 200- or 500-mesh screens, or shall we call it, the milling operation. While in lands where soybeans have been used for centuries, they first hydrate the beans, or as we call it, use the wet-milling operation.

"In Eastern countries interest in soybeans has been primarily in its protein content, while the West has vied for its oil. It was my good fortune that I began my study of the soybean in the Orient where soybeans were used for human food, rather than for animal rations. Soaking the hard, dry bean was the first procedure, and it then is ground into a milklike slurry. The whole soybean is given a water soak for 8 hours, or after dehulling a water bath for 2 hours. In either case the bean doubles its original weight by water intake. It is then ready for the milling operations. This is accomplished with stone buhr mills, or disintegrators, that break up the continuity of the fiber, and expose its nutrient particles of protein, oil, carbohydrate, vitamins, and minerals to a water wash. The water-soluble nutrients are separated from the fiber portion by filtration. The amount of water used in the slurry mix, its temperature, whether hot or cold, and also the quality of beans, determines the ratio of soluble nutrients to those still clinging to the fiber.

"In fact, there are numerous techniques to be observed to get the dispersible protein and other nutrients in the highest soluble amounts. Beans differ, as also the aging of beans. The nutrient yield is greatest immediately after harvest time. Long heat exposure in warm climates, makes for less solubility. A proper soak is of great importance; then next the grinding of the beans. A small stream of water to give a tearing, rubbing action so as to thoroughly expose all soluble ingredients is preferred to a mill with a cutting action to mince into fine particles. Before filtration this slurry should be agitated and heated, which will yield an additional 10 percent to the soluble ingredients. Several methods of filtration, such as a shaking screen, a plate and frame pres, vacuum drum filters, or centrifuges of various types can be used. A re-grind of the fiber cake and a second extraction makes possible an extra 5 to 8 percent recovery of the solubles. A possible 92 percent of protein with other nutrients in proportion has been attained by grinding and filtration methods. In practical plant operations we expect 60 to 80 percent protein recovery of the original bean. This leaves considerable nutrients in the fiber or pulp, which is then used for stock feed.

"The milky solution thus extracted is used either for cheese curds of various types, or is formulated and processed into a beverage milk–liquid or powdered. Soybeans are used

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in different countries in making a savory sauce, called Soy Sauce; a soup base as in Miso, or as a fermented bean as Japanese Natto. They are eaten as immature green beans in pod or shelled and are very delicious.

"Soy Milk: Trials have been made in the past to utilize soy milk by the Asiatics but for lack of proper processing methods such milk, as filtered and not formulated, was neither tasty nor nutritionally acceptable, giving rise to very unpleasant digestive responses. I have repeatedly asked in parts of China, Japan, and Korea why it was not used as a beverage, always with the same answer, that it gave rise to intestinal disturbances. So a cheese curd is used instead of milk. Curdling it into a cheese, through the use of calcium salts, vinegar or other coagulative agencies, has resulted in many savory food products. Heating this milk extract causes a scum film [yuba] to form, also very tasty, and the remaining portion is curdled and made into cheese [tofu] cakes of varying dimensions and density. All such sheets and blocks of curd receive a second cook, or are fermented, which seems to render them more digestible.

"Soy cheese or curd is easy to market and very popular, being tastily flavored and combined in the Chinese cuisine as a meat, fowl, and fish replacer. The Japanese report 70 different forms or dishes utilizing soybeans, and the Chinese even more. Out of 1 pound of soybeans they make 4 pounds of curd called Tofu.

"While we have spent some time in Indonesia we have had little experience with Tempe–a fermented soybean food product.

"My contributions had to do with developing an easily digested and highly nutritious soy milk, and processing it sufficiently to render it acceptable to both infants and adults. The extract from the bean which is rich in protein can be formulated as desired with added fat, carbohydrate, minerals, and vitamins. These properties can be varied or formulated to that of human milk, or any other type of animal milk. The final product can be made in a single strength, or condensed to double strength and canned, or spray-dried as a powder.

"Our first work in developing a formulated soy milk dates back 56 years ago when we secured a Disper mill [Dispermill], or homogenizer, to constitute a formulated liquid. This soy milk was first used in the Shanghai Sanitarium and Hospital as a table beverage for nurses, helpers, staff, and patients of the institution, and later to the baby and children's ward of the Shanghai Clinic and Hospital. Here we had baby boarders, infants kept under observation on soy milk feeding for up to 2 years. The results of this feeding was reported in the China Medical Journal of 1957. Many other farmed out research studies were made, such as at the indigent hospital in the Philippines; at the Tokyo University, and the Ohio State University in America.

"Results on the Ohio State study are shown in Figure 1.

"The first commercial development was a soy milk dairy established in Shanghai in 1935, the process used was in-bottle sterilized milk, formulated to the standard of cow's milk; also a chocolate milk; and a soy-acidophilus milk, which was extensively marketed all over the city of Shanghai up until the plant was destroyed in 1937 by the bombing of Shanghai.

"A soy milk powder plant was also fabricated there, using a local made Grey Jensen spray dryer, which also came to an end in the same way at the same time.

"There are many technical problems involved in producing a satisfactory nutritional beverage from the soybean to simulate milk, which in the few moments we have would be impossible to enter into. These are gradually being solved, such as improved color, taste, stability, condensing as a double strength canned milk, and as an instant soluble powdered soy milk. On vacuum pan evaporation, due to the viscosity of soy milk, concentrating to more than 30 percent solids is the limit, as compared with animal milk at 45 percent solids. However, generally speaking, once a water extraction soy milk is obtained the same methods and equipment used by the dairy industry are applicable to produce it in various forms for marketing" (Continued). Address: M.D., Director Emeritus, International Nutrition Research Foundation, 11503 Pierce Blvd., Arlington, California.

608. Brandemuhl, William. 1963. Soybean history: aspects of Buddhist influence. Anthropology Dept., University of Wisconsin, Madison. 15 p. Jan. Unpublished manuscript. 28 cm. Summarized as "Early Soybeans Were Spread by Buddhists" in Soybean Digest, July 1963, p. 21. [52 ref]

• ***Summary:*** This research paper (which is not a thesis) was prepared for Anthropology 150a, taught by Dr. R.J. (Robert) Miller. Contents: Purpose of study. Method of study. Botanical history: Naming the soybean, the *Glycine ussuriensis* case, other genetic evidence, claim on the origin of the soybean. Initial utilization. Botanical dissemination. Soybean history–non-botanical: Legend, recorded Chinese soybean history, concluding notes on soybean origin and cultivation history. Buddhist influence on the development of the soybean: Soysauce or shôyu, miso, tofu, natto, ancient soybean food products, the soybean grows.

"Another principal concern of this paper is the Buddhist connection to soybean development. The introduction of soybeans, although an approximation at the very best, coincides quite closely with the spread of Buddhism in Japan. As shown later, Buddhism has a very close connection with soybean history and in many product sectors of soybean development, may have created or at least popularized them" (p. 1).

"Contrary to the above statement I submit the following data which I believe can easily be documented: 1. Emperor Shen-nung is a mythical character (letter from Herbert W. Johnson, Research Agronomist, USDA / ARS [Agricultural Research Service] Crops Research Div., Beltsville,

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Maryland, 30 Aug. 1962). 2. Emperor Shen-nung was a legendary character who cannot be pinpointed to a date of 2838 B.C. (letter from Jung-pang Lo, Research Asst. Prof., Far Eastern and Russian Inst., Univ. of Washington, 6 Sept. 1962). 3. Shen-nung is a mythical ruler, never living at the date attributed to him or at any other date (letter from Edward H. Schaefer, Professor of Oriental Languages, Univ. of California, Berkeley, 6 Sept. 1962). 4. A work attributed to Shen-nung is called *Shen nung pen Ts'ao Ching* but since it contains many Han Period facts (around the beginning of the Christian era) it is believed to be a Post-Han work. This work is first mentioned by T'ao Hung-ching (who edited it) early in the 6th century A.D. (Jung-pang Lo). 5-6. The *Pen Ts'ao Kang Mu* was written by L. Shih-chen (1518-1593) in A.D. 1596 or 1597 (Jung-pang Lo, Schaefer)... 9. The word 'Shiyu' cannot be found in Chinese dictionaries. The name for the soybean in China being 'Ta-tou,' meaning big bean (Jung-pang Lo)."

"Concluding notes on soybean origin and cultivation history: *The Book of Poetry* (Shih-ching) mentions boiling shu (pulse) and the *Erh-ya* (a Chou period lexicon, authorship attributed to Confucius or his disciples) mentions Jung-shu. Kao yu, the commentator, remarked that the Jung-shu (pulse of the Hu people) which was also known as Ta-tou (the soybean). Jung was a term used by the Chinese in the Chou period for the non-Chinese people of the North and Ju was a term used by the Chinese people of the North and West. This would seem to indicate that the soybean was introduced to China from the non-Chinese people of the North. Also supporting this is the *Chou-shu* by Hsi meng, in which there is a reference to Shan-jung shu (pulse of the Jung people of the mountains). A commentator explains that the Shan-jung were tribes in the Northeast (Manchuria).

"The Kuang-Tzu contains a passage saying that after Duke Huan of Chi (7 B.C.) defeated the Shan-jung the Jung-shu came to be known throughout China. Chia su-hsieh (5 A.D.) in his book *Ch'i-min Yao-shu* (Ts'tung-shu Chi-ch'eng, editor) quoted the *Shen-nung pen Ts'ao* as saying that Ta-tou (the big bean) was the Hu-Tou (Hu peoples' bean) which Chang Ch'ien brought back from his exploration of central Asia in the first century B.C., there being two varieties. In the Han period both Ts'ui shih and Fansheng in their books on farming techniques mention cultivation of the Ta-tou and its use in famine relief. The *Pen Ts'ao Kang Mu* (1596), mentioned earlier, has a long discourse on the medical properties of the Ta-tou (Jung-pang Lo)."

"Buddhist influence on the development of the soybean: Although references to the Buddhist influence on soybean development are particularly sparse I believe Buddhism deserves credit for initiating the spectacular expansion of soybean utilization in Japan which triggered utilization in the rest of the world. The Buddhist connection is certainly true if oil utilization is excluded. Below lie the reasons for my belief.

"Buddhism was introduced into Japan around 500-600 A.D. (Bush 1959, p. 28-29). Among the priests the traditional hate of flesh was present and agriculture of the field type was encouraged by the government (Tezuka 1936, p. 13). The introduction of soybeans fits well into this historical development. The recent finding of soybean seed in *Shôso In* (Japan) which was established in the Nara era for the storing of legumes of that era that were introduced from China (Nagata 1960, p. 97) proves as does the record of ceremony and taxation system of the Nara era (Nagata, p. 75) that soybeans did exist in Japan at that time.

"Soysauce or more properly shôyu, the now renowned Japanese flavoring, is said to have originated during the Chou dynasty (1134-246 B.C.) (Komiya 1955, p. 14) and was introduced into Japan when Buddhism was being established although not becoming popular until 1300 (Joya 1951, p. 31-33).

"Miso, soybean paste, is a much used breakfast and soup dish in Japan that was introduced to Japan from China or Korea (Horvath 1927, p. 83). It was definitely used by the priests when they first entered Japan, in fact they popularized it among their new vegetarian converts (Joya, p. 21-23).

"An ancient Chinese book states that the Philosopher Hamintze, a prince of the Han dynasty, was the inventor of Tofu or soybean curd (Horvath, p. 6) while another source attributes the tofu innovation to the Chinese Philosopher Whai Nain Tze (Piper & Morse 1923, p. 234). The manufacture of soybean curd (tofu) was started in China in 164 B.C. during Emperor Hwai Wen's reign by Liu An, duke of Hwai Nan. Liu An was a great friend of the Buddhist monks and it seems quite likely that he made this bean curd to provide a change or delicacy to break the monotony of the monastic ration." Note: Whai Nain = Huainan. Liu An was the duke (*tze*) of Huainan. So all of these people are one and the same person.

"Tofu was introduced into Japan from Korea for the first time during the Toyotomi government (Horvath, p. 73) and was undoubtedly introduced into Japan from China by the Buddhists (Piper & Morse, p. 234) being used for their daily food before it was generally used (Horvath, p. 73).

"The true Buddhist monk was carried through the period of childhood growth on a rather heavy diet of bean curd (Horvath, p. 17). Even the naming of soybean curd has its esoteric connotations as the Classical Chinese name for tofu is Li chi which probably means morning prayer (Horvath, p. 72).

"Natto, a sort of vegetable cheese prepared from soybeans has long been used by the Buddhists and is now used extensively by the Japanese (Piper & Morse, p. 224).

"Buddhism seems to have been a major reason for the development of Japan for main soybean products. With the existence of these products Japan opened the world to soybeans." Address: Univ. of Wisconsin, Madison, Wisconsin.

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609. Choe, C.E.; Lee, S.K.; Chung, Y.S.; Choe, C.E. 1963. Studies on the vitamin B12 contents of fermented soybean inoculated with *Bacillus megaterium. Army Research Test Lab* (*Korea*) 2:22-23. Jan. *

610. Meals for Millions. 1963. Friendship food for a hungry world. Distribution of relief shipments, September 1946–May 15, 1963. 215 West 7th Street, Los Angeles 14, California. 4 p. Undated. [2 ref]

• ***Summary:*** Total distribution of MPF (Multi-Purpose Food) up to 15 May 1963 was 12,830,416 pounds, comprising 102.6 million meals. Countries receiving over 20,000 pounds, in descending order of amount received, were: India (1,979,748 lb), Korea (1,356,110), Japan (541,102), Hong Kong (394,259), China (358,957, stopped in 1951), Brazil (312,244), Germany (206,185), United States (183,366), Philippines (146,943), Haiti (139,823), France (126,022), Pakistan (101,041), Congo (86,101), Austria (82,159), Tanganyika (77,997) Mexico (65,722) Burma (63,554), Taiwan (58,639), Lebanon (56,910), Canada (51,836), Ceylon (38,428), Israel (38,280), Jamaica (38,171), Greece (38,133), Vietnam (37,524), Italy (36,768), Indonesia (35,873), Jordan (33,375), Hungary (33,165), New Guinea (31,535), Gabon (27,704), Liberia (27,187), Okinawa (23,640), Malaya (23,454), Morocco (22,736), Chile (22,721), Iran (21,482), Peru (21,374), Honduras (21,168), Bolivia (20,860), Nepal (20,626), Borneo (20,053).

The following countries (listed alphabetically) were early recipients of soy-based Multi-Purpose Food from Meals for Millions, and were late in introducing soybeans to the country: Bahamas (received 6 shipments totaling 2,079 lb between 1 July 1960 and 31 Dec. 1962). Basutoland [Lesotho] (received 2 shipments totaling 1,539 lb between 1 July 1960 and 31 Dec. 1962). Bolivia (received 2 shipments totaling 1,634 lb between Sept. 1946 and 30 June 1960). British Honduras (received 5 shipments totaling 11,319 lb between Sept. 1946 and 30 June 1960; renamed Belize in about 1975). Cape Verde Islands (received 1 shipment of 2,007 lb between Sept. 1946 and 30 June 1960; independent since 1975). Caroline Islands (received 2 shipments totaling 2,008 lb between Sept. 1946 and 30 June 1960; renamed Federated States of Micronesia in 1986). Central African Republic (received 1 shipment of 2,025 lb between 1 July 1960 and 31 Dec. 1962). Eritrea (received 1 shipment totaling 2,025 lb between Sept. 1946 and 30 June 1969). Fiji Islands (received 2 shipments totaling 2,052 lb between Sept. 1946 and 30 June 1969). Finland (received 1 shipment of 2,040 lb between Sept. 1946 and 30 June 1960). Gabon (received 3 shipments totaling 17,660 lb between Sept. 1946 and 30 June 1960). Guam (received 3 shipments totaling 4,995 lb between 1 July 1960 and 31 Dec. 1962). Guadalcanal ([later part of the Solomon Islands] received 1 shipment of 513 lb between Sept. 1946 and 30 June 1960). Iraq (received 3 shipments totaling 8,122 lb between Sept. 1946 and 30 June 1960). Jordan (received 9 shipments totaling 28,839 lb between Sept. 1946 and 30 June 1960). Liberia (received 10 shipments totaling 21,949 lb between Sept. 1946 and 30 June 1960). Luxemburg [Luxembourg] (received 1 shipment of 5,130 lb between Sept. 1946 and 30 June 1960). Marshall Islands (received 1 shipment of 739 lb between Sept. 1946 and 30 June 1960). Mozambique (received 3 shipments totaling 7,641 lb between Sept. 1946 and 30 June 1960). New Hebrides [later Vanuatu] (received 1 shipment of 513 lb between Sept. 1946 and 30 June 1960). Oman (received 4 shipments totaling 10,659 lb between Sept. 1946 and 30 June 1960). Panama (received 1 shipment of 96 lb between Sept. 1946 and 30 June 1960). Samoa (American) (received 6 shipments totaling 6,480 lb between Sept. 1946 and 30 June 1960). Somali (received 1 shipment of 270 lb between 1 July 1960 and 31 Dec. 1962). Swaziland (received 1 shipment of 621 lb between 1 July 1960 and 31 Dec. 1962). Tonga Islands [Kingdom of Tonga, independent since 1970] (received 5 shipments totaling 6,723 lb between 1 July 1960 and 31 Dec. 1962). Virgin Islands [USA] (received 2 shipments totaling 2,113 lb between Sept. 1946 and 30 June 1960). Western Samoa [independent since 1962] (received 1 shipment of 1,026 lb between 1 Jan. 1963 and 15 May 1963).

Other countries which received MFM shipments by 15 May 1963 are: Afghanistan, Algeria, Angola, Argentina, Basseterre [Probably refers to the island, Basse-Terre (or Guadeloupe proper) which is the western half of Guadeloupe, separated from the other half, Grand-Terre, by a narrow channel. As of 1994 Guadeloupe is a French Overseas Department. Probably not the seaport on St. Christopher Island, capital of St. Christopher-Nevis–since that is not a country], Belgium, Cambodia, Republic of Cameroun [Cameroon], Canal Zone, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, England, Eritrea, Ethiopia, French West Indies, Gambia, Ghana, Goa [former Portuguese possession; annexed by India in 1962; became a state of India in 1987], Grenada, Guatemala, Haute Volta [Upper Volta, later Burkina Faso], Iraq, Kenya, Laos, Libya, Macao, Madeira Islands [autonomous region of Portugal in east Atlantic Ocean, 600 miles due west of Casablanca, off the coast of Morocco], Mauritius Islands, Montserrat [island in the West Indies], Netherlands, Nicaragua, Nigeria, Northern Rhodesia [later Zambia], Nyasaland [later Malawi], Oman, Paraguay, Persian Gulf, Poland, Puerto Rico, Ruanda Urundi, Rumania [Romania], Ryukyu Islands, American Samoa, Santa Lucia [probably Saint Lucia island in the Caribbean], Sicily, Sierra Leone, South Africa, Southern Rhodesia [later Zimbabwe], Spain, Surinam [Suriname], Switzerland, Thailand, Trieste [Italy], Tunisia, Turkey, Uganda, Uruguay, Venezuela, Yugoslavia.

Note: This is the earliest document seen (March 2021)

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concerning soybean products (soy flour in MPF) in British Honduras [Belize], Cape Verde, Caroline Islands, Eritrea, Iraq, Lesotho, Liberia, Macao (May 1963), Marshall Islands, New Hebrides [Vanuatu], Oman, Samoa (American), Tonga, or Western Samoa. Soybeans as such have not yet been reported in these countries.

This document contains the earliest date seen for soybean products (soy flour in MPF) in Bolivia (June 1960), British Honduras (June 1960), Cape Verde (June 1960), Central African Republic (Dec. 1962), Eritrea (June 1960), Iraq (June 1960), Lesotho (Dec. 1962), Liberia (June 1960), Marshall Islands (June 1960), New Hebrides (June 1960; Vanuatu), Oman (June 1960), Samoa (American) (June 1960), Tonga (Dec. 1962), or Western Samoa (May 1963). Soybeans as such had not yet been reported by that date in these various countries. Address: Los Angeles, California.

611. Strayer, George M. 1963. Development of the Japanese market for soybeans: The first and largest U.S. market development project for soybeans and soybean products. *Soybean Digest.* May. p. 13, 16.

• ***Summary:*** A good historical overview of the American Soybean Assoc. soybean program in Japan, from Strayer's speech presented at the Agricultural Trade with Japan conference in Chicago.

"For a long period of years Japan has produced a sizable tonnage of soybeans, a part of them in the northern island of Hokkaido, and a part of them grown on the other islands largely on the dikes or dividers around the rice paddies. But these supplies were not adequate to fill their needs, so considerable tonnage was imported from China and Manchuria each year.

Note: By 1886 Japan was producing 11.5 million bushels of soybeans a year; most were consumed as food (Tamari 1886).

The conquest of the Red Force [Red Army] in China, followed by the Korean episode [Korean war], cut off these Chinese supplies. The American military government shipped supplies of U.S. soybeans to Japan in the years immediately following World War II, as a source of protein for the Japanese people. The Japanese were also importing soybeans from Manchuria during these years, and at the same time Japanese interests owned processing facilities in Korea and in Dairen and Port Arthur of Manchuria. The Korean episode ended all that, and Japan found herself badly in need of a source of supply for her protein.

"During this same period things had been happening on American farms. At the start of World War II we were the world's largest net importer of fats and oils. The sea lanes were cut off, and we doubled and redoubled our soybean production as a means of supplying our requirements of fats and oils. We increased soybean production from 60 million bushels to over 180 million bushels during the war years. We learned what soybean oil could do in human foods and in industry, and what soy protein could do in contributing to economic livestock production. So, in the years since the war ended we have continued to increase soybean production from 180 million bushels per year to a predicted 725 million bushels in 1963. Today we are the world's largest net exporter of fats and oils and oil bearing materials.

"Early export troubles: As this process was going on Japan was restoring her economy, putting her people to work, increasing their incomes and their demand for food. Soybeans were being purchased from the United States but they were produced and handled mechanically, delivered in bulk, and the Japanese buyers were not accustomed to this type of handling and production nor happy with our beans. When I first went to Japan in 1955 we had a market for about 250,000 metric tons of soybeans but we were in trouble. I spent 6 weeks contacting the trades people, seeing for myself just what problems confronted us. A gentleman from the grain grading branch of the U.S. Department of Agriculture joined me, so that agency might understand our soybean sales problems. When we came home we agreed to try to do something about the situation.

"Exporters were appraised of the situation in meetings at export ports. Growers were told what the Japanese market demanded. Sampling and grading was tightened up. Japanese buyers were taught how to buy on our federal grade basis to get the desired quality. A Japanese firm was employed to make impartial samplings and grade determinations on the basis of our U.S. federal grades on cargoes as they arrived in Japan. By focusing much attention on our problems and their solutions we solved them–today U.S. soybeans are not only accepted but preferred in the Japanese market by most buyers, especially the oilseed crushers. Our quality is better, the oil content higher, our supply more dependable.

"In 1955 Japan was buying about 250,000 tons of soybeans per year from us. This seemed to be only a small portion of the potential, for per capita consumption of both oil and protein was far below levels necessary for proper nutrition. In early 1956 the American Soybean Association signed a contract with Foreign Agricultural Service to use some Japanese yen accrued under Public Law 480. A contractual working arrangement was worked out with the five trade groups in Japan representing the major users of soybeans plus the importers, and an office was established in Tokyo in April 1956. A campaign to increase per capita consumption of soybean food products was launched, using a variety of approaches.

"Working closely with the Ministry of Health, the Ministry of Agriculture, with private promotional organizations and with the miso, tofu, shoyu and oil trade groups a concerted campaign was carried on the educate the Japanese housewife on the functions of protein and oil in the human diet, and with the necessity of providing proper amounts of both in the meals prepared for her family. Very naturally, the Japanese, who had used soybeans for centuries,

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turned to soybean food products because of availability, price, and knowledge of how to use them."

Today Japan buys 1.2 million tons–42 million bushels– of U.S. soybeans a year, "and we visualize further increases to nearly double those figures by 1970."

"Last year Japan paid U.S. farmers about $100 million for soybeans."

Photos show: (1) A tofu maker in Japan selling tofu from a wooden box on the back of his bicycle to a group of laughing Japanese housewives. (2) Participants in the Agricultural Trade with Japan conference. Left to right: Ferenc Molnar, operations assistant, Soybean Council of America. V.H. Hougen, chief foreign marketing branch, fats and oils division, Foreign Agricultural Service, USDA; David G. Wing, vice president of the Soybean Council. Geo. M. Strayer, American Soybean Assoc. executive vice president. Howard E. Grow, assistant to ASA executive vice president. Address: Executive Vice President, American Soybean Assoc.

612. Chang, C.H. 1963. [Free sugars in ordinary Korean soysauce]. *Theses Seoul Municipal College of Agriculture.* p. 35-37. [Kor]*

• ***Summary:*** Ordinary Korean soysauce samples obtained from several homes in Seoul were analysed for free sugars by the paper partition chromatography method.

Galactose, glucose, arabinose and xylose were detected in ordinary soysauce.

In descending order of abundance of free sugars: Galactose, arabinose, xylose, and glucose. Address: Seoul Agricultural College, Seoul, Korea.

613. Chang, C.H. 1963. [Studies on chemical composition and free amino acids in ordinary and improved Korean soysauce]. *Theses Seoul Municipal College of Agriculture.* p. 212-23. [Kor]*

• ***Summary:*** Korean soysauces were prepared by the ordinary and improved method; analysis indicated the following results:

(1) Substances influencing taste, such as amino acids, organic acids, and reducing sugars, were found more in improved soy sauce than in ordinary soy sauce.

(2) The fact that much ammonia nitrogen is contained in ordinary soy sauce was one of the most important elements. Therefore, it is necessary for *meju* [Korean soybean koji] to be improved.

(3) Amino acids in ordinary soy sauce, which were identified by two-dimensional paper chromatography and colorimetric methods, were found to be aspartic acid, glutamic acid, serin, alanine, tyrosine, valine, phenylalanine, leucin, lysine, histidine, proline, cystine, and methionine.

(4) Amino acids in improved soy sauce, which were identified by two-dimensional paper chromatography and colorimetric methods, were found to be aspartic acid, glutamic acid, serin, alanine, tyrosine, valine, phenylalanine, leucin, lysine, histidine, proline, cystine, methionine, and threonine.

(5) The total free amino acids were not different from each other, especially in quantity, but methionine and histidine are found more in improved soy sauce than in ordinary soy sauce. Address: Seoul Agricultural College, Seoul, Korea.

614. Chung, J.; Cho, B.; Lee, C. 1963. Studies on the composition of kochujang. *J. of the Korean Agricultural Chemical Society* (*Hanguk Nonghwa Hakhoe Chi*) 4:43-46. [Eng; Kor]*

• ***Summary:*** Other names of this periodical: *Agricultural Chemistry and Biotechnology* and *Journal of Applied Biological Chemistry.*

615. Chung, J.H.; Cho, B.H.; Lee, C.Y. 1963. [Studies on the compositions of hot bean paste {*gochujang*}]. *Korean J. of the Society for Applied Biological Chemistry* 4(1):43-46. [Kor; eng]*

616. Chung, Y.S.; Lee, K.H.; Song, S.H.; Kim, C.H.; Chang, K.H. 1963. [Studies on microbiological standards of foods. I. The occurrence of coliform organisms in several samples of soybean mash, soy sauce, and red pepper mash]. *Report of the Army Research and Testing Laboratory* (*Seoul, Korea*) 2:47-50. [Kor]*

• ***Summary:*** The presence of coliform bacteria in or on foods depends on many environmental factors, each of which must be determined separately for each food item. When a correlation is found to exist between unsanitary methods of food production and the presence of *Escherichia coli* in the finished product, the presence of confirmed fecal strains of coliform organisms can be interpreted as having sanitary significance. Address: Food Div., Army Research and Testing Laboratory, Seoul, Korea.

617. Kim, Y.H.; Kim, Z.U. 1963. [Effects of the ratio of raw materials on the quality and taste of soy sauce. I. Studies on the changes of enzymatic activities and chemical components during koji preparation with various ratios of raw materials]. *J. of the Korean Agricultural Chemical Society* 4:17-22. [Kor]*

• ***Summary:*** Changes of enzymatic activities and chemical components during koji preparation of soy sauce with various ratios of soy beans and wheat were studied as the first step in checking the current ratio of raw materials for improved soy sauce and determining the proper ratio for them with respect to its quality and taste. The following results were obtained.

(1) The protease in the dried koji were mainly composed of one part which was active at the neutral pH (about 6.0) range, while other parts that were active at acid and alkaline

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pHs were inferior. The more wheat in the koji, the stronger the protease activities at acid and neutral pH and the weaker at alkaline pH.

(2) The activity of enzymes increased rapidly in early stages, then gradually in later stages protease and beta-amylase rapidly throughout except the drying of alpha-amylase during the course of koji preparation. The greater the amount of wheat as a raw material, the stronger the protease and the beta-amylase activity.

(3) Reducing sugars, amino nitrogen, and total nitrogen were increased, while total sugar was decreased during the course of koji preparation.

(4) The more wheat used as a material, the more reducing sugar and total sugar there was. While the total nitrogen was decreased, no noticeable differences were observed in the amino nitrogen among the dried kojies. Address: College of Agriculture, Seoul National University, Suweon, Korea.

618. Lee, K.H.; Chang, K.H. 1963. [Studies on koji for soy sauce brewing. II. On the optimum conditions of growth and identification of *Aspergillus* species]. *Report of the Army Research and Testing Laboratory* (*Seoul, Korea*) 2:24-25. [Kor]*

• ***Summary:*** These experiments concern the identification, growth conditions, and lethal temperatures of three previously-identified superior strains of *Aspergillus* species, which were isolated from the soils and Meju (fermented soy bean [koji]) in Korea.

The results obtained in light of the manual of Raper and Thom for identification of the *Aspergilli* show that the three strains of *Aspergillus* species all pertain to the *Aspergillus flavus oryzae* group.

The optimum temperature, pH and the lethal temperatures of the three species have been measured. Address: Army Research and Testing Laboratory, Seoul, Korea.

619. Song, S.H.; Kim, J.H.; Lee, K.H.; Chung, Y.S.; Chang, K.H. 1963. [Studies on the preservation of soy sauce. I. Isolation of the pellicle forming yeasts from soy sauce]. *Report of the Army Research and Testing Laboratory* (*Seoul, Korea*) 2:32-37. [Kor]*

• ***Summary:*** Soy sauce is one of the most widely used seasonings for Korean foods. About 4.5 million liters per year is consumed by the military alone. The quality of soy sauce is often made to deteriorate by harmful microorganisms, especially yeasts which form a film or pellicle on the surface of the sauce during long-term storage. At the end of deterioration, the sauce gives off an offensive odor and a thick pellicle grows on the entire surface of the sauce; then it goes bad and rots. Many investigators have reported on this problem. In this study, the harmful yeasts are isolated from soy sauce in military storage and their microbiological characteristics are identified. Such yeasts have been identified as *Hansenula anomala* group, *Zygosaccharomyces japonicus* group, and another group of *Zygosaccharomyces.* Address: Food Div., Army Research and Testing Laboratory, Seoul, Korea.

620. Song, S.H. 1963. [Studies on the preservation of soy sauce. II. The pellicle forming yeasts as influenced by fungicides]. *Report of the Army Research and Testing Laboratory* (*Seoul, Korea*) 2:38-42. [Kor]*

• ***Summary:*** The quality of soy sauce is often made to deteriorate by harmful microorganisms, especially by yeasts which form a film or pellicle on the surface of the sauce during long-term storage. At the end of deterioration, the sauce gives off an offensive odor and a thick pellicle grows on the entire surface of the sauce; then it goes bad and rots.

Heretofore many fungicides such as capric acid [decanoic acid], benzoic acid, esters of benzoic acid, vitamin K compounds, sorbic acid and surface active agents (Tweens and Emulgens) have been applied in order to prevent growth of the yeasts–regardless of their effects on human health.

These experiments found the following fungicides (and their minimum concentrations) to be effective against pellicle forming yeasts: Vitamin K group (0.05%). Esters of p-hydroxy benzoic acid (0.007%). Sorbic acid (0.05%). Emulgen-106 (0.1%). Capric acid (0.003%).

In addition, the following mixtures are effective: Emulgen-106 + p-hydroxylbutyl benzoate; Vitamin-K3 + Emulgen-106; and sorbic acid + benzoic acid. Address: Food Div., Army Research and Testing Laboratory, Seoul, Korea.

621. Cartter, Jackson L.; Hartwig, Edgar E. 1963. The management of soybeans. In: A.G. Norman, ed. 1963. The Soybean. New York: Academic Press. x + 239 p. See p. 161-226. [209 ref]

• ***Summary:*** Contents: 1. Introduction: World production, United States production trends, utilization (processing to obtain oil and meal, hay and green manure). 2. Soil and climatic adaptation: Areas of production in the United States, soil requirements, climatic adaptation (effect of temperature on plant growth, effect of temperature on composition of seed, effect of light on plant growth, effect of photoperiod on flowering and maturity, effect of soil moisture on growth). 3. Time of planting and varietal adaptation: Effect on plant characters (maturity, plant height, lodging, seed quality, size of seed, seed yield), effect on composition of the seed. 4. Planting methods and equipment: Seedbed preparation (conventional, minimum tillage, deep tillage), row width and planting rate (row width, planting rate), double cropping (after fall-sown grain crops, after peas), special methods of planting, types of equipment. 5. Rotation practices and erosion control: Effect on soybean yields, effect on the following crop, effect on weed population, soil residues from herbicides, erosion control. 6. Weed control: Effect

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of planting time on plant growth and weed competition, methods of cultivation, chemical weed control (pre-emergence herbicides, post-emergence herbicides). 7. Seed quality and seed treatment: Factors affecting seed quality and germination, seed treatment. 8. Nutrient requirements: Nitrogen requirements and nodulation (effectiveness of nodulation as a source of nitrogen, methods of inoculation, survival of bacteria in the soil, effect of seed treatment on inoculation, effect of nitrogen applications), liming and pH levels (pH and plant development, calcium and magnesium requirements), phosphorus, potassium, trace elements, fertilizer practices and recommendations. 9. Water requirements and utilization: Water needs in relation to plant growth and development, irrigation and soil management. 10. Growth-regulating chemicals. 11. Diseases: Foliar, root and stem, seed. 12. Insects and spider mites: Leaf feeders, above-ground stem feeders, pod feeders, root feeders. 13. Nematodes: Root knot, cyst, others. 14. Harvesting: When to harvest (moisture content of seed, chemical defoliation, losses from respiration after maturity), harvesting methods (historical, combine harvesting). 15. Seed storage. 16. Discussion.

The USA now produces about 57% of the world's soybeans, followed by China (PRC; about 33%), Indonesia, Japan, Korea, USSR, Brazil, and Canada, in that order. By 1920, U.S. production was 3,000,000 bushels and the leading states were North Carolina, Virginia, Alabama, Missouri, and Kentucky–North Carolina producing 55% of the total. By 1931, the center of production had shifted to the North Central States, where it is at present.

The subsection titled "Seed treatment" (p. 193) states: "Seed treatment with a fungicide is not recommended as a general practice when seed with high germination is planted. Stands may be increased by seed treatment when seed having a germination of 85 per cent is planted. Although seed treatment seldom results in increased seed yields,... the improved stands resulting from seed treatment aid in giving soybeans a competitive advantage with weeds. Studies by Howard W. Johnson *et al.* (1954) show that seed may be treated at any time between harvest and planting with equal effectiveness. The most satisfactory time for treating seed would be as it is cleaned. The materials Arasan, Captan, and Spergon have proved to be most satisfactory for treatment of soybean seed. Before any lot of seed is treated, it may be a good practice to check the germination with and without the fungicide to determine the beneficial effect of seed treatment on each seed lot."

The section titled "Harvesting methods: Historical" (p. 219) states: "The earliest harvester designed specifically for soybeans was a two-wheeled, horse-drawn machine which straddled the bean row (Piper & Morse, 1923, p. 94). This special harvester was common in Virginia and North Carolina, but was never commonly used in the North Central States. Harvesting losses ranged from 20 per cent under favorable conditions to as high as 60 per cent under unfavorable (Sjogren, 1939). In small-grain growing areas, the binder and thresher were adapted for soybean harvest. Harvest losses for using the binder or mower for cutting and then threshing ranged from 16 to 35 per cent of the total yield, with an average loss of 24 per cent (Sjogren, 1939).

"The combine harvester was first used for soybeans in the mid-twenties. The combine harvester has been a major factor in the expansion of soybean production. This machine required less labor than earlier methods and was more efficient."

Note: This book chapter is quite similar to an article with the same title by the same authors published in *Advances in Agronomy* 14:359-412 (1962). Address: 1. Agronomist-in-charge, U.S. Regional Soybean Lab., Crops Research Div., ARS USDA, Urbana, Illinois; 2. Research Agronomist, U.S. Regional Soybean Lab., ARS USDA, Stoneville, Mississippi.

622. Yang, Pyong-yong. 1963. Chang saengsan solbi [Soy sauce production equipment]. South Korea. 195 p. 21 cm. [Kor]
Address: South Korea.

623. Kwon, S.H.; Torrie, J. H. 1964. Heritability of and interrelationships among traits of two soybean populations. *Crop Science* 4(2):196-98. March/April. [6 ref]
• ***Summary:*** "The objectives of the present investigation were to estimate for 2 soybean... crosses: (1) heritability, (2) progress to be expected from selection, (3) variance due to genotype, genotype-environment interactions and error, and (4) interrelationships among 9 traits."

"A portion of these data was submitted by the senior author as part of a thesis in partial fulfillment for the Ph.D. degree." Kwon is now a member of the Atomic Energy Research Inst., Seoul, Korea. Address: Dep. of Agronomy, Wisconsin Agric. Exp. Station, Madison, Wisconsin.

624. Miura, Muriel K. 1964. Dining in the Islands. *Honolulu Star-Bulletin* (*Hawaii*). Aug. 2. p. 82-85.
• ***Summary:*** The section title "Japanese Foods" (p. 83-84) begins: "The Japanese meal is generally enjoyed by most first-timers. It is built upon a few basic items such as rice, green tea, seafood, shoyu and many colorful local vegetables."

All Japanese foods can be placed in nine basic categories. One of these is "2. Shirumono (soup)–There are three main kinds of soup... A thick soup made of soup stock and seasoned with miso (soybean paste).

"7. Chuzara–Served in a relatively large dish, it consists of fried or steamed fish or vegetables. Tofu (soybean curd) is frequently used."

Korean foods use tofu, soy sauce, and a red hot miso (soybean paste) sauce. Address: Home Economic Dep.,

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Honolulu Gas Co., Ltd.

625. Sim, K.S. 1964. [Studies on the antifungal activity of capsaicin for Ganjang soy sauce]. *Yakhakhoe Chi* (*J. of the Pharmaceutical Society of Korea*) 8(3):69-73. Sept. [Kor]*
• ***Summary:*** Cayenne pepper has been used traditionally as a hot seasoning and an antifungal agent in Ganjang soysauce in Korea. However the correlation between its components and antifungal activity has been unknown. Capsaicin is known as a hot component of cayenne pepper. Antifungal activity of capsaicin in Ganjang soy sauce was studied and the results are as follows: (1) In Ganjang soy sauce, antifungal activity of capsaicin is as strong as butyl-p-hydroxybenzoate.

(2) Antifungal activity of capsaicin was intensified by the addition of sodium chloride.

(3) The antifungal activity of capsaicin was increased by the lower pH (pH 5.5-4.5) of Ganjang soy sauce.

Note: This is the earliest English-language document seen (May 2021) that contains the word "Ganjang." It appears in the English-language summary of the article. Address: College of Pharmacy, Seoul National Univ., Seoul, Korea.

626. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). 1964. USDA promotes soy beverage, defatted grits in test project. 2(48):10. Nov. 30.
• ***Summary:*** A pilot project to test the consumer acceptance of U.S. defatted soy grits and soy beverage products will get underway within the next 3 months with the distribution of 7,500 tons to consumers in six foreign countries. Main participants will be Brazil, Hong Kong, India, Korea, the Philippines, and Taiwan.

627. Chung, E.S.; Chang, K.H. 1964. [Studies on microbiological standards of foods. II. On the contaminative ratio and death characters of the Coliform Group contaminating soybean mash and red pepper mash]. *Report of the Army Research and Testing Laboratory* (*Seoul, Korea*) 3:7-10. [Kor]*
Address: Section of Microbiology, Army Research and Testing Laboratory, Seoul, Korea.

628. Lee, Chun Yung. 1964. [A history of the agricultural technology of the Yi dynasty]. *The Korean Studies* (*Korean Research Center, Seoul*) 21: [Kor; eng]
• ***Summary:*** Under the item Fu Yu is: Annals of the Kingdom of Wei and Biography of Dong Yi (p. 3, line 14). See also the first 3 lines on page 4. Address: Seoul, Korea.

629. Aykroyd, Wallace R.; Doughty, Joyce. 1964. Legumes in human nutrition. *FAO Nutritional Studies* No. 19. xi + 138 p. Reissued by FAO in 1982 (152 p.). [119 ref]
• ***Summary:*** Contents: Preface. Introduction. History of legumes. Production and consumption. Composition and nutritive value. Methods of processing and cooking: Soybean preparations in East Asia (p. 48-52)–Germination (sprouted soybeans), soybean curd (tofu, incl. *chou tofu* or "stinking soybean curd"), soy sauce (shoyu), soybean paste (miso), tempeh, natto, hamanatto, soybean "milk," fermented preparations from groundnuts. Groundnut flour.

Effects of processing on nutritive value: Soaking, decortication, heating, germination, fermentation (mentions tempeh), effects of storage.

Toxic substances. Legume proteins. Observations on the value of legumes in human feeding. The place of legumes in human diets. Appendixes: (1) Legumes eaten by man. (2) Nutritive value of important legumes. (3) Amino acid content of legumes. (4) Account of lathyrism in central India by General Sleeman. (5) Bibliography of soybean (11 references). Some legume recipes. References.

Soybeans are also mentioned on: Page 15: Table 1, "Important legumes." Page 23: Indonesia, soybean curd, soy sauce, tempeh. Pages 23-24: Japan, miso, shoyu, natto, tofu, Korea, Taiwan. Pages 39-40: Carbohydrates in soybeans include "galactans, pentoses, and hemicelluloses which are poorly utilized." Fats: only the groundnut and soybean are important sources of it.

Page 55: Heating and trypsin inhibitor, methionine and cystine, raw unheated soybean meal, saridele. Page 58: fermentation, tempeh, PER. Pages 75-76: Protein values.

Page 81: Dean used soybeans to treat a protein deficiency. Page 84: Soybeans in India. Page 97: Soybean curd.

Appendix 1, titled "Legumes eaten by man" (p. 101-14), lists the various legumes by their Latin names. The entry for *Psophocarpus tetragonolobus* gives its vernacular names as "Goa bean, asparagus pea, winged pea, winged bean, sesquidillas."

Note: This is the earliest English-language document seen (Aug. 2007) that uses the word "sesquidillas" to refer to the winged bean. Address: 1. Dep. of Human Nutrition, London School of Hygiene and Tropical Medicine; Former Director, Nutrition Div., FAO, Rome, Italy.

630. Choy, Jung Suck (Mrs.). 1964. The art of Oriental cooking. Los Angeles, California: The Ward Ritchie Press. xi + 156 p. Introduction by Dr. Lee Wok Chang. Illust. Index. 18 x 18 cm.
• ***Summary:*** Contents: Introduction. Korean food. Chinese food. Japanese food. Shopping guide for Oriental ingredients (1 p., with emphasis on the names and address of stores selling Oriental foods). For each category of food (such as Soup) and for each recipe, the name in English is given first, followed by the Asian name in parentheses. ½ to 1 teaspoon "monosodium glutamate" is called for in many recipes. Likewise "soy sauce" is used in many recipes.

Note 1. The index to this book is not a typical index. For example, although "bean curd" is called for in many recipes,

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it does not appear in the index. So one must read the entire book and all the ingredients in each recipe to find which recipes call for bean curd.

Note 2. The book has an unusually heavy emphasis on animal foods–meat, chicken, fish, shellfish, and eggs. Did people in Korea, China, and Japan really eat like this in 1964?

In Korean, bean curd is called dubu or do-bu (p. 13); bean curd is also called for on pages 45, 50, 54, 125, 136, 137, 138 Other ingredients used: Miso, p. 125. Red beans [azuki], p. 63.

Recipes include: Fish teriyaki, p. 134. Sukiyaki, p. 136. Mizu-taki, p. 137-38. Beef teriyaki, p. 140-41. Pork teriyaki, p. 141.

The shopping guide mentions: Bean curds. Chinese black beans [fermented black soybeans]. Miso. Monosodium glutamate. Sesame seeds. Sesame oil. Soy sauce.

Note: The author was born and raised in Korea. She and her husband joined the faculty of Seoul National University in 1947; she taught home economics. Since 1950 in the United States, she has been giving courses on Oriental cooking to various social and church groups. Address: Berkeley, California.

631. Lee, C.Y. 1964. A history of agricultural technology in the Yi dynasty. Seoul, South Korea: Korean Research Center. *

Address: Seoul, South Korea.

632. Kim, Ze-Uook. 1965. [Studies on peptides during soybean koji preparation. III. Amino acid sequence of oligopeptides formed during soybean-koji preparation]. *J. of the Korean Agricultural Chemical Society* 6:107-17. April 20. [23 ref. Kor; eng]

• ***Summary:*** "(1) In order to study the specificity of *Aspergillus soya* protease to soybean protein, as well as the types of peptides formed during soybean-koji preparation the amino acid sequence for the di & tripeptide and N-terminal amino acid residue and C-terminal amino acid residue were identified. As the results of the study, the following were obtained. Gly, Glu. Ala. Ser. Glu. Ser. Ala. Val (Cys, Glu, Ser, Ala, Arg, Try, Leu or Ileu) Asp. Phe (His, Arg, Cys, Asp, Ser, Ala, Leu or Ileu) Glu. Ala (Cys, Gly, Met) Glu. Ala (Asp, Glu,) Gly. Met (Asp, Glu, Ala, Tyr, Leu or Ileu, Lys,) Gly. Leu or Ileu (His, Asp, Glu, Gly, Ser, Lys, Thr, Phe,) Cys. Gly (Asp, Tyr,) Glu. Pro (Asp, Glu, Ser, Gly, Thr, Ala, Val, Leu or Ileu) Try. Ser (Gly, Glu, Arg, Ala, Met, Leu or Ileu,) Asp. Met (Asp, Glu, Ala, Try, Pro, Leu or Ileu,) His Thr (Ser, Gly, Tyr, Pro, Leu or Ileu,) Glu. Gly (Asp, Ala, Ser, Glu,) Leu or Ileu (2) It has revealed that Aspergillus soya protease has considerably wider range of specificity than that of chymotrypsin, pepsin and trypsin but not mold protease and Aspergillus saitoi protease. It can be said that Asp. soya protease split the bond adjacent to glutamic acid, aspartic acid, glycine, serine, alanine, cystine, tryptophan, histidine preferably acidic amino acid as C-terminal amino acid residue." Address: Dep. of Agrochemistry, College of Agriculture, Seoul National Univ., Suweon, Korea.

633. Kim, Ze-Uook. 1965. [Studies on peptides during soybean koji preparation. II. Amino acid sequence of oligopeptides formed during soybean koji preparation]. *J. of the Korean Agricultural Chemical Society* 6:107-17. April 30. [21 ref. Kor; eng]

• ***Summary:*** (1) In order to study the types of peptides formed during soybean koji preparation, the amino acid sequences for the di- and tripeptide and N-terminal amino acid residues and C-terminal amino acid residue were identified. The following results were obtained:

Each of 15 amino acid groups is listed, e.g., Gly, Glu.

(2) It was found that *Aspergillus soya* protease has a considerably wider range of specificity than those of chymotrypsin, pepsin, and trypsin. However, its range of specificity is not wider than those of mold protease and *Aspergillus saitoi* protease. *Asp. Soya* protease split the bond adjacent to glutamic acid, aspartic acid, glycine, serine, alanine, cystine, tryptophan, histidine preferably acidic amino acid as C-terminal amino acid residue.

Note: It's hard to imagine what is meant by the previous sentence. Address: Dep. of Agrichemistry, College of Agriculture, Seoul National Univ., Suweon, Korea.

634. Abbott, J.C. 1965. Protein rich foods from oilseeds: Economic aspects. *P.A.G. News Bulletin* (*Protein Advisory Group, WHO / FAO / UNICEF*) No. 5. p. 19-38. April. [15 ref]

• ***Summary:*** Table 1 lists annual consumption (in metric tons) of oilseed protein foods in some main consuming areas. Column 1: Miso, tofu, tempeh and other fermented or cooked soybean products: Mainland China 3,736,000. Japan 2,536,000. Indonesia 200,000. South Korea 160,000. Taiwan 153,000. Hong Kong 15,000. Malaya 15,000. Singapore 15,000.

Column 2: Soy milks: Singapore and Malaya 1,300 metric tons, Hong Kong 1,000.

Note: This is the earliest document seen (March 2020) that contains industry or market statistics for soymilk by geographical region. Address: Chief, Marketing Branch, FAO Headquarters, Rome, Italy.

635. Chang, C.H. 1965. [Chemical changes during the fermentation of Korean soy sauce, in connection with its fermentative period]. *J. of the Korean Agricultural Chemical Society* 6:8-13. April. [12 ref. Kor; eng]*

• ***Summary:*** Korean Mejues

Mejus were prepared by means of ordinary, improved, and compromised methods, and analysis of the changes in various chemical compositions of the soy sauces throughout

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the fermentation period of 10 weeks Now, their results are as follows:

(1) In all of the soy sauces under study, the content of organic acids showed a slight increase for several weeks, followed by a marked increase after this period.

(2) In all of the soy sauces the total nitrogenous content indicated a rapid increase for the first four weeks, followed by a slower increase.

(4) In all of the soy sauces the content of reducing sugars indicated a slight increase for the first four weeks, followed by a rapid decrease until 8 weeks in the improved soy sauce. Then, it maintained an almost flat curve. In the ordinary and compromised soy sauces, there was a rapid decrease in reducing sugars for the first six weeks, followed by an almost flat curve.

(5) In the ordinary soy sauces, the *Samwol-zang-bub* (soy sauce prepared in March) is considered to be based on a comparatively scientific ground during the fermentative period.

(6) In order to improve the taste in ordinary soy sauce it is favorable to delay the period of preparation. The adequate period of waiting appears to be at least 8 weeks. It is recommended to mix the materials with carbohydrate sources.

(7) According to the *Samwol-zang-bub,* in the improved soy sauce it is thought that 8 weeks were adequate for fermentation.

(8) The compromised method may be recommended for the improvement of homemade soy sauce, and it may also be superior in quality to the ordinary soy sauce. Address: Seoul Municipal College of Agriculture.

636. Hesseltine, C.W. 1965. A millennium of fungi, food, and fermentation. *Mycologia* 57(2):149-97. March/April. [38 ref]

• ***Summary:*** A landmark, widely cited work on indigenous fermented foods. Interestingly, it makes no mention of amazake, or kanjang (Korean soy sauce). Contents: Tempeh. Ragi. Sufu (describes process, mentions pehtzes and the mold *Actinomucor elegans* NRRL 3104).

Color photos (sent by Dr. Clifford Hesseltine) show: (1) Luxuriant growth of *Actinomucor elegans* mold on some skewered cubes of tofu in an incubator; on the top row are uninoculated cubes. (2) Cubes of sufu (fermented tofu) in their final form after removal from brine.

Thamnidium (meat tenderizer and flavor enhancer from the mold *Thamnidium elegans*). Miso. Shoyu (incl. tamari. "In China, shoyu is more of the tamari type, that is, more soybeans are used and less wheat,..."). Tea fungus. Ang-kak (red fermented rice [red rice koji], p. 179-81). Advantages of fermenting foods. The future of food fermentations.

The glossary gives brief descriptions of aga-koji, akakoji, amylo process, anchu, angkak, angkhak, ang-quac, anka, ankak, arack, arak, arrack, atsumandie, awamori, bagoong, bakhar, beni-koji, benikoji, braga, brem, busa, chao, ch'au yau (Chinese name for shoyu), chee-fan (a type of Chinese cheese or sufu), chiang (Chinese equivalent of miso), chicha, Chinese cheese (sufu), Chinese red rice (ang-kak), chiu-chu (Chinese yeast), chiu-niang (Chinese term for koji), chou [*ch'ü; qu*] (Chinese equivalent of koji), dahi, dawadawa (made from African locust bean–*Parkia filicoidea;* soy is not mentioned), dhokla, dosai, fermentation of citron, fermented fish, fermentation of maize, fermented minchin (wheat gluten), fermented soybeans ("a Chinese food prepared from small black soybeans." See A.K. Smith 1961 [fermented black soybeans]), fish paste, fish sauce, fish soy, fu-yu, fu-yue, fuyu (see sufu [fermented tofu] for all 3), ginger beer plant, grib, hamanatto, hon-fan [fermented tofu], hongo, hung-chu, idli, injera, jamin-bang, java yeast, jotkal, kaffir beer, kanji, katsuobushi, katyk, kefir, ketjap, kimchi, kishk, kisselo mleko, koji, kombucha (tea fungus fermentation), kome-miso, kuban, kumiss, kumys, kushik, kushuk, kvass, kwass, kyoku-shi, lao-chao, leben, lebeny, levain of khasia, levain of sikkin, lontjom (ontjom), magou, mahewu, maize fermentation of the maoris, mazun, medusen tee, meen, meitauza, meju (fermented soybeans of Korea), mén, mien (Chinese yeast), mirin, mish, miso, moromi, mugi miso, murcha, nappi, nata, natto, ngapi, nuoc-mam, nukamiso, ontjom, patis, paw tsay, peh-khak, pehtze, peujeum, peyem, poi, prahoc, pulque, raggi, ragi, ranu, red pepper sauce, red rice, red sufu, sajur asin, saraimandie, sekihan [rice cooked with azuki beans; not fermented], shiro koji, shottsuru, shoyou, sho-yu, shoyu, soja japonais (shoyu), sonti (a rice beer wine of India), South African fermented corn, soy, soybean cheese [fermented tofu], soy sauce, sufu, su fu [both fermented tofu], sweet flour paste, taette, tahuli, tahuri [both "Philippine fermented soybean curd"], takuwan, tamari, tane koji, tao-cho [taotjo], taokoan [pressed or firm tofu, not fermented], tao dji (see taotjo {sic}), tao-si ([fermented black soybeans]; see Handbook of Philippine Agriculture. 1939. p. 132-43), tao-tjung, tao-yu, taotjo, tapej, tape ketan, tape ketella, tarhana, tea beer, tea cider, tea fungus, teekwass, teeschwamm, tempe, tempeh, tempeh bongkrek, tempeh kedelee, thamnidium, thumba, tibi, tien mien chang [chiang], tojo ("Philippine name for soybean curd"), tokua ("Philippine name for soybean curd"), torani, tosufu, toyo, trassi, tsue fan, tuwak, uri, u-t-iat, wunder pilz, yen-tsai.

Note 1. This is the earliest document seen (Oct. 2011) that mentions *Actinomucor elegans* in connection with sufu [fermented tofu]. In 1966 Hesseltine describes it as the best mold for use in making this fermented food.

Note 2. This is the earliest English-language document seen (Oct. 2011) that uses the terms "fuyu" or "fu-yue" or "chao" to refer to fermented tofu.

Note 3. By the mid- to late-1960s, macrobiotic companies in the USA were importing barley miso from Japan and labeling it "Mugi Miso."

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Photos show: (0) Clifford W. Hesseltine (portrait). (1-3) *Rhizopus oligosporus* mold, used to make tempeh (3 views). (4) Skewered cubes of sufu in an incubator, with one skewer of uninoculated tofu cubes and three rows of tofu inoculated with *Actinomucor elegans* showing luxuriant growth of mold. (5) Cubes of Chinese cheese [fermented tofu] removed from brine. (6) Dilution plate of tane koji showing different types of *Aspergillus oryzae*. Address: Northern Regional Research Lab., Peoria, Illinois.

637. *Jackson Sun* (*The*) (*Jackson, Tennessee*). 1965. Kipling was wrong, at least on Burkett in Jackson. Nov. 21. p. 34.
• ***Summary:*** East Asian and American students are rooming together with an advisor at 540 Burket St. in Jackson.

"The boys enjoy cooking in their house too. Lee makes a relish called 'Gochujan,' which is a dish from Korea. Jimmy Taylor said, 'the only way to describe it is hot!'"

Note: In April 2021, when we searched www.newspapers.com, the huge digitized newspaper database, for "gochujan," we got only 15 matches from 1965 to 2018. But when we searched for "gochu jang" (or "gochu-jang") we got 433 matches from 1983 to 2021. And when we searched for "gochujang" we got 3,351 matches from 1983 to 2021. Address: Sun staff writer.

638. Han, P.J.; Min, B.Y.; Kim, K.S. 1965. [Studies on the manufacturing of fermented soybean paste and soy sauce using defatted soybeans]. *Research Reports of the Office of Rural Development* 8:333-46. [Kor]*
• ***Summary:*** To ensure better utilization of soybean, comparative trials were conducted pertaining to the manufacturing of Korean condiments, bean paste, and soy sauce using the defatted soybean and whole soybean.

As a starter of fermentation, some elite microbes were cultured in carbohydrate resources such as barley, wheat, and sweet potato flour, which may be an important subsidiary material for well-flavored final products.

(1) From wild strains of microbes, 2 strains were preliminarily pure cultured to select an excellent strain, which is referred to as *Aspergillus oryzae* A.

(2) Through the comparative test among four strains already identified (*Aspergillus* original, *Aspergillus oryzae* #612, *Aspergillus sojae*, *Aspergillus oryzae* E209 E2 and *Aspergillus oryzae* A) the *Aspergillus oryzae* A was selected as an available strain for this purpose, and this strain has revealed conspicuously high activities of enzyme, amylase, and protease 2.5-3 days after culture.

(3) With the progress of bean paste fermentation, the sugars were decreased, while the total acid and amino-nitrogen were decreased by the relatively higher degree of defatted soybean plot. There was a possibility of manufacturing fairly good bean paste utilizing the defatted soybean within the shorter time requested, though the product has shown slightly inferior quality compared to bean paste made from whole bean.

(4) In the soy fermentation there was no marked difference between whole bean and defatted plot with regards to progressive sugar decrease and total acid and amino-nitrogen increase. However, total nitrogen value was higher in the defatted plot. It was found that within the relatively shorter time requested to reach full maturity of soy sauce, quality of soy could be as good when made from defatted soy beans as when it was made from whole beans.

(5) The paper chromatographic analysis of soy sauce gave no difference between the whole bean and defatted plot in the features of amino acid pattern, of which more than 12 kinds of amino acids were identified. This data implies the precise relevance of the availability of the defatted soybean.

(6) Costs of defatted soybean are calculated to 10.90 won to produce 1 kilogram of bean paste and 18.25 won to produce 1 liter of soy sauce. These are comparatively reduced costs compared to 14.60 won and 25.75 won for the cost of the soybean required. Address: Inst. of Agriculture & Engineering Utilization, Ministry of Agriculture & Forestry, Suweon, Korea.

639. Kim, Ze-Uook. 1965. [Studies on peptides during soybean koji preparation. I. Formation of peptides during soybean koji preparation]. *J. of the Korean Agricultural Chemical Society* 6:79-87. [Kor]*
• ***Summary:*** The contents of insoluble protein nitrogen, water soluble protein nitrogen, and peptides' nitrogen were determined from samples which were taken in 7½ hour intervals during soybean koji preparation to study changes in soybean protein. The contents of total nitrogen and amino nitrogen were measured for the fractions resulting from molecular sieving by using Dowex 50 having various cross linkages for peptides from soybean-koji extracts. The following results were obtained:

(1) The contents of the insoluble protein nitrogen and peptides' nitrogen are fairly constant at the earlier stage. The insoluble protein decreased and peptides' nitrogen increased markedly as mycelia grew. The rates of decrease and increase, respectively, lowered at later stages after sporulation. The contents of water soluble protein are also constant at the earlier stage, until the covering of mycelia over the koji, after which they are increased until the stage of sporulation, then decreased at the later stage.

(2) The amount of peptides' nitrogen in each fraction obtained by the molecular sieving was almost constant at the earlier stage. The values in fractions of X-16, X-12, X-8, X-4 and X-2 increased considerably together as mycelia grew. Then the values in the fractions almost plateaued after sporulation, when the effluent fraction showed markedly increased values throughout mycelia growth. Address: College of Agriculture, Seoul National Univ., Suweon, Korea.

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640. Lee, K.H.; Chang, K.H. 1965. [Studies on koji for soy sauce brewing. III. On the abilities of UV-induced mutants of *Aspergillus oryzae* to produce protease, amylase, and vitamins]. *Misaengmul Hakhoe Chi* (*Korean J. of Microbiology*) 3:9-14. [Kor]*

• ***Summary:*** The enzyme producing potential of industrially important strains of *Aspergillus* was studied. Irradiation of three original isolates of *Aspergillus oryzae* to ultra-violet rays resulted in the production of mutants that differed from the parent riboflavin and vitamin B-12 in culture media.

(1) Irradiation of three strains of *Aspergillus oryzae* to ultra-violet light produced mutants. Two of these strains were selected for soy sauce brewing.

(2) The two strains are the physiological mutants of *Aspergillus oryzae*. Both were found to have superior enzyme activity to their relatives.

(3) *Aspergillus oryzae* UV-induced mutants 172-722 and 569-713 were more powerful than others in the production of riboflavin and vitamin B-12. The enzyme activity of these strains was high and decreased only slightly even in a 20 percent solution of NaCl.

(4) *Aspergillus oryzae* UV-induced mutant 172-722 had more powerful protease producibility in wheat bran media than in modified Czapek's solution. On the contrary, *Aspergilluz oryzae* UV-induced mutant 569-713 had more powerful producibility for saccharogenic and dextrinogenic amylase in modified Czapek's solution than in mold bran.

(5) *Aspergillus oryzae* UV-induced mutant 172-722 formed the spore rapidly and *Aspergillus oryzae* UV-induced mutant 569-713 did so ordinarily.

(6) *Aspergillus oryzae* UV-induced mutant 172-722 is valuable material for the manufacture of soy sauce because of its high protease activity in 20 percent solutions of NaCl. *Aspergillus oryzae* UV-induced mutant 569-713 is suitable for soybean mash and for fermented red pepper sauce because of its high saccharogenic and dextrinogenic amylase activity in 20 percent solutions of NaCl. Address: Army Research and Testing Laboratory, Seoul, Korea.

641. Brandemuhl, William. 1965. Moyashi [bean sprouts] (Document part). In: William Brandemuhl. 1965. Soybean Utilization in Japan. San Francisco, California. xxii + 478 p. See p. 413-23, Unpublished manuscript. 28 cm. [1 ref]

• ***Summary:*** See next page. "Manufacture: Japan has two basic types of Moyashi (bean sprouts), one made from Burmese mappe beans and the other from soybeans. The mappe bean is imported duty free by trade companies and contracted for by the National and Local Moyashi Associations. Soybean Moyashi [soybean sprouts] can be made only from Hokkaido soybeans which cost $194.45 (70,000 yen) per ton as other soybeans are too hard or contain too many splits. The type of soybean that is suitable for soybean Moyashi is also suitable for Natto."

Note: Black mappe (*Vigna mungo*) also known as black gram, black lentil [not to be confused with the much smaller true black lentil (*Lens culinaris*)], white lentil, black matpe bean, is a bean that originated in India and is now grown in southern Asia (Thailand, Burma. India). The mung bean (*Vigna radiata*), a close relative of the black mappe, is also widely used for sprouting in many countries–but apparently not at this time in Japan.

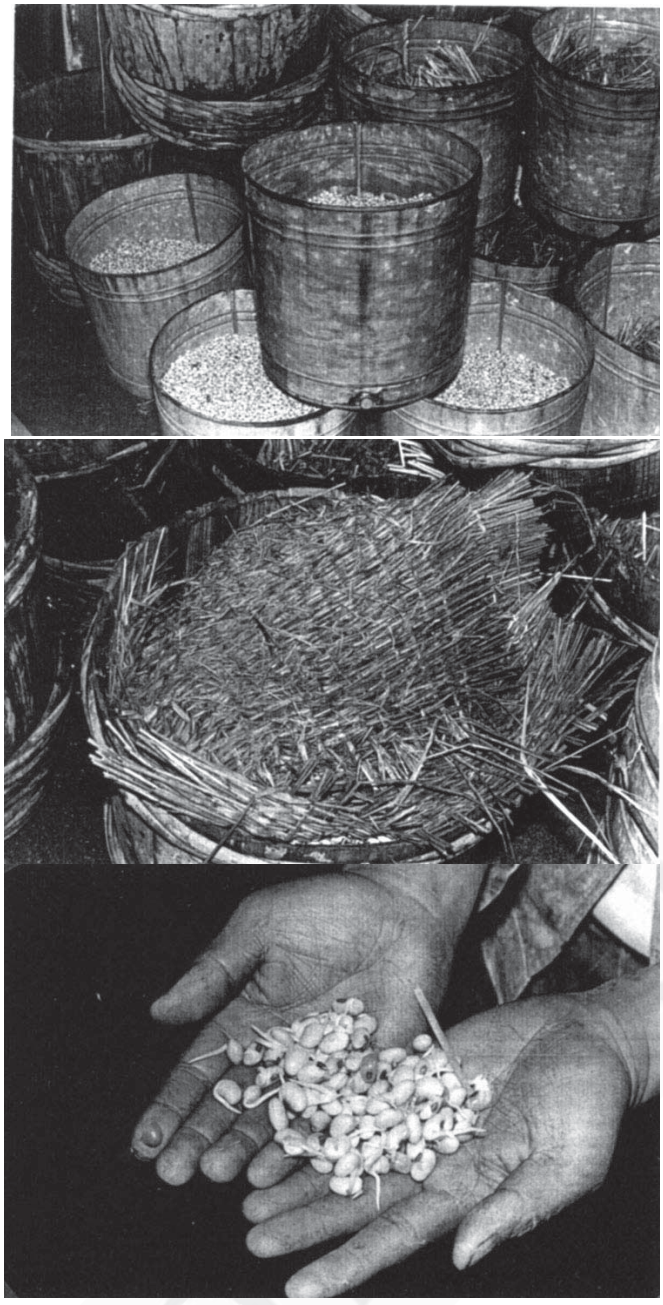
"The Moyashi maker in Japan, unlike the small scale operators of other Asian countries, can be very large, at least with respect to his mappe facilities. Temperature and humidity control are common as well as automatic soaking machines. As will be apparent soybean Moyashi is not produced on this scale in Japan because demand is not high.

"The process of making soybeans Moyashi is accomplished under the same condition as for mappe Moyashi, that is, the sprouting room at 22-23ºC and water used to soak the growing sprout at 18ºC although since soybean sprouts are less sensitive, these conditions are not required but exist because they are required for mappe Moyashi.

"First 15-20 pounds of soybeans are placed in a container (see Figure 180) and washed with water. The container has outlets at the bottom so at no time is there water standing in the container but rather the soybeans are washed down. From that time the soybeans must be washed with water every four hours night and day the entire seven days it takes to finish the sprouting process. While the environmental conditions of sprouting soybean Moyashi do not need to be delicate, the inherent nature of the soybean cause it to be difficult to sprout so it is important that new soybeans be used. The first day the container need not be covered but is just allowed to stand in the dark room. The next day the soybeans in the container mentioned above are put in four containers and covered with a straw mat (see Figure 181).

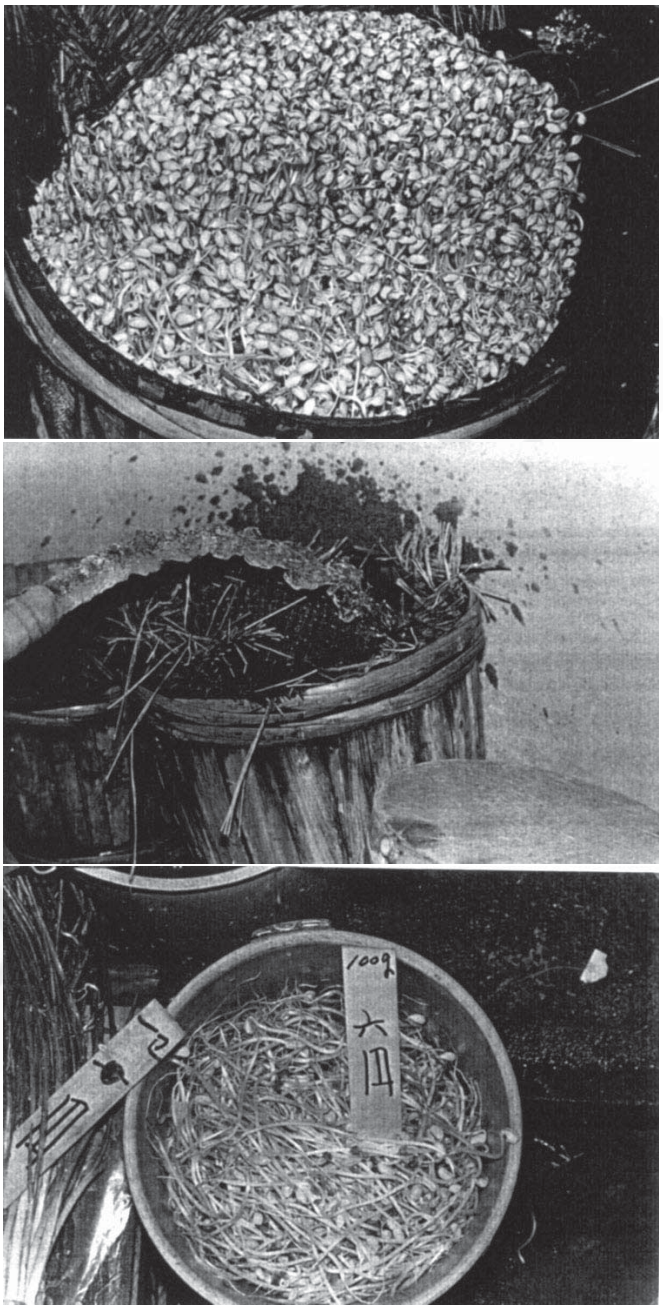
"In addition to protecting the sprouting soybeans from light so they do not turn green, the container is covered so the heads of sprouts grow straight up. The head of the mappe bean is removed after sprouting but the head of the soybean is eaten. After one or two days in the second container the soybeans have sprouted as shown in Figure 182. While near the end of the seven day sprouting period they look as shown in Figure 183. After the container is covered with straw, washing is accomplished by running water into the container (see Figure 184) until it fills. As the water flows out the outlet at the bottom of the container, the straw mat as well as the sprouting soybean absorbs an adequate quantity of water. After seven days the sprout becomes about five inches long. The growth of the sprout can be regulated by raising and lowering temperature which quickens or slows growth respectively. With average facilities the Moyashi maker claims that soybean Moyashi is extremely simple to make. After the seven days sprouting period the sprout is ready to be marketed at $.014 (5 yen) per 100 grams, the same price

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as mappe Moyashi.

"Use: The consumption of mappe Moyashi is greatly dependent upon the supply of fresh vegetables. At certain times fresh vegetables because extremely high priced even during a particular vegetable's season. At this time mappe Moyashi's demand greatly increases. The production of mappe Moyashi is therefore considered highly profitable but economically dangerous for the maker while the production of soybean Moyashi has an element of scarcity but profit is low. The scarcity stems from the fact that the demand of soybean Moyashi is constant over a short term because the only people that eat it are the Korean residents of Japan (except in case of extreme food shortage).



"The concept of Moyashi originated in China, became popular in Korea then passed to Japan's southernmost island, Kyushu, where inhabitants eat more mappe Moyashi than other areas of Japan even today. Soybean Moyashi is a popular Korean food so it might be expected that the 500,000 Koreans that reside in Japan might demand same instead of consuming the mappe Moyashi which they consider tasteless. As the Korean people do not substitute soybean Moyashi for vegetables but eat it regularly, demand is constant. Demand level is indicated by the fact that for the 50,000 Koreans who live in Kyoto four of seven Moyashi makers produce 240 kilograms of soybean Moyashi in addition to mappe Moyashi. Although soybean Moyashi

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are required for Korean ceremonial occasions, the Korean population in Japan is decreasing and becoming more Japanized so consumption of soybean Moyashi is decreasing. Even though decreasing the present number of Koreans is rather conspicuous as they tend to group together. The prejudice that the Japanese have toward the Koreans is well illustrated by the following: when a Japanese family desires to rent or construct a home, their visits to the area prior to moving there may well include an examination of the market place. If a pan of soybean Moyashi (see Figure 185) is displayed with mappe Moyashi (see Figure 186) the family seriously considers whether or not to move into the neighborhood because they then know that Koreans live nearby. Whatever the social implication might be, soybean Moyashi is sold wherever Korean people live, with such food usually consumed by the Korean people in large quantities either boiled or fried by itself or with vegetables and meat."

Photos show: 180 (p. 414). Soybeans for sprouting in metal pails. 181. Sprouting soybeans in wooden kegs covered with straw. 182. Close-up of sprouting soybeans held in two hands. 183. Sprouting soybeans as they overflow a wooden keg. 184. Wetting down sprouting soybeans. 185. Soybean sprouts in retail tub. 186. Mappe sprouts. Sources (p. 469, #178): Yamato Bean Sprout Company, information obtained interviewing owner of same, Kyoto, Japan, March 19, 1964. Address: San Francisco, California.

642. Brandemuhl, William. 1965. Tofu (including Aburaage and related products): History, use of soybeans, manufacture (Document part). In: William Brandemuhl. 1965. Soybean Utilization in Japan. San Francisco, California. xxii + 478 p. See p. 137-201, Unpublished manuscript. 28 cm. [18 ref]

• ***Summary:*** "History: Tofu, the coagulated protein and fat of ground cooked soybeans (see Figure 38) according to an ancient Chinese book was invented by a philosopher, prince *Hamintze* of the Han dynasty, while another source attributes the invention of Tofu to another Chinese philosopher *Whai Nain Tze.* Manufacture was supposedly begun in China in 164 B.C. during Emperor *Hwai Wen's* reign by *Liu an,* duke of *Hwai an. Liu an* was a good friend of the Buddhists monks so it is believed he started manufacturing Tofu, so as to give them a somewhat more varying diet. Tofu come to Japan (probably through Korea) for the first time during the Toyotomi period (880 years ago). Although not completely documented, Buddhist priests probably were the transmitting agents as the priests used Tofu long before it was in general use.

"Use of soybeans: Throughout Japanese history domestic soybeans were used to make Tofu, however Chinese soybeans began to be used after trade began between Japan and China. During and at the end of World War II all soybeans were in short supply, however in the early fifties U.S. soybeans began to be used for Tofu. This use developed so that now Tofu accounts for the largest Japanese food use of U.S. soybeans. The Tofu makers would use domestic soybeans if they were not too expensive however. Some makers still use a certain percentage of domestic beans although such practice is becoming less popular. More often used are U.S. specialty beans such as Illinois, Indiana, Ohio, Hawkeye, or select No. 2 ordinary even though such soybeans are higher priced then regular soybeans. Chinese soybeans are again starting to be used for Aburaage although because of custom U.S. soybeans are not likely be replaced in the foreseeable future. The existence of over 60,000 Tofu makers consuming over 200,000 MT of soybean per year with each maker consuming between 15-300 kilograms per day presents somewhat of a problem regarding soybean purchasing. Each particular maker is too small to purchase directly from anyone but the smallest wholesaler where the price of soybeans is too high for efficient operation. The Japanese people are association minded with the Tofu makers being no exception. The Tofu makers authorize their local association to purchase soybeans in large lots for future distribution to individual makers. The Tofu makers do not especially like to purchase through the association as the association charges for handling, however the makers have a desire to support the association so accept purchasing through it. The association deals with the importer, crusher, and large wholesaler, selecting whichever seller will give the best terms.

"The numerous Tofu makers that do not belong to the association (about 1/6) as well as members whose association does not purchase usually work out an arrangement with the smaller wholesalers. Soybeans are delivered to the maker by truck with the maker receiving material for a number of weeks each time he receives. The shipment is kept in bag form until the day before use.

"Manufacture–Regular Tofu (white Tofu): The manufacturing procedure described below is for the most used type of Tofu, 'Shirodofu' (white Tofu) as is seen in Figure 38. Other related products such as Yakidofu, Kinugoshi dofu, Aburaage, Hirosu, and others are processed in much the same way. Additional or different methods of processing these latter products are described in respective sections.

"The process of making Tofu consists of ten steps, that is, soaking, cooking, filtering, coagulating or precipitating, shaping, pressing, submerging [in water], cutting, and again submerging.

"Soaking: Depending upon season of year, 5-15 hours before processing, clean whole soybeans are put in containers of any size but most used are metal drums, wooden barrels or 20 liter tins. Water is added to the container until the soybeans in the container are completely submerged. Although length of soaking is not such a strict factor, generally soybeans are soaked 10-14 hours in winter and 5-10 hours in summer. Soybeans soaking in any one container should be of uniform size as soaking would not be

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even. Because of their small size, U.S. soybean are soaked for less time than Hokkaido soybeans. In winter Hokkaido soybeans may require as much as five additional hours of soaking. There seems to be to guides besides experience that indicate when soaking is sufficient, that is, the appearance of bubbles rising to the surface of the water and the whiteness of they inside of the soybeans.

"Grinding: Tofu processing usually begins at 3:00-5:00 in the morning so that the final product may be ready for use during that day. Processing is initiated by the removing of unabsorbed water from the containers. After that between five and eight kilograms of the soaked soybeans are put into an electric powered grinder of the types shown in Figures 39, 40, and 4l. The type of grinder pictured in Figure 39 is the most popular. Water is run into the grinder's intake container and the grinder is started. After ground as small as possible the soybeans in the form of thick white cream (see bottom of Figure 41) enter a container positioned at the outlet of the grinder. The cream could be called more paste-like than a liquid although it flows If it cannot water is added. If the cream is too thin, the residue after filtering will contain too much of the protein. For a batch of approximately seven kilograms of soaked soybeans the volume of creamy substance should be around 54 liters.

"Cooking: The type of cooker used depends upon the economic situation of the maker. Two of three types of cookers commonly used are shown in Figure 42 and 43. Although, wood (Figure 43) or oil stoked cookers are used, use of a steam boiler is slowly replacing all other methods. Either a small steam pressure cooker or a live steam open pit steam cooker (Figure 42) might be used if the factory has a steam boiler. To indicate that making Tofu is a cottage type industry very often makers with steam boilers will use same for heating their bath. The ground soybeans and water are usually drawn into the cookers by negative pressure but this procedure may also be done manually. Such is necessary if the maker does not have a steam boiler. After the cream is pulled into the cooker, water is added to the container to collect the residue remaining on the container's surface. This thin solution is also drawn into the cooker, Cooking lasts about four or five minutes or until pressure reaches approximately 10-12 pounds per square inch or the equivalent of it if another type of cooker is used. Cooking is very important for removing distasteful flavor, protein, causing good or bad cohesiveness and water holding capacity, although it is done without gauges, meters, or time control by the experienced Tofu maker. As an indication of the time of operation the cooking of 35-40 different batches may be completed by 6:00 a.m.

"Filtering: After cooking, a valve is opened. This valve is connected to a 1½ inch diameter pipe which bends upward so that it is positioned over a container usually around 24 inches square and made of metal although wood and tile are also used. A tile tank is shown in Figure 44. At the end of the pipe a course nylon bag is attached. The opening of the outlet value with pressure still fed to the cooker causes the cooked material to be forced through the looped pipe and into the nylon bag filter. Steam flow is then terminated then started again to force out what remains in the cooker.

"At some factories gravity may be used to remove the material from the cooker and such also might be accomplished by hand. The tank which the bag rests in also has an outlet at its bottom so the liquid (called Tonyu [soymilk]) which can readily pass through the coarse filter makes it way by pipe to a container. The temperature of this material is 100ºC when it leaves the cooker, however it drops to 80ºC by the time it reaches the container. The material that does not flow through the nylon filter is called Okara. As soon as all the material is forced out of the cooker and what liquid there is flows to the precipitating container a quantity of cold water (15-20 liters) stored in a tank above the container is dumped upon the nylon filter dropping the temperature of the Okara to 60ºC so that as much protein as possible can be removed. At some places this water may run directly into the cooker after the initial liquid was forced out.

Note 1. The author and his wife, Tomoko, did most of their tofu research in Kyoto. Companies they visited and observed in the spring of 1963 (listed alphabetically) were: Hamano Tofu Co., Hamamoto Tofu Co., Namikawa Tofu Co., Ryo Tofu Co., Shimamoto Tofu, and Uno Tofu. They also learned much from the Tofu-Aburaage Association (Kyoto). And they visited and observed Sasanoyuki Tofu Restaurant (Tokyo, 11 June 1963).

Note 2. The word *Shirodofu* is occasionally (but rarely) used to distinguish "white tofu" from non-white tofu (such deep-fried tofu, grilled tofu, dried-frozen tofu, etc.). This is the earliest English-language document seen (April 2013) that contains the word *Shirodofu.* (Continued). Address: San Francisco, California.

643. Ch'oe Pu's dairy: A record of drifting across the sea, translated with introduction and notes by John Meskill. 1965. Tucson, Arizona: University of Arizona Press. 177 p. See p. 73. Index. 24 cm. Series: The Association for Asian Studies: Monographs and Papers, No. XVII. [ soy ref]

• ***Summary:*** The *P'yohae-rok* (A record of drifting across the sea), is the diary of a Korean official–Ch'oe Pu. In Feb. 1488, during the Ming dynasty, he and his crew were caught in a storm off the coast of Cheju, at the southernmost tip of Korea; they drifted for 16 days in an open boat, a terrible ordeal, to the southeast coast of China, landing near Ning-po. After being taken captive, he and his crew suffered many more ordeals, but were gradually sent to Peking, following the route of the Grand Canal. On the way, in Shao-hsing prefecture (south of the Huang [Yellow] River), the Regional Commander and the other two high officials served him tea and fruit, and wrote a list of twelve foods and drinks to be presented to him. The last item on the list was "One plate of

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bean-curd."

In Peking, his adventure attracted the attention of the highest authorities, who provided the means to return him to the border of his homeland at the Yalu River. In 1488 Ch'oe presented his travel diary to the Korean King, "who was pleased and ordered that it be put into the archives."

Also discusses: When Koreans are in mourning for their parents, they do not drink wine or eat meat, garlic, oniony plants, or sweet things for fully three years (p. 50). Korea no longer revered the Buddhist law, but honored only the Confucian system. All its families made filial piety, fraternal duty, loyalty, and sincerity their concern (p. 51). Many Chinese officials had both a wife and concubines (p. 64). Public examinations were given great importance in both China and Korea. Those who placed high in the exams were honored by the government with public stipends, banners displayed on their gates, and their rank written on their name cards. In China, high ranking people we often carried in a sedan-chair, borne on poles by two men (p. 66). Address: Meskill: Barnard College, Columbia Univ., New York City, New York.

644. Han, P.J.; Choi, K.S.; Yoon, I.W. 1966. Soybean oil extraction methods and processing of bean milk and bean curd. *Nongsa Sihom Yon'gu Pogo* 9(1):247-59. *

645. **Product Name:** La Choy Teriyaki Sauce.
**Manufacturer's Name:** La Choy Food Products.
**Manufacturer's Address:** 901 Stryker St., Archbold, OH 43502.
**Date of Introduction:** 1966.
**New Product–Documentation:** Fred Marken's brochure. Talk with Milan Drake. 1988. Jan. 4. He thinks this was launched in about 1966. Chun King may have had an earlier Teriyaki Sauce. He thinks Kikkoman came later. For details, contact Karen Johnston in Fullerton: 714-680-1430. A packaged teriyaki dinner was launched in about 1970. Note that La Choy was part of Beatrice Foods before Hunt-Wesson bought it.

646. Food and Agricultural Organization of the United Nations. 1966. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook* (*Rome, Italy*) 20:207-09.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* F = FAO estimate. North Korea: Harvested 348,000F ha in 1948-1952, 375,000F ha in 1952-1956, 385,000F ha in 1961 through 1965. South Rhodesia: Harvested 1,000 ha in 1961-1963, 1,000F ha in 1965. The yield was 640 kg/ha in 1961, 660 kg/ha in 1962, 470 kg/ha in 1963, 410 kg/ha in 1964, and 510F kg/ha in 1965. Ruanda-Urundi: Harvested 2,000 ha in 1948-1952, and 6,000 ha in 1952-56. No figures are given for soybean area for 1961-65, however yield figures (500-530 kg/ha) are given for each of those 5 years.

The Philippines reappeared in 1966. The country harvested 1,000 ha in 1952-56, 2,000 ha each year from 1961 to 1965. The yield increased from 670 kg/ha in 1948-52, to a peak of 940 kg/ha in 1961, decreasing to 880F kg/ha in 1965.

Ethiopia harvested 13,000 ha in 1948-52, 10,000 ha in 1952-56, and 10,000F ha each year from 1961 to 1965, during which years the yield was 600F kg/ha.

Under Asia, there is a listing for "China Taiwan." After Asia, there is separate listing for "China Mainland."

Name change: Tanganyika (1963) is changed to Tanzania, United Rep. of Tanganyika (1964), then Tanzania / Tanganyika (1965).

647. American Soybean Association. 1967. Soybean Digest Blue Book Issue. Hudson, Iowa: American Soybean Assoc. 170 p. Index. Advertisers' index. 22 cm.
• ***Summary:*** The title page of this year's *Blue Book* states: "Blue Book issue. Vol. 27. March, 1967. No. 6."

A table (p. 26) gives world soybean production by continent and country, from 1955-59 to 1966 (preliminary) as follows: North America: Canada, United States, Mexico. South America: Argentina, Brazil, Colombia, Paraguay. Europe: Italy, Romania, Yugoslavia, Other Europe (excluding U.S.S.R.). USSR (Europe and Asia). Africa: Nigeria, Rhodesia, Tanzania. Asia: Turkey (Europe and Asia), China–Mainland, Cambodia, China–Taiwan, Indonesia, Japan, Korea–South, Thailand. Total #1. Total #2.

Soybean production in Mexico increased from about 39,000 bu in 1955-59, to 1,315,000 in 1964, to 2,205,000 in 1965 to 4,410,000 (preliminary) in 1966.

Soybean production in "China, Mainland" [including Manchuria] decreased from about 344,000,000 bu in 1955-59, to 255,000,000 in 1964, to 250,000,000 in 1965, and 250,000,000 in 1966 (preliminary).

Soybean production in "China, Taiwan" increased from about 1,248,000 bu in 1955-59, to 2,117,000 in 1964, to 2,414,000 in 1965.

A table (p. 29) gives U.S. exports of soybeans, oil and meal from 1962 to 1965 (preliminary) to the following regions and countries (for marketing years beginning Sept. 1; in bushels): North America: Canada, Mexico, other, total. South America: total. Western Europe: Belgium & Luxembourg, Czechoslovakia, Denmark, Finland, France, Germany–West, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, other, total. Eastern Europe: Czechoslovakia, Hungary, USSR (Europe and Asia), Poland, other, total. Africa, total. Asia and Oceania: Hong Kong, Israel, Japan, Korea–South, Philippines, Taiwan, other, total. Grand total.

Exports of U.S. soybeans to Mexico increased from 33,000 bu in 1962 to 177,00 in 1964.

Note: This is the 2nd earliest document seen (Feb. 2009) that gives statistics for trade (imports or exports) of

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## WORLD SOYBEAN PRODUCTION (Metric)

Soybeans: Acreage, yield per acre and production in specified countries and the world, average 1955-59, annual 1964-66 1/

| | Acreage 2/ | | | | Yield per hectare | | | | Production | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1955-59 | 1964 | 1965 | 1966 3/ | Average 1955-59 | 1964 | 1965 | 1966 3/ | Average 1955-59 | 1964 | 1965 | 1966 3/ |
| | 1,000 hectares | 1,000 hectares | 1,000 hectares | 1,000 hectares | kilos | kilos | kilos | kilos | 1,000 metric tons | 1,000 metric tons | 1,000 metric tons | 1,000 metric tons |
| **North America:** | | | | | | | | | | | | |
| Canada | 99 | 93 | 107 | 108 | 1,701.4 | 2,030.9 | 2,037.6 | 2,172.1 | 168 | 189 | 218 | 235 |
| United States 4/ | 8,637 | 12,461 | 14,256 | 15,130 | 1,526.5 | 1,533.3 | 1,614.0 | 1,694.7 | 13,169 | 19,076 | 23,013 | 25,351 |
| Mexico | 5/.4 | 16 | 25 | 50 | 5/1,748.5 | 2,225.9 | 2,400.8 | 2,400.8 | 5/1 | 35 | 59 | 120 |
| **South America:** | | | | | | | | | | | | |
| Argentina | .8 | 12 | 10 | 6/16 | 975.1 | 1,143.2 | 968.4 | 1,089.4 | .7 | 13 | 9 | 18 |
| Brazil | 94 | 359 | 348 | 404 | 1,324.8 | 847.3 | 1,304.6 | 1,371.9 | 125 | 304 | 456 | 554 |
| Colombia | 5/9 | 26 | 33 | 40 | 5/854.0 | 1,506.4 | 1,499.6 | 1,499.6 | 5/8 | 40 | 49 | 60 |
| Paraguay | 5/.8 | 6 | 11 | --- | 5/1,365.1 | 1,614.0 | 1,593.8 | --- | 5/.9 | 9 | 17 | 11 |
| **Europe:** | | | | | | | | | | | | |
| Italy | .4 | 7/ | --- | --- | 1,761.9 | 1,856.1 | --- | --- | .4 | .2 | .2 | --- |
| Romania | 22 | 3 | --- | --- | 464.0 | 497.6 | --- | --- | 9 | 1 | --- | --- |
| Yugoslavia | 6 | 5 | 8 | 6 | 1,183.6 | 1,674.5 | 1,203.7 | 1,540.0 | 7 | 9 | 9 | 9 |
| Other Europe (excluding USSR) | 2 | 2 | --- | --- | --- | --- | --- | --- | 1 | 1 | --- | --- |
| USSR (Europe and Asia) | 363 | 890 | 870 | 880 | 457.3 | 342.9 | 497.6 | 457.3 | 176 | 304 | 435 | 400 |
| **Africa:** | | | | | | | | | | | | |
| Nigeria 8/ | --- | --- | --- | --- | --- | --- | --- | --- | 9 | 19 | 18 | 12 |
| Rhodesia 9/ | 5/.4 | .8 | .8 | --- | 5/564.9 | 174.8 | 188.3 | --- | 5/.1 | .1 | .1 | --- |
| Tanzania 10/ | --- | --- | --- | --- | --- | --- | --- | --- | .9 | 4 | --- | --- |
| **Asia:** | | | | | | | | | | | | |
| Turkey (Europe & Asia) | 6 | 6 | 6 | --- | 833.9 | 833.9 | 793.5 | --- | 5 | 5 | 5 | --- |
| China, Mainland | 11,181 | 8,300 | 8,099 | 7,998 | 847.3 | 833.9 | 847.3 | 847.3 | 9,362 | 6,940 | 6,803 | 6,803 |
| Cambodia | 20 | 12 | --- | --- | 497.6 | 800.2 | --- | --- | 10 | 9 | --- | --- |
| China, Taiwan | 42 | 50 | 53 | --- | 780.1 | 1,129.8 | 1,230.6 | --- | 33 | 57 | 65 | --- |
| Indonesia | 549 | 600 | --- | --- | 685.9 | 665.7 | --- | --- | 378 | 399 | --- | --- |
| Japan 6/ | 363 | 216 | 184 | 169 | 1,230.6 | 1,109.6 | 1,250.8 | 1,291.2 | 447 | 239 | 229 | 220 |
| Korea, South | 270 | 281 | 308 | --- | 551.4 | 578.3 | --- | --- | 149 | 162 | 174 | --- |
| Thailand | 22 | 33 | 6/35 | 35 | 1,015.4 | 948.2 | 934.7 | 934.7 | 22 | 32 | 33 | 33 |
| Total, excluding Romania, "Other Europe," USSR, Mainland China, and North Korea 11/ | 10,169 | 14,247 | 16,070 | 16,997 | --- | --- | --- | --- | 14,557 | 20,628 | 24,749 | 27,300 |
| Estimated world total 11/ | 22,134 | 23,982 | 25,584 | 26,420 | --- | --- | --- | --- | 24,337 | 28,147 | 32,316 | 34,779 |

1/ Years shown refer to years of harvest. Southern Hemisphere crops which are harvested in the early part of the year are combined with those of the Northern Hemisphere harvested the latter part of the same year. 2/ Figures refer to harvested areas as far as possible. 3/ Preliminary. 4/ Acreage harvested for beans. 5/ Less than 5 years. 6/ Planted area. 7/ Less than 500 acres. 8/ Quantities purchased by the Nigerian Marketing Boards for export. 9/ European farms only. 10/ Sales. 11/ Includes estimates for the above countries for which data are not available and for minor producing countries. Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source materials, reports of U. S. agricultural attaches and foreign service officers, results of office research and related information.



soybeans, soy oil, or soybean meal to Mexico or Central America. Address: Hudson, Iowa.

648. De, Sasanka S.; Russell, J.S.; Andrè, L.M. 1967. Soybean acceptability and consumer adoptability in relation to food habits in different parts of the world. *USDA Agricultural Research Service.* ARS-71-35. p. 20-27. May. Proceedings of International Conference on Soybean Protein Foods. Held 17-19 Oct. 1966 at Peoria, Illinois. [1 ref]

• ***Summary:*** Contents: Traditional soy products in the Far East: Soysauce, soy milk, bean curd, tempeh, natto and miso, roasted soy flour, kochu chang [Korean soybean miso], sprouted beans. Introduction [of soybeans] in other countries: Brazil, USSR, Africa, Latin America, Turkey. New types of products: Defatted soy flour, full-fat soy flour and beverages made from it developed by the Soybean Council of America. Justification: Cost of a pound of protein from different foods. Beef $4.60. Pork $4.30. Poultry $1.50. Nonfat dry milk solids $0.41. Dry beans $0.35. Soybeans $0.14. Attempted introductions: India. Factors involved in adoptability.

Soybean varieties can be divided into three basic groups: commercial, forage, and garden or vegetable varieties. The commercial and forage varieties do not cook easily and have a raw, beany flavor, whereas the garden varieties can be characterized as having a milk or nutty flavor.

"Kochu chang is produced in every household in Korea from mashed boiled [soy] beans which are hung in bags for 2 to 3 months. The product is broken up, dried, and ground. It is then mixed with ground red pepper [plus salt and water] and kept for some time before use."

This paper was presented by Leon Marie Andrè.

Note 1. This is the earliest English-language document seen (Jan. 2007) that contains the term "roasted soy flour." We read (p. 22): "This product is produced in small amounts and consumed with rice cake [mochi]. There is hardly any information on the nutritive value of the product."

Note 2. This is the earliest English-language document seen (March 2009) that uses the word "kochu chang" (or "kochu-chang") to refer to Korean-style red pepper and soybean paste (miso). Address: 1-2. Food and Agriculture Organization of the United Nations, Rome, Italy; 3. FAO Liaison Officer and adviser to UNICEF.

649. *Los Angeles Times.* 1967. Pilot plant and training center opened by Meals for Millions. July 9. p. WS12.

• ***Summary:*** Meals for Millions has opened a demonstration pilot plant at 1800 Olympic Blvd., Santa Monica, California. Mark Sterner is foreman of the demonstration plant. It contains $40,000 worth of machinery and has the capacity to produce 3-4 tons of high-protein food supplement (or protein beverage) per day from oil seeds such as soy bean, sunflower, safflower, sesame, or cotton.

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Also in the building is a "multitrax classroom, where foreign technical trainees can select verbal instruction from one of five different languages all of which are electronically synchronized with a rear projection visual presentation.

Starting later this month, students from the following countries will arrive at Meals for Millions to attend training classes: Bolivia, Brazil, Chile, Ecuador, Japan, Korea, Philippines, and Taiwan.

They will learn how to make the high protein food supplement or beverage from seeds indigenous to their home countries. They will also learn processing sanitation, packaging, marketing, and distribution, so they may start a self-help program when they arrive home.

650. Chong, Y.H.; Ponnampalam, J.T. 1967. The effect on duckling of a diet containing moulded-soybeans. *Medical J. of Malaya* 22(2):104-09. Dec. [16 ref]

• ***Summary:*** Recent discoveries have shown that several common species of mold (such as *Aspergillus flavus, Aspergillus parasiticus,* and *Penicillium puberulum*) which cause spoilage in food, "produce a group of toxic metabolites known collectively as aflatoxins. Aflatoxins are the most potent liver poisons yet discovered." Aflatoxins are also extremely carcinogenic, and can cause liver cancer.

Ducklings are particularly sensitive to aflatoxins. In this experiment day-old ducklings were fed a "diet containing moulded soybeans which had previously been shown by physico-chemical means to be free of aflatoxins. No significant difference was observed in the general appearance, growth rate, mortality and liver histology between ducklings fed the experimental diet and those fed the control diet. This not only confirmed our previous finding of the absence of aflatoxins but also appeared to rule out the possibility of other hepatotoxic principles of fungal origin in moulded-soybeans."

"Our present results taken in conjunction with those of our previous study (Chong *et al.* 1966) seem to rule out firmly the possibility of aflatoxin contamination in moulded-soybeans and their product–soy sauce." Address: Inst. for Medical Research, Kuala Lumpur, Malaysia.

651. Chang, C.H. 1967. [Organic acid in Korean soy sauce]. *J. of the Korean Agricultural Chemical Society* 8:1-9. [Kor]*

• ***Summary:*** Korean soy sauces were prepared by the ordinary and improved methods and the organic acid content of each was analysed–with the following results.

(1) In analysing the general components of prepared soy sauce, larger quantities of total acid, volatile acid, and non-volatile acid were found in improved soy sauce than in ordinary soy sauce.

(2) Volatile organic acids were analysed using gas chromatography. The following results were obtained:

(a) In the ordinary soy sauce, formic acid, acetic acid, propionic acid, and butyric acid were detected. Acetic acid was in the highest amount, followed by propionic acid, butyric acid, and formic acid, respectively.

(b) In the improved soy sauce, formic acid, acetic acid, propionic acid, and butyric acid were detected. Acetic acid was in the highest amount, followed by propionic aid, butyric acid, and formic acid, respectively.

(3) Non-volatile organic acid was analysed with the paper partition chromatography method. The following results were obtained:

(a) Lactic, glutaric, fumaric, malonic, malic, glycolic, oxalic, tartaric, and succinic acids, in addition to two unknown spots were detected in ordinary soy sauce. Lactic acid was in the highest amount, followed by succinic, glycolic, oxalic, tartaric, glutaric, malik, fumark, and malonic acids, respectively.

(b) Lactic, glutaric, malonic, malic, glycolic, tartaric, succinic, and galacturonic acid, in addition to two unknown spots were detected in the improved soy sauce. Lactic acid was in the highest amount, followed by succinic, glycolic, malic, glutaric, tartaric, galacturonic, and malonic acids, respectively.

(4) Alpha-keto acid was analysed with paper partition chromatography. The following results were obtained: Pyruvic acid, alpha-keto glutaric acid and an unknown spots were detected in the ordinary and improved soy sauce. Pyruvic acid was in the highest amount, followed by alpha-keto glutaric acid.

(5) Stale flavor in the ordinary soy sauces seemed to be partly affected by butyric acid and propionic acid.

(6) Substances influencing taste, such as lactic acid and succinic acid, were found more in improved soy sauce than in ordinary soy sauce. Address: Seoul Agricultural College, Seoul, Korea.

652. Kim, S.Y.; Kim, Z.U. 1967. [Studies on the changes of protein, peptides and amino acids during natto preparation]. *J. of the Korean Agricultural Chemical Society* 8:11-20. [Kor]*

• ***Summary:*** In order to study the change of nitrogenous compounds during the Natto preparation, the contents of insoluble protein, water soluble protein, and amino nitrogen were determined, and the pattern of peptides and amino acids was investigated by paper chromatography for the fractions resulting from molecular sieving. The results are as follows:

(1) Insoluble protein nitrogen, which was increased to 84% by autoclaving the native soybean, decreased to 44%. The trichloroacetic acid soluble nitrogen increased from 8% to 45% during Natto preparation. The soluble protein nitrogen showed a slight increase.

(2) Fractionation of the peptides using Dowex-50 resins showed that they consisted mostly of lower molecular weight peptides, which increased in accordance with the progress of fermentation, especially after a 30-hour period.

(3) Sixteen known and two unknown amino acids,

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and three peptides with different Rf values, were identified during the Natto preparation. Their appearance showed some difference in that phenylalanine appeared after 10 hours, methionine after 20 hours, and proline after 30 hours. The three peptides appeared at different stages of fermentation. Address: Seoul Agricultural College, Seoul, Korea.

653. Loma Linda University, School of Medicine, Women's Auxiliary to the Alumni Association. 1967. An apple a day: Vegetarian cookery by doctors' wives. Pasadena, California: Typecraft Inc. & WAAA. 296 p. 23 cm. Recipe index.
• ***Summary:*** A Seventh-day Adventist lacto-ovo vegetarian cookbook. Soy-related recipes include: Tofu loaf (p. 51). Soy cheese scallops (with tofu, p. 54). Soyameat–vegetable loaf (with 1 lb. Soyameat Chicken Style, p. 95; many recipes on pages 95-103 use Soyameat, which comes in 13 oz cans or frozen, and is made by Worthington Foods). Roasted soybeans (Nepalese, p. 258). Soy cheese roast (Korean, with tofu, p. 268). Chop Chai #1 (Korean mixed vegetables with 2 cups soy bean threads, p. 269). Pineapple soy chicken curry (Polynesian, with Chicken Style Soyameat, p. 274). Polynesian soya meat with cling peaches (with Chicken Style Soyameat, p. 274). Address: Loma Linda Univ., School of Medicine, Los Angeles, California.

654. Miller 67: New U.S. domestic soybean variety. 1967.
• ***Summary:*** Sources: Bernard, R.L.; Cremeens, C.R. 1970. "Evaluation of maturity group 00 to IV named varieties of the U.S.D.A. soybean collection." Urbana, Illinois: United States Regional Soybean Laboratory. iii + 31 p. Dec. RSLM 244. (A revision of RSLM 205, 1960). See p. 12-13. "Variety: Miller 67. Prior designation: --. Source: Unknown, from Korea? Year named or released: 1967. Developer or sponsor, year selected: Richard Miller, farmer, Arcanum, Ohio."

Bernard, R.L.; Juvik, G.A.; Nelson, R.L. 1987. "USDA soybean germplasm collection inventory." Vol. 1. INTSOY Series No. 30. p. 14-15. Miller 67 is in the USDA Germplasm Collection. Maturity group: III. Year named or released: 1967. Developer or sponsor: Richard Miller, farmer, Arcanum, Ohio. Literature: 18. Source and other information: Unknown origin, perhaps from Korea. Prior designation: None. Address: USA.

655. *Soybean Digest.* 1968. ASA [American Soybean Assoc.] expands to Taiwan, Korea, West Germany. July. p. 38.
• ***Summary:*** "The American Soybean Association is expanding its market development activities to Taiwan, Korea and West Germany.

"ASA has directed the promotion efforts in Japan for 11 years. In July, ASA's country director, Scott Sawyers, based in Tokyo, will conduct a preliminary market survey in bustling Taiwan in answer to a formal request from the Taiwanese Vegetable Oil Manufacturers Association. Sawyers flew to Korea June 19 to meet with industry leaders in Korea and investigate the possibility of participating in a trade fair in Seoul this fall.

"In West Germany a pilot program of promoting identified soybean oil will be tried for the first time in cooperation with the Soybean Council of America. Soybean oil is not identified but sold as a blend around the world. The identified soybean oil will be sold through thousands of retail outlets of the EDEKA food chain, the largest in Germany.

"The rapidly expanding Taiwanese pig and poultry industry is creating an increased market for soybean meal. U.S. soybean sales have passed the 10-million-bushel-per-year mark–all in dollar sales. In addition to meal for feed, opportunity exists to increase human per capita consumption of vegetable oil in Taiwan.

"In contrast to the Orient, Western Europe has a high edible oil consumption–higher than the U.S.–that is not expected to increase. Soybean oil promotion in West Germany aims for a larger share of the present market. Competition is toe-to-toe against other identified vegetable oils such as sunflowerseed oil from Russia.

"ASA's entry into Taiwan and Germany is made possible by funds contributed by market promotion agencies in Iowa, Louisiana, Mississippi, Missouri and Ohio. A recent amendment to the contract with Foreign Agricultural Service, USDA, provides funds for program activities in Taiwan and extends financing of the Japanese project through June 1971.

"The soy oil promotion is a cooperative effort of the Soybean Council of America and ASA. Joint financing comes from FAS, EDEKA, and ASA with administration by the Council. SBC president Glenn Pogeler notes that West Germany is currently the No. 2 buyer of U.S. soybeans after Japan. A successful soy oil promotion could significantly increase U.S. soybean sales."

656. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). 1968. Soybeans to Asia. Sept. 16. p. 12.
• ***Summary:*** "Two Asian buyers of American soybeans have emerged in recent years–the Republic of China (Taiwan) and South Korea–both of which import beans to supplement local supplies.

"Taiwan's purchases of U.S. soybeans doubled to 312,000 metric tons after its 1967 import liberalization. In 1968 this import figure could reach 320,000. Most of the increase in soybean imports would be for consumer products, but purchase of soybean meal for feed are likely to show some increases as well. The country is on a campaign to double the output of its swine industry in the next 2 or 3 years.

"South Korea, although not now a large buyer of U.S. soybeans (21,000 tons in 1967), also shows some indications of future growth. The South Korean Government has moved away from efforts for self-sufficiency and has become more dependent on imports. The country could be in the market

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for some 70,000 tons of soybeans this year depending on weather conditions and its continued ability to improve its foreign exchange situation."

657. Sawyers, Scott. 1968. The soybean market in Japan, Taiwan, and Korea. *Soybean Digest.* Sept. p. 68, 70-72.
• ***Summary:*** "Soybean inspections for export to Japan this marketing year, from September 1967 through July 1968, have totaled 65,816,000 bu [bushels]. Shipments to Japan for the same 11 months the previous year amounted to 56,311,000 bu., or about 10 million bu. ahead of last year. This is good news to all of us in the soybean industry, particularly those of us involved in market development in Japan. Let's examine what has accounted for these increased sales.

"1–The Japanese economy has continued to grow. Their population continues to show preference for more and better foods.

"2–The swine industry has recovered and resumed growth after undergoing a period of market adjustment in 1966 and early 1967.

"3–The poultry industry has recovered from severe disease problems in 1966 and 1967 and has now resumed a normal growth pattern.

"Regarding the market situation in Taiwan and Korea, as a result of a recent visit to Taiwan, it appears purchases of U.S. soybeans will also again increase considerably. Before liberalization Taiwan purchased between 5½ and 6 million bushels per year. During 1967, after liberalization, volume doubled to over 11 million bu. per year.

"The Taiwan Market: The Taiwan market could grow to 12½ or 13 million bu. for 1968 based on a desire to process greater quantities of soybeans for oil for human consumption.

"Over the last 2 years Taiwan has imported about 1.1 million bu. each year, to supplement the domestic production, particularly as a result of dry weather conditions, but also in recognition of their increased foreign exchange capabilities and the growth in demand for more and better food items. The Taiwanese want to expand the swine industry, double it if possible, in the next 2 or 3 years. This will require more soybean meal.

"Korea, although not a large market now, shows indications of future growth. The government has departed from an effort to be self-sufficient in soybeans. Import allocations have been permitted through private channels as of 1967.

"During a recent survey trip I learned that the expected Korean purchases this year could jump to 2.4 to 2.6 million bu. This is highly dependent on weather conditions and their continued ability to improve a very tight foreign exchange situation."

The American Soybean Assoc. office in Japan, known as the Japanese American Soybean Institute, has concentrated on mass media and consumer promotions to increase the utilization of soybean oil, meal, and traditional foods prepared from soybeans. In Japan, this means liquid cooking oil, tempura oil, salad oil, vegetable oil margarine, miso, tofu, and soy sauce. Also, the growing preference for more meat, milk, and eggs in the Japanese diet requires the use of more soybean meal to support an expanding livestock and poultry industry. Efforts were made to popularize two slogans: "Take Oil Once a Day for Foods Cooked with Vegetable oil." And: "Take Oil for Health, Stamina, and Vitality." The key focus is to encourage the Japanese to consume more soy oil in their diet.

A small portrait photo shows Scott Sawyers. Address: Country Director, Japanese American Soybean Institute-American Soybean Assoc., Tokyo.

658. *Soybean Digest.* 1968. Worldwide oils and fats. Sept. p. 81.
• ***Summary:*** Discusses the situation in Eastern Europe, Korea, Australia, and Iran.

"Poultry farming is one of the most advanced areas of agricultural industry in Iran, but product prices tend to be relatively high in comparison with other countries. Iranians pay an equivalent of ten times as much as U.S. citizens do for a pound of poultry."

The Soybean Council of America has suggested improving the feed formulation used as well as overall operating efficiency. A photo shows Council Vice President Ferenc Molnar visiting a poultry farm near Tehran.

659. Marton, Larry B. 1968. Korean trade fair. *Soybean Digest.* Nov. p. 42.
• ***Summary:*** "Star attraction of the First Korea Trade Fair at Seoul Sept. 9 to Oct. 20 was the American agricultural exhibit sponsored by the U.S. Department of Agriculture in cooperation with the American Soybean Association, Wheat Associates, National Renderers Association, and U.S. Feed Grains Council.

"More than 25,000 visitors poured through the 3,000-square-foot American exhibit on opening day. By the end of the week, attendance had rocketed past the 125,000 mark–far exceeding totals chalked up by any other of the 10 nations sponsoring exhibits.

"Although the major drawing card was a generous distribution of wheat products including cake and yeast-raised doughnuts, waffles, pancakes, hot-dog-on-a-stick, and pig-in-a-blanket, widespread interest was centered around the ASA booth where soybean commodities generally unknown to Koreans were on display.

"Soybean products: Housewives and husbands alike kept booth attendants busy answering queries about margarine, quality cooking oil, salad dressings and mayonnaise. For the most part, home consumption of soybeans is in the form of traditional foods such as soy sauce, bean paste, bean curd,

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whole beans, and bean sprouts.

"The major stimulus for increased soybean consumption will most likely come in the area of new uses. With the Korean economy expanding at an annual rate that is one of the highest of any developing country in the world, and with per-capita incomes on the rise, the public is becoming more receptive to new and improved foods and upgraded diets.

"Both American and Korean officials believe, however, that the extent to which the soybean market expands will depend on a number of factors including the implementation of a nationwide educational program.

"Another factor is the force with which Korea moves through the transitional Aid-to-Trade stage which it has now entered. A recipient of about $4 billion in U.S. aid during the past 20 years, Korea is beginning to flex its economic muscles in the world commercial market.

"Cash imports: As a case in point, until 1966 virtually all soybean imports were under the P.L. 480 program. In 1966, the ROK approved an import license for 30,000 metric tons [m.t.] of whole soybeans and some meal and oil, representing the first significant cash purchase in that country's history. In 1967, another 30,000 m.t. were imported from the United States for cash and about one-half was permitted for the first time to move into commercial channels (previously the government used the entire import for its armed forces).

"Reaction of fairgoers to the doughnuts they sampled and their measurable interest in the soybean story, particularly the uses of margarine, went considerably beyond anything expected by the Foreign Agricultural Service, USDA's market development agency. If that interest is translated into demand at the market level, Korea may well become America's second largest cash customer in the Far East where Japan holds the No. 1 spot, and Taiwan now ranks second.

"ASA eyes potential: An increase of no more than 10% in Korea's soybean consumption would mean approximately an additional, $2.5 million in America's export cash register. The average per-capita consumption of soybeans is now roughly 15 pounds. Assuming the introduction of an educational program, which is even now under consideration by ASA officials, and the availability of credit, it is not unrealistic to project as much as a 50% consumption increase.

"Scott Sawyers, American Soybean Association's representative in Japan, who presided over the ASA booth at the Korea Fair in cooperation with USDA, believes all the elements for expanded commercial trade with Korea are present. 'If we can put them together at the right time and in the right place,' claims Sawyers, 'I have very high hopes for the future.'"

Several photos show the booth and visitors. Address: USDA Office of Information.

660. Chang, C.H. 1968. Biochemical studies on stored soy sauce. *J. of the Korean Agricultural Chemical Society* 9:9-27. [Eng; Kor]*

• ***Summary:*** Studies were conducted in order to elucidate chemical components and microflora in three types of soy sauce: 12 year old aged soy sauce prepared by the improved method, and 7 year aged and 20 year aged soy sauces prepared by the ordinary method. The results are as follows:

(1) The following are found to be the most important factors affecting the quality of soy sauce.

(a) Organic acids, reducing sugars and free amino acids were increased over the course of storage.

(b) In the aged soy sauces under study, non-volatile organic acid increased while volatile organic acid decreased, with the total acidity dependent on the latter.

(c) It was found that salt concentration decreased during storage.

(2) The results of investigation of microflora in the stored soy sauce are as follows. A table (a) shows the type and number of bacteria and yeasts in improved and ordinary soy sauce. The three columns show: (1) Name of microorganism, such as aerobic bacteria colony. (2) Improved soy sauce. (3) Ordinary soy sauce.

(b) In the stored soy sauces, aerobic bacteria are incapable of growth due to a drop in pH value and the influence of salt concentration.

(c) Halophilic lactic acid bacteria are incapable of growth due to a drop in pH value. Even the salt concentrations decreased during the storage.

(d) Osmophilic yeast continue growth in a low pH value and in decreasing salt concentration during this stage.

(3) The results of amino acid analysis by paper partition chromatographic and colorimetric methods are as follows:

(a) Fourteen different types of amino acids were detected in the 12 year aged improved soy sauce. Thirteen types of amino acids were detected in the 7 year aged and 20 year aged soy sauces.

(b) The contents of aspartic acid, glutamic acid, serine, valine, leucine, lysine, histidine, and methionine increased in the 20 year aged ordinary soy sauce compared to the 7 year aged soy sauce. Contents of alanine, tyrosine, phenylalanine, and cystine decreased.

(4) The results of sugar analysis by paper chromatography are as follows.

(a) In the 12 year aged improved soy sauce, galactose, glucose, arabinose, xylose, rhamnose, maltose, and an unknown were detected. Their amounts were in the above order, except maltose and an unknown. Address: Seoul Agricultural College, Seoul, Korea.

661. Who was who in America, historical volume: P.H. Dorsett. 1968. Chicago, Illinois. See p. 259.

• ***Summary:*** Palemon Howard Dorsett is known for his work of introducing foreign plants to the USA. Birth: Carlinville, Illinois, on 21 April 1862, the son of William Newman

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Dorsett and Laura Oceola. Earned B.A. degree from the Univ. of Missouri, 1884. Married Mary Virginia Payne, of Columbia, Missouri, on 12 Sept. 1892; she died on 13 August 1905. They had 1 son, James H. Dorsett (deceased). He was with the U.S. Department of Agriculture (USDA) since 1891; field office worker, and has assisted in building up 6 plant introduction gardens under the USDA; leader of an agricultural exploring expedition to Brazil, 1913-14; to China, 1924-26; Dorsett and Morse Agricultural Expedition to Japan, Chosen [Korea], Manchuria and Northern China, 1929-31. Member American Genetic Association (life), American Red Cross (life), Botanical Society of Washington, Episcopalian. Mason. Home: Bell, Maryland (P.O. Glendale, MD, R.F.D. 1). Address: U.S. Dept. of Agriculture, Washington, DC.

Note: An entry in the card catalog at the National Agricultural Library states that P.H. Dorsett died in 1943. His obituary appeared in the *Washington Post* on April 2. (p. 9B, col. 4).

662. Spilsbury, Calvin C. 1969. Three stages in Far East soybean markets. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). April 14. p. 6-8.

• ***Summary:*** "Today soybean markets in the Far East, the original home of the soybean, have emerged from time-honored Eastern patterns and have differentiated into what may be called three types–traditional, transitional, and industrial.

"In traditional markets soybeans continue to be sold and used chiefly for human protein foods, and volumes traded are comparatively small. Also, volumes processed by modern methods are small. Transitional markets are characterized by larger volume, the modern processing of considerable quantities of soybeans for oil for human consumption, and the developing use of soybean meal for human food products and for high-protein animal feeds for emerging livestock and poultry industries. In industrial markets very large quantities of soybeans are efficiently imported, marketed, and processed for oils and fats for human use and for meal for vigorous livestock industries; at the same time soybeans are still used in traditional foods and soybean meal is used to make a variety of new food products.

"Republic of Korea: Korea is a traditional soybean market. Nearly all soybeans are processed into human protein foods such as synthetic milk, flour, paste for soup [miso], curd for consumption in more solid form, mash, sprouted beans, soy sauce, and even fermented 'cheese'... About 60 to 70% of the domestic crop of about 200,000 tonnes annually is sold in the country's food markets directly to private and commercial consumers. Total imports in 1968 were 28,000 tonnes–all from the United States."

"Most processing of soybeans for human use is done in individual homes by housewives. For example, nearly every Korean family makes a product known as kochojang, or hot bean mash, which consists of powdered, fermented soybeans mixed with red pepper, salt, and water. Some foodmaking (soybean curd and soy sauce) is organized into cottage industry."

"Most of the soybeans imported from the U.S. are made into traditional soybean foods for rations for the Korean army by one large food factory. Crushing soybeans and other oilseeds for oil is done by about 100 small mills throughout the country. The estimated capacity of all the mills added together is about 200,000 tonnes per year of oilseeds of all types... The largest mills have capacities less than 25 tons per day."

In Taiwan, very little of the imported soybeans are used to make traditional Far East foods. The larger crushing and extraction facilities are clustered around large cities–Taipei, Taichung, Tainan, and Kaohsiung. Only the last is a port, and even there no mills are located on deep water. Imported soybeans are discharged by ships' equipment onto docks, where they are bagged and then stored. Bagged beans are sent by truck or rail to inland processing plants. Modern deep-water bulk discharge facilities are to be built at Kaohsiung along with storage for soybeans and grain.

Japan is the giant of Far Eastern markets for U.S. soybeans. One of the most important recent improvements in soybean logistics has been the development of modern deepwater grain and soybean terminals where soybeans can be rapidly discharged from ships' holds directly to storage, interim transportation, or crushing mills. The first fast-discharge elevator on deep water for soybeans or grain was built by an American-Japanese company. At present four terminals have been built in the Tokyo and Kobe areas, and two more are under construction. Unloading is accomplished by pneumatic suction tubes with capacities of 600 to 800 tons per hour (about 6,000 tonnes per 8-hour day). In Korea and Taiwan, facilities for the fast unloading of large tankers do not exist. Many large, new crushing mills have been built on harbor frontage rather than inland so that they can benefit from bulk transportation methods. The annual capacity of the 15 large, modern mills in Japan is estimated at 1.8 million tons of soybeans. The first mills in Japan were in the mountains because most oilseed crops were grown there. Address: Fats and Oils Div., Foreign Agricultural Service.

663. Kim, Z.U.; Cho, M.J.; Kim, S.S. 1969. [Studies on the preparation of improved soysauce kojis]. *J. of the Korean Agricultural Chemical Society* 11:35-41. April. [Kor]*

• ***Summary:*** In order to determine the proper ratio of wheat to soybean in soysauce koji so that it is suited to the Korean people's taste, sensory evaluation for the soysauces made from soysauce kojis with the various above-mentioned ratios and analysis of chemical components through the brewing period of six months was carried out. The results are as follows:

(1) The specific gravity of all the soysauce increased

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gradually as the time passed and had maximum values in two months, with nearly constant values thereafter. Concerning soybean / wheat ratio, generally the higher soybean/wheat ratio, the lower the observed specific gravity. However, when the ratio was above 10 to 6, the specific gravity was similar.

(2) The solid material in all of the soysauces increased in the earlier stage, and there were no significant differences among the treatments. However, the soysauces without wheat had a slightly lower content.

(3) The less amount of wheat as raw material, the higher the content of total nitrogen was. The content of total nitrogen in every ratio of raw material increased as the mash aged.

(4) The amino-nitrogen levels were found to have similar tendencies to total nitrogen levels.

(5) The reducing sugar content was higher in the soysauces with more wheat and increased rapidly, up to the maximum level, in two months. Then, the higher the wheat / soybean ratio was, the slower the decrease of the observed sugar content.

(6) The maximum total acidity observed was in the soysauces with a soybean / wheat ratio of 4 to 6, and increased similarly in all the soysauces throughout the period.

(7) According to the sensory evaluation, the short (2-3 months) fermented soysauces showed the best taste when soybean / wheat ratio was 10 to 8 and 10 to 6 if diluted. In long (4-6 months) fermented soysauces, it was 10 to 6 and 10 to 4 diluted. Address: Seoul Agricultural College, Seoul, Korea.

664. *Soybean Digest.* 1969. Worldwide oils and fats. April. p. 58.

• ***Summary:*** Discusses: Rapeseed. Thailand. Palm oil. Spain. Korea. Asia. World. Iran.

"Thailand: The first Thai International trade fair–held Dec. 12-29 in Bangkok–drew over 750,000 people and introduced them to 422 U.S. food products including new textured vegetable protein items made from soybeans."

"Korea: Response to a new U.S. soy beverage tested as part of a Korean school lunch program has encouraged early introduction into the commercial market."

"Iran: Vegetable oil extraction and processing equipment worth $750,000 has been ordered by Iran from a British engineering firm..."

665. *Time.* 1969. Cancer: A clue from under the eaves. 93:81. May 9.

• ***Summary:*** This article discusses the work of Dr. David Seel, who has studied 919 cases of stomach cancer at the Presbyterian Medical Center in Chonju, South Korea. He thinks the culprit "may be a mold used in the preparation of a favorite Oriental delicacy, soya paste."

He explained that each winter, almost every Korean household makes "loaves of soybean mash" [*meju*, soybean koji, used to make Korean soy sauce and soya paste] and stores them in a cool, dark place, often under the eaves, where they become moldy. By early spring, a mycelium of black or gray mold covers the loaves. The Koreans scrape off this mold, then immerse the loaves in brine for a month. Finally, they pour off the black liquid, which is soy sauce, and "make the debris left in the crock into a stiff soya paste," of which some Koreans consume as much as five ounces a day.

Dr. Seel believes the "soya-paste molds" might well be a cause of stomach cancer in South Korea. He suggests there may actually be two causes of the problem: "The most widely used mold is *Aspergillus flavus*, some growths of which secrete substances called aflatoxins. For some animals, these are among the most powerful cancer-causing agents known. Moreover, says Seel, the stomach lining seems especially liable to damage, including cancer. Among Koreans who had both low vitamin A readings and a high consumption of soya paste, stomach cancer was twice as common as among other groups." Aflatoxins have also been found in peanuts, which are consumed by Southern Negroes, among whom vitamin A deficiency is known to be prevalent. A photo shows a person "immersing soya loaf [meju] in brine."

Note 1. For another perspective, see the *SoyaScan Notes* interview on this subject with Dr. C.W. Hesseltine (Feb. 1981), an internationally recognized expert on aflatoxins.

Note 2. This is the earliest English-language document seen (April 2021) that uses the term "soya paste" to refer to miso, or to Korean-style miso.

666. *Medical World News.* 1969. Is the staff of Asian life the stuff of cancer? 10(20):12. May 16.

• ***Summary:*** This article (under the heading "Late News of the Week") seems to be based, at least in part, on a report in *Time* magazine (9 May 1969, p. 66). *Aspergillus flavus* is "a fungus often found in soya paste or soya sauce. These foods are prepared by molding [i.e. from meju]. *Aspergillus flavus* produces toxic metabolites called aflatoxins, apparently the most potent carcinogenic substances ever discovered." Research on stomach cancer patients in Korea seems to support the theory that low intakes of vitamin A or a vitamin A deficiency may open the way to stomach cancer if the diet is loaded with carcinogens. A Korean team led by American missionary doctors [incl. Dr. David J. Seel, associate director of the Presbyterian Medical Center in Chonju] examined the socioeconomic, clinical, and dietary histories of 70 stomach cancer patients and 70 controls, matched by age and sex. "A striking finding was that the average daily intake of vitamin A for the control group was around 3,331 International Units, but for the cancer patients, only 2,853. 'The typical Korean stomach cancer patient is apt to be a farmer with poor education, at the lowest income level,' reports Dr. Seel. For

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the poor Korean farmer, soya loaves [meju] are a staple. The loaves are prepared each winter from a bean mash and stored for molding in a cool, dark place, often under the eaves of the farmer's house.

"Should the American with exotic tastes limit his horizons to avoid carcinogenic intake? A physician attending the meeting assured MWN [*Medical World News*] that Occidentals who are Chinese and Japanese restaurant buffs have nothing to worry about, since they are probably fully protected by the quantities of vitamin A in Western diets."

667. Park (Mrs. Duk Pong). 1969. Park's brand Korean food (Ad). *Honolulu Advertiser* (*The*) (*Hawaii*). Sept. 13. p. 10, cols. 1-2.

• ***Summary:*** "Ko Chu Jung–Korean Hot Paste [Gochujang]
"Cho Jung–Korean Hot Sauce
"Korean Miso–Tang Jung [Doenjang]
"Kim Chee Sauce–Kim Chee Base
"Barbecue Sauce–Korean Style
"Wholesale orders accepted
"Mon. thru Sat. 7 a.m.–5 p.m.
"Sun. 7 a.m.–12 noon.
"Park's Vegetable Stand
"Owner Mrs. Duk Pong Park" Address: 145 North King St., Stand #53, Oahu Market, King Kekaulike (inside), Honolulu. Phone: 538-1727.

668. Barnes, Harris H., Jr.; Randolph, Chet. 1969. A massive program mounted: ASA report. *Soybean Digest.* Sept. p. 19-22.

• ***Summary:*** At the annual meeting of the American Soybean Assoc. in New Orleans last year, there was evidence of a new outlook and attitude. "An entire section of the growers' convention dealt with market development and more precisely the need to mount a massive program to move soybeans and soybean products." The ASA's 15-year-old program in Japan has provided experience and the nucleus for expansion into other countries, including Taiwan, Korea, Germany, and Iran. The ASA has signed a $1.6 million agreement with the Foreign Agricultural Service for market development in 17 countries during the next two years.

"It's particularly encouraging to note that three states have now held soybean checkoff referendums that passed by sound majorities. In Louisiana it was 77%, North Carolina 82%, South Carolina 80%... In addition, Minnesota, Missouri, Texas, and Ohio have all passed enabling acts... The above is evidence growers support the ASA effort to step up market development work." Yet ASA membership has failed to grow. Address: 1. President; 2. Executive vice president. Both: American Soybean Assoc.

669. Funchess, William H. 1969. Soybeans saved my life. *Soybean Digest.* Sept. p. 32-33.

• ***Summary:*** He was captured on November 4 [probably in 1950]. The snow began falling the day after he was captured by the Communists in North Korea. Just before he was captured, he had been shot by a machine gun, so every step was like walking on nails. He had already seen the Communist Chinese shoot and kill one of his men who could not walk. After several days of walking in the freezing cold, wearing only light clothing, he and the other American POWs finally reached a temporary prisoner of war camp. "Snow covered the ground and the temperature was 10 to 20 degrees below zero. Thirty-six of us were assigned to a mud house that had a straw roof, dirt floors, paper windows, and no heat. There was a bundle of dried corn stalks for bedding."

One day he noticed soybean stubble extending several inches through the snow. He found a stick, hobbled out to the small soybean field near his hut, pried out the soybeans from the frozen ground, and collected them one by one in his pocket. When the guard left his fire, Funchess placed the beans on a piece of tin in an effort to roast them. When he saw the guard returning, he would grab his beans and move out of sight. Occasionally, however, when he was not quick enough, his beans were kicked into the fire.

He had never eaten soybeans before but he knew they had a high protein content and would sustain life, so he determined "to acquire as many of those little life-giving nuggets as possible."

His daily rations were a cupful of cooked millet or corn that he got twice a day. He received no additional water from Nov. 4 until sometime in February. But he could eat snow–if he could stand the stomach cramps that followed.

He did not get a grain of salt or any meat for nearly 5 months. By that time, however, the Communists would occasionally throw several handfuls of soybeans into the pot of millet. He was so hungry and thin that those soybeans tasted better than anything he had ever eaten. But many of his fellow prisoners died of starvation. His weight dropped to 105 pounds. He and his friends knew they had to improve their diet.

When he was made to carry bags of soybeans, he learned to "accidentally" tear the bags and fill his pockets during every work detail. Occasionally he found earthen jars of fermented "soybean paste" [miso]. It did wonders to the millet seed that he was constantly eating.

After the peace negotiations began [on 10 July 1951], some 8-9 months after he was captured, their food supply improved. Whole soybeans were added to the rations. First they tried boiling whole beans in water; they enjoyed them seasoned only with salt. Then they cracked the soybeans and mixed them into their millet or rice. After a while they began to grow soybean sprouts, which they found very tasty–and when he enjoys to this day.

Finally they learned to make a product some of the men called "Tofu." The Communists gave them a coagulant, They added a small amount of tofu to everything they cooked–and

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he began to feel his strength returning. Then they learned to make soybean milk, which they also liked if they were careful not to scorch it. It was so rich, however, that they soon learned to drink only a few ounces at a time.

"Eventually a small amount of soybean oil was provided for cooking purposes... A small dish of oil and a cotton wick made an excellent light at night."

"Soybean oil worked well, too, for chapped hands. Some of us even found that it made pretty good hair tonic.

"While a prisoner of war I learned to appreciate the soybean for its life-giving characteristics. To me, the soybean became not a "way of life" but a "way to sustain life." Needless to say, I gained great affection for the little yellow bean that helped keep us alive in the prisoner of war camps of North Korea.

"Each fall at harvest I still collect some soybeans to roast. I always take great delight in offering roasted beans to my friends. Most people will accept only a few, but I can still sit down and enjoy them by the pocketful."

A portrait photo shows William H. Funchess. Address: County Agent, Allendale, South Carolina.

670. Lee, Eun Ock. 1969. [Studies on the contents of mercury in Korean soy-bean sprouts and persimmons in markets]. *Korean J. of Food Science and Technology* 2(2/3):87-89. Sept. [13 ref. Kor; eng]
• ***Summary:*** The mean mercury content of Korean soybean sprouts was 0.088 parts per million. Address: College of Pharmacy, Sookmyung Women's Univ., Seoul, South Korea.

671. *Soybean Digest.* 1969. MPF provides protein for world's hungry. Nov. p. 3.
• ***Summary:*** Multi-purpose food, developed for the Meals for Millions Foundation nearly 25 years ago, "continues to provide vital protein-enrichment to the diets of the hungry both at home and abroad."

"Of equal significance, through the Foundation's pilot plant and training center in Santa Monica, California, students from all over the world learn how to process their own protein-rich food supplement from their own resources.

"Today, soy-based MPF is being manufactured in Japan, Brazil, Mexico, and Korea. These plants, operated by the inhabitants of the countries, with the technological assistance of Meals for Millions, personify the self-help philosophy of the Foundation which believes in a hand-up rather than a hand-out program."

A photo shows two young boys carrying a case of "Meals for Millions–Friendship Food."

672. Kim, Z.U.; Cho, M.J.; Kim, S.S.; Lee, C.Y. 1969. [Studies on the digestion of soybean protein by *Aspergillus sojae*]. *J. of the Korean Agricultural Chemical Society* 12:19-24. [Kor]*
Address: College of Agriculture, Seoul National Univ., Suwon, South Korea.

673. Kwon, Shin-Han; Quyen, Nguyen H. 1969. [Effect of plant spacing on several agronomic traits of a soybean variety under the tropical environment]. *Korean J. of Crop Science* 7(1):133-37. [7 ref. Kor; eng]
• ***Summary:*** "This experiment was conducted to determine the optimum row width and plant spacing within row under the tropical environment for a leading soybean variety Palmetto and it was carried out at Eakmat Experiment Station in Vietnam... Highest seed yield was obtained at closet spacing in both dry and rainy season, and these results led to drilling method in seeding where about 20 seeds per meter of row could be recommended. Besides the seed yield, the close planting may produce some advantages, such as increase plant height and decrease lodging, weeds and erosion of surface soil." Address: 1. Formerly FAO Agricultural Officer Radiation Research Institute in Agriculture.

674. Pak, K.H.; Han, K.C. 1969. An analysis of food consumption in the Republic of Korea, 1964-1967, with projective trends, 1968-1971. Seoul, South Korea: Yonsei University. *
• ***Summary:*** A table shows production and food use of beans and consumption of some soybean products from 1964-1967 (reprinted in Wang 1976, p. 56-57). Bean production (see footnote) was 190,000 metric tons (tonnes) in 1964, increasing to 203,000 tonnes in 1965, then to 236,000 tonnes in 1967, with 361,000 tonnes projected for 1971.

The amount of soybeans used for food was 94,000 metric tons (tonnes) in 1964 (49.5% of the soybeans produced), increasing to 104,000 tonnes in 1965, then to 134,000 tonnes in 1967 (56.7% of production), with 206,000 tonnes projected for 1971 (57.1% of the soybeans produced).

Consumption of bean curd [tofu] was 223,000 metric tons (tonnes) in 1964, increasing to 243,000 tonnes in 1965, then to 290,000 tonnes in 1967.

Consumption of soybean sprouts was 227,000 metric tons (tonnes) in 1964 (1.8% more than tofu), increasing to 240,000 tonnes in 1965, then to 270,000 tonnes in 1967 (93.1% as much as tofu).

Consumption of bean sauce [soy sauce] was 57,400 metric tons (tonnes) in 1964, increasing to 61,000 tonnes in 1965, then to 69,700 tonnes in 1967.

Consumption of bean paste [Korean-style miso] was 22,900 metric tons (tonnes) in 1964, increasing to 24,300 tonnes in 1965, then to 27,700 tonnes in 1967 (only 39.7% as much as soy sauce).

Footnote: Based on the average production of the 4 years surveyed, the beans consisted of 85% soybeans, 8.5% red beans [azuki], 1.6% green beans [Mung beans], 1.3% peanuts, and 3.4% other beans. Address: South Korea.

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675. Park, J.S.; Han, S.C.; Lee Y.B. 1969. [Studies on the varietal resistance of the soybean to the cyst nematode, *Heterodera glycines* Ichinohe and its damage]. *Korean J. of Applied Entomology* 7:21-25. [16 ref. Kor; eng]
• ***Summary:*** "In order to find out resistant varieties of the soybean to the cyst nematode, *Heterodera glycines* Ich. 64 soybean varieties were tested." Address: 1. Dep. of Entomology, Institute of Plant Environment, ORD, Suwon.

676. Park, Y.M. 1969. [Studies on commercially produced soybean sauce in Korea]. *Kongjung Pogon Chapchi* (*Korean J. of Public Health*) 6(2):293-98. [11 ref. Kor; eng]*
• ***Summary:*** The author conducted a study on soybean sauces collected from 74 manufacturers out of the 228 in Korea from April 6 to July 4, 1969. The pH value, specific gravity, buffer force, salt content, pure extract, arsenic and heavy metals of the sources were analysed. Main findings are as follows:

(1) In the pH value test, out of 74 samples, 6 (8.1%) are outside the government-permitted range of pH 4.5 to 5.8. The mean value of all samples is 5.03.

(2) Specific gravities of 10 samples (13.6%) are lower than the government permitted value, more than 1.142. The mean value is 1.168.

(3) Buffer forces of 20 samples (27.0%) exceed the government-permitted value, more than 17.0% of the sauce. The mean is 19.09%.

(5) The contents of pure extracts of 15 samples (20.3%) are lower than the government permitted value, more than 8.0% of the sauce.

(6) All the sauces are qualified in the test of arsenic, of which the government-permitted value is less than 1.5 ppm of the sauce.

(7) The contents of heavy metals of 13 samples (17.6%) are more than the government-permitted value, less than 20 pm of the sauce. Address: School of Public Health, Seoul National Univ., Seoul, Korea.

677. Meals for Millions Foundation. 1969. Annual report 1968. Santa Monica, California: MFM Foundation. 8 p. Typed with signature on letterhead.
• ***Summary:*** Submitted by I.F. Saunders, Executive Director. Contents: Summary. MFM board and staff. Technical training. Research & development. Multi-purpose food shipments (278,113 lb to 33 countries). Financial condition (Donations in 1968 were $408,000, the highest in MFM's history. Only 7% of income was used for administration and management, and only 13% for fund raising and public relations). U.S. Projects: California ("Governor Ronald Reagan has readily accepted the title of Honorary Chairman of the Meals for Millions California Chapter." He has participated in MFM "activities over the past years, and is acquainted with what we are doing and firmly believes in the way we are doing it"), Nevada, Arizona, Mississippi, South Carolina. Overseas Projects: Japan, Korea, Taiwan, Philippines, Hong Kong, Thailand, India, Ceylon, Pakistan, Iran, Ecuador, Chile, Brazil, Mexico. Remarks.

Note 1. This is the earliest document seen (Dec. 2010) which shows that Meals for Millions Foundation was now located at 1800 Olympic Blvd. in Santa Monica–15 miles west of Los Angeles. Actually, MFM moved to this location in 1967.

Note 2. This is the earliest annual report seen (Dec. 2010) for Meals for Millions.

Chris Dodson of Freedom from Hunger (FFH), who kindly sent this annual report (and almost all subsequent MFM / FFH annual reports) to Soyinfo Center (Dec. 2010), says she can find no evidence of annual reports for 1965, 1966, or 1967 in the FFH archives. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California. Phone: 870-0451.

678. Iwamota, Amy. 1970. Two tasty Korean recipes to add to spring menus. *Hawaii Tribune-Herald* (*Hilo, Island of Hawaii*). Jan. 29. p. 11.
• ***Summary:*** The headnotes for the first recipe state: "As an extra flavor for those who like hot, spicy foods, a hot sauce, which follows the Korean Fried Rice recipe, can be used to season the rice and vegetable mixture. It also can be served with noodle, meat, and vegetable dishes. A small amount of the Korean sauce goes a long way."

The first recipe is for "Korean Fried Rice." At the end of the directions we read: "Mix well. Add rice. If desired, mix in ½ teaspoon of Kochujan Sauce. Makes 6 servings."

Next comes a recipe for "Kochujan Sauce."

"1 teaspoon miso (made from fermented rice and soy beans)

"1 teaspoon soy sauce

"1 teaspoon cayenne

"Combine ingredients together."

Note: In April 2021, when we searched www.newspapers.com, the huge digitized newspaper database, for "kochujan," we got only 5 matches from 1970 to 2010. But when we searched for "kochujang" we got 257 matches from 1978 to 2010. Address: HELCO [Hilo Electric Light Company] Home Economist.

679. Meals for Millions Foundation. 1970. Annual report 1969. Santa Monica, California: MFM Foundation. 9 p. Typed with signature on letterhead.
• ***Summary:*** Submitted by I.F. Saunders, Executive Director. MFM's logo (in the upper left on the title page) shows two hands gripping the handle of a horizontal spoon, with its mouth to the right facing upward–in white on a black background. Note: This is the earliest document seen (Dec. 2010) on which this logo appears.

Contents: In Memoriam: Three great friends of the Foundation passed away in 1969: "Our Founder, Clifford

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E, Clinton, a giant among men; Florence Rose, the first Executive Director, beloved around the world; and Don Belding, a much-revered and long-time member of the Board of Directors.

"Their loss is felt deeply by each of us."

Summary of annual report. MFM board and staff (In March of 1969, at the Semi-Annual Meeting of the Board of Directors, in accordance with the By-Laws of this Foundation," Dr. Morris Asimow was re-elected chairman of the board and Mr. Russell Eller, was re-elected president...)

"Key loss to the staff was: Mark Sterner, who now lives in Korea, but who continues to help us through his work with Korea High Protein Foods, Inc." Meals for Millions training school (administrated by Eva Kadiev). Research and development (enriched noodles, peanut meal concentrate, crystalline protein). United States projects: California, Texas, Connecticut, South Carolina, American Indians. Overseas Projects: Korea, Ecuador, Japan, Taiwan, Hong Kong, Thailand, India, Pakistan, Iran, Vietnam, Brazil, Mexico, Chile. Women's Clubs. Public relations. Remarks.

Note 1. No financial information is given, nor information on shipments of MPF for the year.

Note 2. A photo (on the Web, Dec. 2010) shows Clifford E. Clinton's signature on his grave marker at Forest Lawn Memorial Park (Glendale, California). Plot: Kindly Light section, Lot 311, Interment Space 6. A second photo shows that the grave site is on a grassy hillside. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California. Phone: 870-0451.

680. Hilo Electric Light Co., Ltd., Home Service Department. 1970. Display ad: Reddy Kilowatt's Free Cooking Class. *Hawaii Tribune-Herald* (*Hilo, Island of Hawaii*). June 1. p. 7, cols. 4-5.

• ***Summary:*** "Tuesday, June 4, 1970

"Time: 7:30 P.M.

"Place: Papaaloa Hongwanji Hall

"A delicious cosmopolitan menu made up of Chicken and Rice Casserole, Luau Stew, Shrimp Tempura, Portuguese Style Tuna, Korean Fried Rice with Kochujan Sauce, and Almond Jelly will be prepared.

"Recipes will be distributed to everyone attending. Reddy Kilowatt helpers as well as foods prepared will be given away as door prizes. It's Free for All!"

681. Lee, T.S.; Lee, S.K.; Shin, B.K. 1970. [Studies on the yeasts for the brewing of soy sauce. II. Isolation, identification and classification of the yeasts in soy sauce mash]. *J. of the Korean Agricultural Chemical Society* 13(2):171-80. June. [Kor]*

Address: 2. Sampayo Soy Sauce Brewery, College of Agriculture, Chung Nam [Chungnam] Univ., Daejeon, Korea.

682. U.S. Department of Agriculture. 1970. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1969. Washington, DC: U.S. Government Printing Office. See p. 122-27. Cover reads: Food for Peace: 1969 Annual Report on Public Law 480.

• ***Summary:*** Table 20 is titled "Title II, Public Law 480–Total commodities by program type, fiscal year 1969." The three main program sponsors and distributing agencies are (1) Volag (American voluntary agencies, UNICEF and UNRWA [United Nations Relief and Works Agency] unless otherwise noted), (2) Government to government, and (3) WFP (World Food Program). Each of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. Only two foods containing soy protein were distributed: CSM (Corn soya mix) and WSB (wheat soya blend). They were lumped together in the statistics and sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa total 89,470 lb: Cameroon 600, Congo 162, Dahomey 80, The Gambia 385, Ghana 976, Kenya 478, Lesotho 775, Malawi 39, Mali 4,500, Morocco 300, Nigeria 78,232, Senegal 80, Sierra Leone 1,810, Tanzania 365, Togo 18, Upper Volta 670.

Near East-South Asia total 222,817: Gaza [occupied by Israel since 1967] 2,653, India 216,176, Jordan 1,527, Jordan-West Bank [occupied by Israel since 1967] 1,042, Lebanon 738, Nepal 18, Pakistan 1, Syria 662.

Far East total 57,861: Burma 360, Indonesia 3,669, Korea 9,698, Laos 53, Macao 113, Malaysia 2,474, Philippines 3,140, Ryukyu Islands [located south of Japan, incl. Okinawa, Sakishima, and Amami island groups. Self governing from 1966. Returned to Japan in 1972] 227, Vietnam 38,127.

Latin America total 45,291: Bolivia 72, Brazil 19,851, Chile 2,605, Colombia 1,696, Costa Rica 142, Dominica 4, Dominican Republic 6,680, Ecuador 608, El Salvador 1,178, Grenada 68, Guatemala 1,773, Guyana 58, Haiti 1,585, Honduras 435, Jamaica 124, Martinique [French] 75, Panama 734, Paraguay 2,477, Peru 4,847, Uruguay 279.

Grand total: 415,439,000 lb of CSM and WSB. The following amounts of CSM/WSB (in 1,000 lb) were distributed by the three groups: Volag 292,587, Government to government 122,851, and WFP 1. Countries receiving more than 1 million lb of CSM and WSB combined (in millions of pounds): India 216.2, Nigeria 78.2, Vietnam 38.1, Brazil 19.9, Korea 9.7, Dominican Republic 6.7, Peru 4.8, Mali 4.5, Indonesia 3.7, Philippines 3.1, Gaza 2.7, Chile 2.6, Malaysia 2.5, Paraguay 2.5, Sierra Leone 1.8, Guatemala 1.8 Colombia 1.7, Haiti 1.6, Jordan 1.5, El Salvador 1.2, Jordan West Bank 1.0.

Note: This is the earliest document seen (Feb. 2002) concerning soybean products (cereal soy blends) in Martinique, or Panama. This document contains the earliest date seen for soybean products in Martinique, or Panama

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(1969); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

683. Probst, A.H. 1970. Fifty years of soybean variety improvement. *Soybean Digest.* Aug. p. 66-70.
• ***Summary:*** Contents: Introduction. The trend to yellow seed. Common objectives of soybean breeders: High yield, high oil content, high protein content, disease resistance, improved seed quality, maturity to fit rotations, shattering resistance, desirable plant height, lodging resistance, high podding from soil level. Threat of root rot. Reasons for yields of 100 bushels/acre.

"Soybean varieties have played a vital role in the expansion of soybean production and in the development of a soybean industry which has been favorable to the producer, the processor, and the consumer in the U.S. Soybeans were scarcely known in the U.S. before the beginning of the 20th century. Prior to the numerous introductions by the U.S. Department of Agriculture beginning in 1898, there were not more than eight varieties grown in the U.S.

"The slow but steady growth of the soybean crop in the early part of this century, especially up. to 1920, was tied mainly to its use as a forage crop. The crop was used extensively for hay, and to a lesser extent for soilage, silage, green manure, lambing- or hogging-off when grown as a companion crop with corn, and for direct feeding of the beans.

"The importance of soybeans as grain in this early period related primarily to production of seed for the above purposes. When official production estimates of the crop became available in 1924, of the 1,782,000 acres produced, only 448,000, or 25%, were harvested for beans. It was not until 1941 that 5,881,000 acres harvested for beans surpassed the 5,510,000 acres grown for all other purposes.

"The development of the soybean processing industry was nudged into being mainly by World War I when there was such a shortage of fats and oils in the U.S. that it was necessary to import Manchurian soybean oil. The industrialization of an otherwise entirely farm crop in the U.S. began to take place.

"Although a processing industry was emerging, the need of high-oil-type soybeans continued to have competition from hay-type soybeans. The acreage for hay reached 4.8 million acres in 1940 and then declined very rapidly. Production of soybeans for processing increased at a phenomenal rate following the start of World War II in 1941.

"Thus, through the first 15 to 20 of the past 50 years there was still considerable work done in the development of soybean varieties for hay and nongrain uses. There was an increasing emphasis on development of varieties with a high-oil content as well as emphasis on the development of vegetable varieties for human consumption. In this early period there was a shift in emphasis from black- or brown-seeded hay types to yellow-seeded varieties which were thin-stemmed and would serve a dual purpose for both hay and processing for oil and meal.

"The trend to yellow seed: There was a trend to produce meal only from yellow-seeded soybeans to give a uniform-appearing product. This trend was a factor in t h e development of yellow-seeded varieties.

"Of major importance in variety development in the past 50 years has been the introduction of many varieties and types from the Orient and other areas of the world.

"Well over 10,000 introductions have been brought into the U.S. since 1898. Approximately 4,775 introductions were brought in by W.J. Morse and P.H. Dorsett who spent 2½ years during 1929-1931 on an agricultural exploration trip in Japan, Korea, and Manchuria.

"The germplasm collection today numbers about 3,200 types plus nearly 300 named varieties. These introductions range from very early to very late in maturity and serve as a base for the development of superior varieties.

"Through 1940 most varieties were released either as direct introductions, rogued introductions, or selections from introductions. Some selections from introductions may have been of hybrid origin. A few varieties developed from introductions which played an important role in the rapid expansion of acreage planted for processing 20-50 years ago included Dunfield, Illini, Manchu, Richland, Mukden, Mandarin, Habaro, Boone, Patoka, and Roanoke. All vegetable-type varieties up to 1956 were introductions.

"Only a few varieties released through 1940 are known to have come from artificial hybridization-breeding programs. These include Mamloxi, Mamotan, Mamredo, Ogden, Volstate, Tennessee Non-pop, Oloxi, Pee Dee, and Yelredo.

"Of this group, only Ogden, with numerous good qualities sought in varieties today, was grown extensively for a long period. The popularity of Ogden was such that nearly 30 years after its release in 1941 some of it was still being grown commercially.

"Following 1940, and especially after 1950 there have been few varieties released which have come directly from introductions. A few varieties, developed mainly by farmers or seedsmen, have originated as selections from released varieties. These varieties have seldom, if ever, been a distinct improvement over the best varieties recommended by experiment stations at the time of their release.

"The establishment of the U.S. Regional Soybean Industrial Products Laboratory (now the U.S. Regional Soybean Laboratory) in 1936 at Urbana, Illinois, brought about a tremendous increase in soybean breeding. Variety development immediately lost its provincialism and went 'big league' to have an immediate impact nationally and eventually internationally. Today, the efforts of personnel working both within the agricultural experiment stations and the U.S. Department of Agriculture are reflected in better

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varieties in many parts of the world, including some areas where the soybean originated.

"Soybean breeders generally have had a common set of objectives in developing new varieties which include:

"High yield
"High oil content
"High protein content
"Disease resistance
"Improved seed quality
"Maturity to fit rotations
"Shattering resistance
"Desirable plant height
"Lodging resistance
"High podding from soil level

"These objectives in total add up to the development of higher yielding, higher protein, and higher-oil-content varieties–all of which are direct benefits to the producer, the processor, and the consumer.

"Threat of Root Rot: During the American Soybean Assn.'s 50-year period there have been times when soybean breeders have had to make a quick change in direction to meet emergencies. The inroad on yield and the threat to eliminate soybeans as a crop created by phytophthora root-rot, especially in parts of Ohio, Indiana, Ontario [Canada], the [Mississippi] Delta area, and elsewhere, dictated immediate action. Phytophthora root-rot-resistant varieties were developed and released in the early 1960's. There has been a succession of resistant varieties since to minimize effects of the disease. Resistance to other diseases are available in numerous other varieties to minimize losses and avoid emergencies.

"The emergency created by the presence and spread of the cyst nematode required a crash breeding program. Obstacles were overcome and varieties were developed quickly which changed the emergency into 'production as usual.' New resistant varieties are now a part of breeding programs where the cyst nematode is a problem.

"Several extensive soybean breeding programs are devoted now to the development of brown-stem-rot-resistant varieties and to improve quality of seed in varieties. These are major problems in extensive soybean-producing areas.

"Soybean breeders have recognized the need for special-purpose varieties, especially for foreign markets. Several vegetable-type and high-protein varieties have been developed.

"Today, there are many excellent varieties available to fit any production area from about 27º latitude in Florida to near 50º latitude in Canada. A recent listing of the leading soybean varieties for the U.S. and Canada included 39, plus seven special-use varieties, five of which were vegetable types and two were high-protein types.

"Since 1943 over 80 varieties have been or are in the process of registration by the American Society of Agronomy or, more recently, the Crop Science Society of America.

"The major part of soybean-variety development in the past has been accomplished by public agencies, particularly the agricultural experiment stations and the U.S. Department of Agriculture. At least one private company has been breeding soybeans for many years; a few for shorter periods" (Continued). Address: USDA Research Economist, and Prof. of Agronomy, Purdue Univ. [Indiana].

684. Probst, A.H. 1970. Fifty years of soybean variety improvement (Continued–Document part II). *Soybean Digest.* Aug. p. 66-70.

• ***Summary:*** (Continued): "During the past few years, a few number of private companies have entered the field of soybean breeding and the development of private-brand soybean varieties, some rather extensively and others to a lesser extent. Still other companies may become active in this endeavor if Congress passes the Plant Variety Protection Bill. This recent activity in soybean breeding is certain to bring many new varieties on the market. Much progress has been made in soybean-variety improvement in the past 50 years. Yield, one of the best criteria with which to measure progress, has increased from a national average of 11 bu/a in 1924 to the all-time high of 27.3 in 1969.

"The impact of recently released, improved varieties should put the national yield average above 30 bu/a in a few years. Some individual state yields have risen from a lowly 11-to-12 bu/a in 1924 to 33 to 33.5 in 1969, which are all-time highs.

"Reasons for the 100-bu. yields: In recent years a number of top soybean growers, who have put all their know-how into production, have consistently produced above 60 bu/a. Some have reported just above 100 bu/a. This yield progress is not due to better varieties alone. Yield depends also on many cultural improvements. But today's varieties do have the genetic potential to produce!

"As an average overall of today's varieties, there has been a reasonably good improvement in oil and protein content over varieties developed and used in the past several decades. Natural shattering losses of seed are of little or no concern in today's varieties. Many varieties have a marked resistance to lodging. Also, many varieties pod well above the ground, which helps to minimize seed loss. Most of today's varieties have resistance to one or even several important diseases.

"No review of the past 50 years of soybean improvement would be complete without recognizing those men who have administered the work. This includes all the administrators in many agricultural experiment stations and the U.S. Department of Agriculture who have quietly, but effectively, helped bring the soybean crop to its place of prominence. Of particular note are those men who have guided the soybean improvement program as USDA soybean project leaders, including the late W.J. Morse, 1907-1949, who probably did more than any other man to bring soybeans to their state

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of improvement and prominence today; Dr. M.G. Weiss, 1950-1953, now assistant to deputy administrator, Farm Research. USDA; Dr. H.W. Johnson, 1953-1964, now head, department of agronomy and plant genetics, University of Minnesota; Dr. R.W. Howell, 1964-1965, now chief, oilseed and industrial crops research branch, crops research division, Agricultural Research Service, USDA; and Dr. B. E. Caldwell, 1966-present.

"Also playing an important role in soybean development are those men who have directed the work of the U.S. Regional Soybean Laboratory at Urbana, Illinois. These include J.L. Cartter, 1936-1965; Dr. R.L. Bernard, interim geneticist-in-charge, 1966; and Dr. R.L. Cooper, 1967 to present.

"Dr. E. E. Hartwig has coordinated the work in the southern states since 1948 and has contributed immeasurably to variety development in that area."

A large portrait shows: George Kimmons (Ozark, Missouri; the first person to get 100 bu/acre yields, in 1968 with 109.6 bu/acre).

Small portrait photos across the top of page 70 show: W.J. Morse. M.D. Weiss. H.W. Johnson. R.W. Howell. B.E. Caldwell. J.L. Cartter. R.L. Bernard. R.L. Cooper. E.E. Hartwig. Address: USDA Research Economist, and Prof. of Agronomy, Purdue Univ. [Indiana].

685. *Soybean Digest.* 1970. W.J. Morse–the first man who tried harder for soybeans. Aug. p. 23.
• ***Summary:*** "W.J. Morse, as the principal agronomist of the Bureau of Plant Industry, Beltsville, Maryland, imported the varietal strains from the Orient that form the basis for today's U.S. soybean crop.

Note: None of the soybeans introduced by the Dorsett-Morse Expedition to East Asia (1929-31) formed the basis of the U.S. soybean crop in 1970. The eleven major ancestors of all soybean varieties grown in the USA in 1972 were introduced between 1901 and 1927. Nine were introduced from China (including Manchuria) and one each from Japan and Korea. For details see: National Research Council, Committee on Genetic Vulnerability of Major Crops. 1972. "Genetic vulnerability of major crops." Washington, DC: National Academy of Sciences. vii + 307 p. For soybeans, see Chap. 13, p. 207-17.

"He helped organize the American Soybean Assn. and by his efforts kept it alive and gave it invaluable guidance during the early years. He served as president three times. And he was one of the first men ASA elected an honorary life member. No wonder he was called 'Daddy of the Soybean!'

"Mr. Morse has been followed by many, many others as dedicated as he, as full of the vision of the great boon soybeans might be for mankind... Such people are what the Golden Anniversary is all about."

A large, excellent photograph, with his autograph, shows W.J. Morse. The inscription reads: "The best crop in the world–soybeans."

686. Clark, R.W.; Mies, D.W.; Hymowitz, T. 1970. Distribution of a trypsin inhibitor variant in seed proteins of soybean varieties. *Crop Science* 10(5):486-87. Sept/Oct. [11 ref]
• ***Summary:*** Soybean trypsin inhibitor is a protein that was discovered by Bowman (1944) and is regarded as an "antinutritional factor in soybeans."

Consumption of raw soybeans causes pancreatic hypertrophy in chickens (Bray 1964; Chernick et al. 1948) and "is believed to inhibit growth, by upsetting the balance between methionine and cystine in the pancreas" (Booth et al. 1960).

Two different forms of soybean trypsin inhibitor protein were studied using electrophoresis with 294 soybeans. 7% of the soybeans had Rf 0.92 electrophoretic bands and 93% had Rf 0.05 bands, where Rf is the relative mobility of the dye front. Soybean varieties of known origin that had the Rf 0.92 band were from Japan or Korea and were mostly in Maturity Groups 1 through IV; but not all soybeans from Japan or Korea had this band. None of the major commercial varieties of soybeans presently grown in the USA contained the Rf 0.92 band. The Rf 0.92 predominates in vegetable type soybeans. Examples of vegetable types are Agate, Aoda, Burwell, Giant Green, Goku, Jogun, Portugal, Rokusun, Sac, Sato-3, Soursei [sic, Sousei], Tortoise Egg, and Wolverine.

Approximately 90 to 95% of the total soybean acreage in the USA is seeded to varieties derived from six plant introductions that originated in Manchuria: P.I. [plant introduction] numbers 30593, 36653, 36846, 50523, 70502, and A.K.

Note: This is the earliest document seen (Oct. 2013) concerning trypsin inhibitors and seed electrophoresis. It is also the first study of the geographical distribution of various forms of the soybean trypsin inhibitor SBTI-A2. Address: Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

687. Dosti, Rose. 1970. Royal heritage of Korean reflected in her cooking. *Los Angeles Times* (*The*) (*California*). Nov. 27. p. 130-21 (part VIII, p. 6-7).
• ***Summary:*** "Kumi Kang, 26, was born in Seoul, Korea. Her mother came from a royal family and was exposed to palace banquets. So when Kumi learned to cook, the food smacked of palace cooking.

"'All Korean girls must learn to cook even though there are cooks at home,' said Kumi, a delicate beauty who is taking her master's degree at USC."

Kumi's favorite dish is Bul-Kogi, a traditional Korean barbecue dish, in which beef, chicken and pork are cooked in a special perforated pan over coals.

"The seasoning is an all-important characteristic of Bul-Kogi." Each meat is seasoned individually. Pork, for example, "is coated with a red pepper paste, called kochujan,

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available in Oriental food stores but red pepper may be used instead."

Note: The article also mentions soy sauce and [soy] bean sprouts. Address: Times staff writer.

688. Crane, Paul S.; Rhee, S.U.; Seel, D.J. 1970. Experience with 1,079 cases of cancer of the stomach seen in Korea from 1962 to 1968. *American J. of Surgery* 120(6):747-51. Dec. [14 ref]

• ***Summary:*** This case-control study shows a very high incidence of stomach cancer when compared with other forms of cancer seen in a rural Korean mission hospital. Consumption of miso soup or miso ("soya paste" [doenjang]) was associated with increased risk of stomach cancer. "The fact that *Aspergillus flavus* is found in soya bean cakes [*meju*] raises the possibility that aflatoxins produced by this mold which grows on the soya cakes (from which soya bean paste is made) may be a possible etiologic factor in the high incidence of stomach cancer seen in 1,079 patients with stomach cancer in a 130 bed hospital in the seven year period from 1962 through 1968 in Southwest Korea."

66.5% or 717 of the patients with stomach cancer were farmers. "Koreans with stomach cancer seem to ingest significantly larger amounts of soya bean paste than persons of the same age and sex without stomach cancer." Soya sauce intake was also studied.

Note 1. Dr. Clifford W. Hesseltine, a world-famous mycologist at the Northern Regional Research Laboratory (Peoria, Illinois) published his first study on aflatoxins in 1966. In 1984 he published the definitive paper on the subject, in both English and Japanese *Nihon Shoyu Kenkyujo Zasshi* (J. of Japan Soy Sauce Research Inst.) 10(3):69-92. He showed that aflatoxins are not produced during the process of making soy sauce or miso in Japan.

Note 2. On 25 Nov. 1983 Dr. Clifford W. Hesseltine of the USDA's Northern Regional Research Center (NRRC, Peoria, Illinois) received the award of the Third Class of the Order of the Rising Sun from the Emperor of Japan in recognition of the meritorious services he has rendered: proving the safety of Japan's traditional fermented foods, etc.

Note 3. This is the earliest soy-related document seen that mentions a "case-control study." "A case-control study is a type of observational study in which two existing groups differing in outcome are identified and compared on the basis of some supposed causal attribute. Case-control studies are often used to identify factors that may contribute to a medical condition by comparing subjects who have that condition/disease (the "cases") with patients who do not have the condition/disease but are otherwise similar (the "controls"). They require fewer resources but provide less evidence for causal inference than a randomized controlled trial" (Source: Wikipedia, May 2017).

Concerning observational study designs, see also: Case control vs. cohort; prospective cohort; retrospective cohort.

"OR" stands for "odds ratio" which is a measure of association between an exposure and an outcome. The OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure.

"RR" stands for relative risk. In statistics and epidemiology, relative risk or risk ratio (RR) is the ratio of the probability of an event occurring (for example, developing a disease, being injured) in an exposed group to the probability of the event occurring in a comparison, non-exposed group. Address: 1. M.D., Nashville, Tennessee; 2-3. M.D., Chonju, Korea.

689. Cho, C.H.; Lee, W.J. 1970. Microbiological studies of Korean native soy sauce fermentation: A study of the microflora of fermented Korean meju loaves. *Applied Biological Chemistry* 13:35-42. [Eng; Kor]*

• ***Summary:*** "Five samples of Korean native Maeju (fermented soy-bean mash) loaves which were collected each from Kyunggi, Chungchung, Kangwon, Cholla and Kyungsang-Do were examined for their fermenting microorganisms. The results of taxonomic and ecological studies of fermentation microorganisms in these Maeju loaves were as the fellows. (1) The fungus flora grew only is the outer layer of Maeju loaves. Miscellaneous molds, 3 species of Mucor, 2 species of Pericallium., one species each of Scopulariopsis and Aspergillus, were isolated..."

690. Kim, Z.U.; Cho, M.J. 1970. [Studies on the preparation of a weanling food from soybean. I. Conditions for the digestion of soybean protein by enzymes from *Aspergillus*]. *J. of the Korean Agricultural Chemical Society* 13(1):29-34. [Kor; eng]*

Address: College of Agriculture, Seoul National Univ., Suwon, South Korea.

691. Lee, T.S.; Lee, S.K.; Shin, B.K. 1970. [Studies on the yeasts for the brewing of soy sauce. I. Isolation, identification and classification of the yeasts in soy sauce koji]. *J. of the Korean Agricultural Chemical Society* 13:97-103. [Kor]*

Address: 2. Sampayo Soy Sauce Brewery, College of Agriculture, Chung Nam [Chungnam] Univ., Daejeon, Korea.

692. Li, T. 1970. [The present condition and prospects for the future of the shoyu industry in Korea]. *Nippon Jozo Kyokai Zasshi* (*J. of the Brewing Society of Japan*) 67:106-08. [Jap]*

• ***Summary:*** The fermented soy sauce industrially produced in Korea is of the Japanese koikuchi type, and in 1970 the annual industrial production was estimated to be about 220,000 kl. Assuming that the daily per capita consumption is about 20 ml, the amount cited above in equivalent to one-half the demand for soy sauce in Korea, and it is estimated

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the same amount is produced at home.

693. Park, K.I.; Kim, K.J. 1970. [Studies on the manufacture of Korean soy sauce]. *Research Report, Central Industrial Research Institute* 20:89-98. [10 ref. Kor; eng]*
Address: National Industrial Research Inst., Food Indust. Section, Tong Soong-dong, Chongro-ku, Seoul, South Korea.

694. Park, K.I.; Kim, K.J. 1970. [Studies on the manufacture of Korean soy sauce (part I)]. *Research Report, Central Industrial Research Institute* 20:56-62. *
Address: National Industrial Research Inst., Food Indust. Section, Tong Soong-dong, Chongro-ku, Seoul, South Korea.

695. Shim, M.J. 1970. [Analysis of aflatoxins in Korean fermented foods]. *Journal of the College of Home Economics, Yonsei University* 3:32. [Kor]*

696. Binding, George Joseph. 1970. About soya beans: Wonder source of protein and energy. London: Thorsons Publishers Ltd. 64 p. No index. 18 cm. About series, no. 35.
• ***Summary:*** A superficial introduction containing many errors. Contents: 1. Beans in general. 2. History of the soya bean. 3. Content of soya beans. 4. About lecithin–vital for retaining youth. 5. The soya bean in the Far East: Cooking in China, soya sauce, bean curd or tufu [sic, tofu], bean sprouts, soya bean milk, candied beans, Japan, natto, miso, Japanese soya sauce. 6. American influence on the soya bean. 7. Industrial uses in America. 8. The soya bean and world food shortage. 9. Soya bean recipes.

On page 10 we read: "For over 5,000 years this tiny seed has been the staple food of certain parts of the East, including North China, Japan, Korea, and some areas of India. The ancient Yogis, who were among the world's first vegetarians, placed great faith in the soya bean as a supplement to their meatless diet."

Note: Soyfoods Center has been unable (Aug. 2004) to find any documentation for the statement that the ancient yogis consumed soya beans. The earliest date we have seen (Aug. 2004) for the soybean growing in India is 1798 (Roxburgh 1832). The earliest document we have seen concerning the soybean in India is by Beckmann (1798). The earliest document seen (Aug. 2004) for soy products in India (soy sauce) is by Locke (1679). Address: England.

697. Haw, Kum; Yu, Jong Yull; Lee, K.Y.; Sung, N.E.; Tchai, B.S.; Cha, C.H. 1970. A report of nutrition survey (1969). *Korean J. of Nutrition* (*Hanguk Yongyang Hakhoe Chi*) 3:1-43. [16 ref]
• ***Summary:*** The last nation-wide nutrition survey in Korea was conducted in 1947. The authors of the present survey, with financial support from the Ministry of Health and Social Affairs, conducted this nation-wide survey (incl. dietary, clinical, and socio-economic aspects) from 29 July to Aug. 15, 1969.

Table II-6 (p. 7), titled "Average food intake per person per day (gm)" shows various categories of food in five different areas or occupations, plus the average. Soyfoods are listed under "A. Vegetable foods–2. Pulses and their products" as follows: Soybean–City 2.6, agriculture 3.6, fishery 3.7, mountainous -, mining -, average 2.4 gm/day. Soybean paste [jang]–City 7.5, agriculture 12.4, fishery 5.8, mountainous 11.2, mining 8.1, average 10.4 gm/day. In this category, figures for "Small red bean" [azuki] are also given, with an average of 1.7 gm/day.

Other tables show (with the 1st 3 columns above): II-7. Average nutrient intake per person per day. II-8. Average nutrient intake per adult per day. II-9. Average food and nutrient intake per person per day and % distribution (protein, fat, carbohydrate, energy).

IV-8. Education. IV-9. Roof materials on house. IV-10. Number of rooms in house. IV-11. Wall materials on house. IV-12. Lighting in house. IV-13. Water supply in house. IV-14. Latrine. IV-15. Bath (private, public, well, stream or spring). IV-16. Kitchen (in the house, out, public). IV-17. Fire place (number in house). IV-18. Fuels IV-19. Kitchen equipment (no. of iron pots, bowls, small bowl, spoons or chopsticks). IV-20. Bed clothes (no. of quilts, of mattresses). IV-21. Occupation (90.6% in agriculture). IV-22. Ownership of house IV-23. Monthly income. IV-24. Land. IV-25. Domestic animals (chicken is by far the most popular).
Address: 1. College of Pharmacy, Kyung Hee Univ., Seoul, Korea.

698. Korean Institute of Science and Technology (KIST). 1970. Comprehensive of the literature on Korean foods. Seoul, Korea: Korean Society of Food Science and Technology. *
Address: Seoul, Korea.

699. Spilsbury, Calvin C. 1971. Markets for U.S. soybeans and soybean products in Asia and Oceania. *USDA Foreign Agricultural Service.* FAS-M 227. 27 p. Feb.
• ***Summary:*** Contents: Introduction. Hong Kong: The market for soybeans and soybean products, marketing problems. Indonesia: Production of oil-bearing materials, prospects. Korea (South): Domestic oilseed production, the oilseed crushing industry, use of soybeans for food, use of soybeans for feed. The Philippines: Domestic soybean production, the crushing industry, poultry and mixed feed industries. Singapore and Malaysia: Soybean crushing, shipping, feed production and use. Australia: Domestic soybean production, production of other oilseeds, oilseed crushing industry, mixed feed and poultry industries, margarine. New Zealand: Domestic oilseed production, feed situation and imports.

Contains many photos–some showing soybeans.
Address: Fats and Oils Div.

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700. Kim, Sang Jae. 1971. [Taxonomical studies of Korean *Aspergilli*]. *Misaengmul Hakhoe Chi* (*Korean J. of Microbiology*) 9(1):1-26. March. [39 ref. Kor; eng] Address: Dep. of Biology, Graduate School, Kon Kuk Univ., South Korea.

701. Meals for Millions Foundation. 1971. Annual report 1970. Santa Monica, California: MFM Foundation. 15 p. 25 x 19 cm.
• ***Summary:*** Submitted by I.F. Saunders, Executive Director. The report is printed with dark brown ink on beige paper. Contents: Introduction. Board of Directors and committees (Chairman is Morris Asimow, PhD, Prof. of Engineering, UCLA; President is Russell Z. Eller). Club activities, by Mrs. Mary Flint–Director (Successful involvement with Walks for Development). Program report, by Donald Ebright, PhD, program director: 1. Programs with production facilities (Korea High Protein Food, Inc. at Chunchon [Chun Chon]) began making protein-rich MPF in June, 1970. Director is Yong Soo Pyun, "ably assisted by Mark Sterner, former production chief for Meals for Millions in Santa Monica, California." The plant has a capacity of making 40 tons per day of MPF. Ecuador will start producing MPF in 1971. 2. Independent production facilities, making MPF in India, Mexico, and Japan. Plans in South Vietnam and Pakistan. 3. Domestic feeding programs with MPF enriching and packaging. 4. Feeding programs with nutritional education (Brazil, Mexico). 5. Disasters aided in 1970 with relief shipments (Biafra / Nigeria, The Congo, Peru). U.S. programs, by Helene Carey, director. Regional headquarters (western region, mid-west area, south-west area). Research and development, by Lawrence Lipman, director. Training school, by Eva-Maria Kadiev. Public relations, by Adine Lough, Director.

MFM's logo shows two hands gripping the handle of a horizontal spoon, with its mouth to the right facing upward–in white on a dark background.

Photos show: (1) Aerial view of the large, impressive plant in Chunchon, Korea. (2) The R&D team.

Note: No financial information is given, nor information on shipments of MPF for the year. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California 90406. Phone: 870-0451.

702. Joo, Hyune Kyu. 1971. [Studies on the manufacturing of chungkukjang]. *Korean J. of Food Science and Technology* 3(1):64-67. May. [19 ref. Kor; eng]
• ***Summary:*** Discusses the manufacture of Chungkukjang, which is made of soy beans, salt (NaCl) and *Bacillus subtilis* S.P. "The appropriate content of moisture was 55% in the manufacturing of Chungkukjang." Address: Dep. of Agricultural Chemistry, Agricultural College, Kon Kuk Univ.

703. Kim, Chang Sik; Shin, H.S. 1971. [Studies on preparation of cheese-like product from soybean milk]. *Korean J. of Food Science and Technology* (*Hanguk Sikpum Kwahakhoe Chi*) 3(1):57-63. May. See also Dairy Science Abstracts 33:822. [17 ref. Kor; eng]
• ***Summary:*** Coagulation of soymilk is brought about solely through acid development by lactic cultures. Address: Dep. of Food Technology, College of Engineering, Dong Kuk Univ., Seoul.

704. Meals for Millions Foundation. 1971. Two ways to starve (Leaflet). Santa Monica, California. 4 panels each side. Each panel: 22 x 9 cm. Undated.
• ***Summary:*** On the cover, printed black on light blue, is an empty bowl above a full bowl. Contents: The empty bowl stands for no food. The full bowl stands for the wrong kind of food. The way to conquer starvation (MFM is made from soybeans). The Meals for Millions one-two punch (Americans helping other nations to help themselves. "Since its inception in 1946, the foundation has shipped 15 million pounds of high-protein foodstuffs to 129 countries and territories"). And where it strikes at hunger (The Foundation has helped the farmers of Duale, Ecuador, set up cooperatives to grow rice and soybeans). Meals for Millions operates at home and abroad ("Korea: In 1969 a new Multi-Purpose Food plant was opened in Chun Chon under the management of Yong Soo Pyun, a former student of the Meals for Millions Training Program. The plant is capable of producing tons of protein-rich MPF a day and is operated by the people of the province." A photo shows the outside of the plant). The far-reaching effects of self-help ("Self-help programs are the only permanent solutions to the world's critical hunger problem").

At the top of the rear panel is MFM's logo showing two hands gripping the handle of a horizontal spoon, with its mouth to the right facing upward–in white on a black background. Below that: Chairman: Dr. Reginald H. Helfferich, D.D., Vice-President, Church World Service. President: Charles E. Sweeney.

Board of Directors (starts with): Morris Asimow, Ph.D. Executive director: Neil J. O'Donnell. Contains 6 photos. Address: 1800 Olympic Boulevard, P.O. Box 1666, Santa Monica, California 90406. Phone: (213) 829-5337. Cable address: mealfomil.

705. Kwon, Shin Han. 1971. Origin and cultivation of soybean in Korea. In: Proceedings of 12th Pacific Science Congress, Canberra, Australia. 24 p. See p. 132-33. Held 18 Aug. to 3 Sept. 1971. [38 ref. Eng]
• ***Summary:*** Note: This is an important early paper contending that soybeans were domesticated in Korea, rather than in China or Manchuria. A similar but less detailed article titled "History of the land races of Korean Soybean" was published by S.H. Kwon in *Sabrao Newsletter* 4(2):107-111. (172).

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"2. History of soybean culture in Korea: The exact history of soybean culture in Korea is not known, but it is clear that the soybean has played an important role in diversification of agriculture and in providing precious nutrients for the people of Korea for many centuries. Hymowitz (8) stated that the soybean first emerged as a domesticated crop around the 11th century B.C. during the 'Chou Dynasty' which had covered the eastern half of the North China. He based his conclusion on (a) the date recorded in Chinese is reliable after 841 B.C. (1, 32), (b) the term of soybean in Chinese character 'Shu' appears in 'the Book of Odes' during the period from the 11th century to 7th century B.C. The year estimated by Kitamura (11, 12) agreed with the Hymowitz's estimation but he assumed that the soybean in China has probably been grown since 20th century B.C. He mentioned that the soybean was presumably one of the oldest crops next to rice and millet in China.

"The earliest mention of soybean in Korea, is found in a Chinese literature 'Wei-Zu' written in 551 A.D. (C.Y. Lee 1964). According to the writings of 'Wei-Zu', 551 A.D., 'Oh-Kok' which literally means five sacred grains (rice, soybean, wheat, barley, and millet) were grown in 'Ok-Jo' (30 A.D.), an ancient tribal nation covering eastern Manchuria and north eastern part of the Korean peninsula. The Neolithic era of Korea was centered about northern most area of the Peninsula in 3000 years B.C. and it was characterized by the appearance of sickle blades, hoes, mortars and pestles made of stone (C.Y. Lee 1964). According to the Korean history books the agriculture was begun in 6-7 century B.C. Lee (1971) reported that the millet was the oldest crop ever cultivated by ancient Koreans and rice was considered to have been introduced in 200 B.C. via China and spread over entire Korean peninsula. The metal culture was already penetrated into Korea around 600-500 B.C. from China. During the War Era [Warring States period] of China (403-221 B.C.), the migration of northern Chinese to north west of Korea Peninsula via 'Ryontong' was accelerated and they brought the Chinese culture and the seeds of various crops were introduced into Korea. Such event resulted in the agricultural revolution in China. Hymowitz (1970) described that the soybean introduced into Korea during the expansion of the 'Chou Dynasty' (1112-771 B.C.) from China. Nagata (1960a) postulated that the soybean was introduced into Korea directly from North China around 200 B.C. and suggested that the cultivated into Japan via Korean Peninsula. Kitamura (1962) also reported that the cultivated type of soybean was introduced into Japan via Korea sometime between 30 B.C.-70 A.D. According to recent archaeological findings, roasted soybeans have been found in 'Buyo' the capital of 'Paik-Je' Dynasty (15 B.C.-676 A.D.), located in the middle west part of the Korean Peninsula (Sadaoka 1936). These historical facts and the reports indicate that the soybean culture in Korea might have started from 5-4 centuries B.C. as suggested by Hymowitz (1970) on the assumption that soybean was brought in from the North Eastern China to Korea."

Page 13: "The seed weight of the collected land races ranged between 44 grams per 100 seeds and 6.7 grams per 100 seeds. The largest seed collected in Korea (44 gr/100 seeds) is larger than the largest seeds (40 gr/100 seeds) of the USDA collections which was reported by Morse and Carter (18) earlier. The smallest seed size found in the collected lend races was 6.7 grams per 100 seeds, and the, variation for the seed size, however, was large, and especially it was the case with soybeans grown in southern area of the peninsula.

"The seed size of wild soybean was extremely small weighing only 2.1 grams per 100 seeds or less. The seed weight of the intermediate type collected from middle part of the Korean Peninsula ranged between 7.6 and 8.2 grams per 100 seeds. The seeds were greenish in color."

Page 17: "*Glycine gracilis* in *Glycine max.*

"Following the historical review made by Hymowitz (1970; #8), it is likely that the first domestication of soybean took place in the eastern half of North China around the 11th century B.C. But it is quite evident that the large area covering the North China and the northern part of the Korean Peninsula is the original gene center of the soybean for the following reasons:

"(i) Regarding the geological and Climatical circumstances, the Korean Peninsula is similar to the North China where many believe the soybean has originated.

"(ii) Numerous soybean land races ere still grown by Korean farmers.

"(iii) Great diversity exists in the Korean land races.

"(iv) Both wild and intermediate types, *Glycine ussuriensis* and *Glycine gracilis,* are found widely in Korea.

"(v) Some varieties grown in Korea possess primitive nature in seed size."

Tables: (1) "Soybean production in Korea." Production increased from 152 million kg in 1955-64 to 229 million kg in 1969.

Area increased from 277,000 ha in 1955-64 to 305,000 ha in 1969.

Yield increased from 548 kg/ha in 1955-64 to 751 kg/ha in 1969.

(2) "Maximum, minimum, average and standard deviations for flowering, number of days from seeding to maturity, plant height, seed size and protein content of named varieties originated in Korea."

(3) "Protein content of soybean land race seeds collected from Korean peninsula." The 8 variety names appear to be the same as the place collected, e.g. Kyunggi-Do, Kangwon-Do, Chungchung Buk-Do, etc. For each variety is given the maximum, minimum, average, and standard deviation.

(4) "Seed size of collected soybean land races in Korea." The 8 variety names appear to be the same as the place collected, e.g. Kyunggi-Do, Kangwon-Do, Chungchung Buk-Do, etc. For each variety is given the maximum,

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minimum, average, and standard deviation.

(5) "Seed size and protein content of wild and intermediate type of soybean." Wild soybean is *Glycine max.* Intermediate type is *Glycine gracilis.* A 3rd type is "Jeaju-Do (Local variety)." Address: Radiation Research Inst. in Agriculture, Office of Atomic Energy, Seoul, South Korea.

706. Chun, Sea Yull. 1971. [Determination by neutron analysis of mercury residues in foodstuffs]. *Korean J. of Food Science and Technology* 3(3):135-43. Oct. [47 ref. Eng; kor]

• ***Summary:*** The mercury content of Korean soybeans was 0.0141 mcg/gm, and of soybean sprouts 0.123 mcg/gm. The soy sprouts contained an unexpectedly large amount of mercury. Address: Biology Div., Atomic Energy Research Inst., Seoul, South Korea.

707. Fischer, R.W. 1971. Plans for developing world markets for U.S. soybeans and soybean products. Cedar Falls, Iowa. 322 p. Nov. Prepared for the American Soybean Association, Hudson, Iowa.

• ***Summary:*** Contents: Summary: World Market Development Plan for Soybeans and Soybean Products. 1. The World Situation for Marketing Soybean Products 2. Objectives of the Long Range Market Development Program 3. Outline of Market Development Activities and Methods 4. Requirements for the Market Development Program

5. Market Development Plans by Area and by Country.

West Europe: Austria, Belgium / Luxemburg, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

East Europe: Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, Yugoslavia.

Far East: Australia, Hong Kong / Singapore, Japan, Korea, Philippines, Taiwan, Thailand.

Others: Iran, Israel, Mexico, North Africa, Southeast Asia.

6. Details of Certain Key Marketing Programs, Operations and Methods. 7. The Market Development Staff: Responsibilities and Qualifications. 8. Market Development Program Budgets. 9. Appendices.

Note: This table of contents was accompanied by a letter on Soypro International, Inc. letterhead signed by Linda Schipper, Secretary to R.W. Fischer. Address: President, Soypro International Inc., 314 Main St., Cedar Falls, Iowa 50613.

708. Hwang, In-mok. 1971. Kasik i taedu kyorhyop e michinun yonghyang [Transplanting soybeans?]. South Korea. 13 p. Dec. [17 ref. Kor; eng]
Address: South Korea.

709. Spiral Foods Inc. 1971. Price list of macrobiotic foods. Chico, California. 2 p. Undated. 35 x 25 cm.

• ***Summary:*** This single-sheet catalog and price list, printed front and back with reddish-orange ink on green paper, contains 8 panels and is undated. Yet it was sent by Chico-San in a portfolio of sell sheets with a cover letter dated 8 Dec. 1971–from which we can estimate the date. It is also with larger Spiral Foods catalogs issued after the disastrous 1972 fire that destroyed the company's plant. Under the name of each food is given a brief description. It includes the following foods:

Condiments: Tekka ("A traditional flavoring prepared from carrot, burdock, ginger, lotus root, Soybean Puree {Miso}, and sesame oil"), seitan ("A meat substitute made from vegetable protein of wheat gluten and tamari soy sauce"), salt plums, kuzu arrowroot, sesame salt, sesame butter, sesame oil (from organically grown seeds), Lima sesame oil (imported), crude sea salt ("Unrefined, unprocessed, trace sea minerals retained"), white unrefined sea salt, Mishio (Lima, with kombu), moromi ("Mash of soy sauce before pressing. A pungent flavor"), furikake ("A seasoning made from Miso, sesame seed, nori, bonita [sic, bonito] powder, whole brown rice and kombu" {kelp}), Goma Muso ("A seasoning prepared from traditional Miso and whole sesame seeds"), bainiku ekisu (concentrate of green [ume] plums), sesame seeds. Dried fish. Cosmetics. Beverages: Yano (grain beverage), Whole grain cereals. Whole grain noodles. Beans: Azuki red (Dainagon, or Korean), black [soy] beans. Sea vegetables. 100% whole grain brown rice. Sweet rice–mochi gome. Rice cakes. Lima soy sauce ("A traditional soy sauce of exceptional quality"), tamari ("The traditional soysauce, fermented naturally and aged 18 months. Prepared from soybean, wheat, salt and water"). Soybean puree (Miso) ("Made from the cultivation of a special enzyme and aged 18 months. The soybean puree is ideal mixed with sesame butter and used as a spread or can be added to soups and sauces"). Utensils.

Note 1. This is the earliest document seen (April 2011) concerning Spiral Foods, a company organized in 1970 by Bob Kennedy of Chico-San and Peter Milbury to distribute Chico-San products directly to retail stores in the greater San Francisco Bay Area. When Chico-San was established in 1962 there were no natural foods stores in the Bay Area (or in the USA). However by 1970 there were many. They were not being well served by the old-line health food distributors such as K&L and Landstrom which distributed Chico-San's products, yet they wanted to buy Chico-San's products.

Note 2. This is the earliest English-language document seen (Dec. 2006) that uses the Japanese-language term "bainiku ekisu" (literally "plum flesh extract") to refer to a commercial extract of ume plums. Address: 1017 Willow Street, Chico, California 95926.

710. Cho, M.J.; Kim, Z.U. 1971. [Studies on a quick ripening process for soy sauce]. *J. of the Korean Agricultural*

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*Chemical Society* 14(1):19-27. [Kor]*

711. Lee, W.J.; Cho, D.H. 1971. [Microbiological studies of Korean native soy sauce fermentation]. *J. of the Korean Agricultural Chemical Society* 14:137-48. [Kor]*

712. Park, K.I.; Sung, H.S. 1971. [Studies on the chung-kook-jang fermentation. I. Isolation and identification of the bacteria and selection of the best strains for chung-kook-jang]. *Korean J. of Microbiology* (*Misaengmul Hakhoe Chi*) 9:74-85. [Kor; eng]*
• ***Summary:*** A total of 65 strains of bacteria were isolated from natural *chung-kook-jang*, Korean-style natto, in an incubator at 37ºC; 37 strains were from sample K incubated enclosed in rice straw and 28 strains were from sample S from steamed soy beans only. In the first screening, 15 strains were selected for their superior protease activities; 8 strains from K and 7 strains from S. In the 2nd screening, conducted by taste panel tests from the first screening, No. K-27 and S-16 were selected as the best for chung kook jang. These two strains were classified and identified as a variation of *Bacillus subtilis* by Bergey's manual.

Note: This is the earliest document seen (May 2021) that mentions Korean-style natto, which it calls "chung-kook-jang" (in the English abstract). Address: National Industrial Research Institute, Korea.

713. Brandt, Vincent S.R. 1971. A Korean village between farm and sea. Cambridge, Massachusetts: Harvard Univ. Press. [ix] + 252 p. Illust. Index. 22 cm. [51 ref]
• ***Summary:*** Concerning farm crops (p. 50): In approximate order of importance these are: Chinese cabbage, sweet potatoes, beans, peanuts, wheat, garlic, red pepper, turnip, cucumbers, sesame, flax, corn, kaoliang, various spinach-like greens, eggplant, and squash.

This book was originally written as a PhD thesis at Harvard University.

714. Hwang, Ki-hyon. 1971. Changnyu mit kimch'i yut'ong e kwanhan yon'gu [The soy sauce and kimchi industries in Korea]. South Korea. 74 p. Series: Nongop Kyongje Yon'gu Pogo, No. 34. [9 soy ref. Kor]
Address: South Korea.

715. Korean Society of Food Science and Technology. 1971. Comprehensive review of the literature on Korean foods (1917-1968). Seoul, South Korea: 71 p. *
Address: Korea.

716. Lee, C.Y. 1971. History of Korean agricultural technique. In: Korean Cultural History, Series No. 3. Seoul, Korea: Korea Univ. Press. See p. 17-66. *
Address: Seoul, South Korea.

717. Pak, Ki-Hyuk; Gamble, Sidney D. 1971. The changing Korean village. Seoul, Korea. 222 p. *

718. U.S. Department of Agriculture. 1971. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1970. Washington, DC: U.S. Government Printing Office. 132 p. See p. 113-20. Cover reads: Food for Peace: 1970 Annual Report on Public Law 480.
• ***Summary:*** Table 19 is titled "Title II, Public Law 480–Total commodities by program sponsor, fiscal year 1970." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), WFP (World Food Program). Each of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. Only two foods containing soy protein were distributed: CSM (Corn soya mix) and WSB (wheat soya blend). They were sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa (50,362 CSM and 6,087 WSB): Cameroon (82 CSM), Ghana (1,104 CSM and 201 WSB), Malagasy [Madagascar] (425 CSM), Malawi (61 CSM), Nigeria (41,343 CSM and 5,886 WSB), Rwanda (200 CSM), Senegal (5,301 CSM), Sierra Leone (699 CSM), Tanzania (887 CSM), Togo (260 CSM).

Near East-South Asia (192,116 CSM and 2,504 WSB): Ceylon (50 WSB), Gaza [occupied by Israel since 1967] (814 CSM and 1,892 WSB), India (189,044 CSM and 105 WSB), Jordan (680 CSM), Jordan-West Bank [occupied by Israel since 1967] (1,110 CSM), Lebanon (160 CSM), Pakistan (457 WSB), Syria (308 CSM).

East Asia (21,530 CSM and 451 WSB): Hong Kong (384 CSM and 100 WSB), Indonesia (9,245 CSM and 150 WSB), Korea (4,586 CSM), Laos (275 CSM), Malaysia (220 CSM), Philippines (1,545 CSM and 201 WSB), Ryukyu Islands [located south of Japan, incl. Okinawa, Sakishima, and Amami island groups. Self governing from 1966. Returned to Japan in 1972] (50 CSM), Vietnam (5,225 CSM).

Latin America (53,761 CSM and 2,305 WSB): Antigua (37 CSM), Bolivia (555 CSM and 173 WSB), Brazil (29,919 CSM and 506 WSB), British Honduras [Belize] (225 CSM and 20 WSB), Chile (1,726 CSM and 151 WSB), Costa Rica (679 CSM and 100 WSB), Dominica (23 CSM), Dominican Republic (7,429 CSM and 105 WSB), Ecuador (1,295 CSM), El Salvador (836 CSM and 200 WSB), Grenada (114 CSM), Guatemala (1,944 CSM), Guyana (72 CSM), Haiti (1,010 CSM), Honduras (674 CSM), Jamaica (208 CSM and 100 WSB), Montserrat (18 CSM), Panama (765 CSM and 450 WSB), Paraguay (491 CSM and 400 WSB), Peru (5,842

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CSM and 100 WSB), St. Kitts (59 CSM), St. Lucia (69 CSM), St. Vincent (30 CSM), Uruguay (81 CSM).

Grand total by commodity: 317,769,000 lb of CSM and 11,347,000 lb of WSB. Agencies distributing the most CSM and WSB (in million lb): CARE 180, CRS 68, UNICEF 42.

Countries receiving more than 1 million lb of CSM and WSB combined (in millions of pounds): India 189.1, Brazil 30.4, Indonesia 9.3, Dominican Republic 7.5, Peru 5.6, Vietnam 5.2, Korea 4.6, Guatemala 1.9, Chile 1.8, Philippines 1.7, Ecuador 1.3, Jordan-West Bank 1.1, Haiti 1.0.

Concerning "veg oil" (soybean oil) shipped under P.L. 480 Title II in fiscal year 1970: India received 54.227 million lb [24,597 metric tons] (p. 116). Address: Washington, DC. Phone: 703-875-4901 (1991).

719. Kwon, Shin Han. 1972. [Origin and importance of protein and oil of Korean soybean]. *Korean J. of Food Science and Technology* 4(2):158-61. Feb. [21 ref. Kor]
• ***Summary:*** No English abstract is given. Address: Seoul, South Korea.

720. Kwon, S.H.; Im, K.H.; Kim, J.R.; Song, H.S. 1972. [Variances for several agronomic traits and interrelationships among several characters of Korean soybean land races (Glycine max (L.) Merrill)]. *Korean J. of Breeding* 4(2):109-12. Feb. [12 ref. Kor; eng]
• ***Summary:*** "Summary: The soybeans, currently grown by Korean farmers, have been grown for many centuries without artificial improvement and it may result an accumulation in abundance of variances. In order to collect the gene sources and to select superior lines from the land races, a continuous collection was made in all parts of the country and planted on line bases to study the character and interrelationships among the characters.

"The average flowering dates were 67 days in the collected population which is earlier than the one studied in the named local varieties. High correlation coefficient was observed between flowering and maturity. Negative correlations between seed yield and maturity or flowering were found, which is contradictory to other reports. The maturity of this population ranged from 106 days to 151 days and highly correlated with plant height, number of nodes per plant and seed weight. Average plant height in the collected population was small as compared to the average height of named local varieties. Variance for lodging and disease were relatively large. Consequently, there are some possibilities to obtain useful gene sources for resistant to lodging and diseases.

"Protein content showed negative correlations with oil content, seed yield, flowering and seed weight, whereas positive correlations with plant height and maturity were observed. Since the small plot size for yield estimate the result was not fully reliable, but the relative seed yield among the collected lines ranged from 60 to 3,484 kg/ha and it is meaningful in breeding for high yielding varieties." Address: Radiation Research Inst. in Agriculture, Office of Atomic Energy, Seoul, South Korea.

721. Meals for Millions Foundation. 1972. Annual report 1971. 25th anniversary year. Santa Monica, California: MFM Foundation. 16 p. 25 x 19 cm.
• ***Summary:*** Submitted by Neil J. O'Donnell, the new Executive Director. On the cover, printed in dark blue ink on light blue, is a stylized globe with equator and the two tropics on a dark blue square. The pages are unnumbered.

Contents: Introduction ("The year of 1971 was a year of shifting gears for Meals for Millions, a time of self evaluation and progress. It was the year in which the Board of Directors re-assessed the goals of the Foundation and made important changes"). History. Program, by director Donald Ebright, PhD (India, Mexico, Ecuador, Korea. In late 1971 the MPF plant in Korea suspended operations "in order to reorganize under new management"). 1971 Multi-Purpose Food distribution report: 201,304 lb were sent to 15 countries overseas and 47,424 lb were sent to locations in the USA for a grand total of 248,720 (as of 18 Jan. 1972). U.S. programs. Training school ("The sixth session of the Meals for Millions Training School began on January 18, 1971." It was demanding: 13 weeks, 7 hours a day, 5 days a week). Research and development. The new executive director.

Photos (in blue) show: (1) Mr. and Mrs. Clinton seated side by side. (2) Trainees seated at a table in the MFM classroom. (3) Lawrence Lipman, Director of Research and Development, and Ea-Maria Kadiev, Administrator of the School, examine a Wenger extruder with a group of students. (4) Neil J. O'Donnell seated at his desk smiling, with his signature below. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California 90406. Phone: 870-0451.

722. Sawyers, Scott. 1972. Korea–A growing market for U.S. soybeans. *Soybean Digest.* May. p. 26-29.
• ***Summary:*** "Some real changes are occurring today in Korean food habits. Five years ago most people thought of soybeans mainly for use in the form of bean sprouts, bean curd, paste [*jang*], soy sauce [*kanjang / ganjang*], and boiled or fermented soybeans for soups and side dishes.

"Recently, where quantities of soy oil are available, new foods such as soy salad oil, cooking oil, margarine, shortening-mayonnaise and other uses of soy grits and soy flour are becoming a reality. Also, the greater abundance of meat, milk, and eggs made possible through livestock-poultry enterprises is making possible better foods and levels of nutrition. U.S. feed grains and soybean meal are playing a significant role in providing formula feeds to support the modernization and growth of poultry, swine, and cattle production.

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"Economic situation improves: Per capita income is on the rise among the 32 million people of Korea. Five years ago, yearly per capita income was $150 to $170. Today it is $250. This opens up opportunities for new kinds of foods. Protein foods and fats and oils are now considered essential daily food items rather than the luxury foodstuffs of a few years ago.

"Economic growth has been 9% to 10% per year. This is expected to continue through 1972. This rate of growth is most important for a developing country with limited resources and difficulty in obtaining the necessary foreign exchange.

"The volume of imported food and feed grains jumped 30% between 1970 and 1971. This resulted in a record outlay of $282 million for imported raw materials and some semiprocessed foodstuffs.

"The Korean government has implemented a program to bolster exports in all possible sectors. Plans to increase export earnings from agricultural items some 20% per year include forestry, fish, and livestock products.

"Also, through land reclamation and higher announced support prices for several crops, the government expects to increase the land area used for crop production. Korean agriculture

"The cattle population is down. Swine at 1.5 million head are up 25%. Likewise, poultry numbers have risen 26% over 1970 to an estimated 29.7 million. An increased amount of soybean meal is required as a protein supplement for these expanded numbers of poultry and swine. Also, the government plans to encourage the raising of 30,000 additional cattle.

"Goals for domestic crop production in 1972 include a new total of 287,000 m/t [metric tons = tonnes] of soybeans which would be an ambitious increase of 29% from 1971.

"To close the gap between domestic supplies and total commodity needs, the government has recognized that imports for feed-food grains will need to be at least 3.09 million m/t during 1972.

"Actual demand for food and feed grains and protein meal including imports in all probability will far exceed these government projections. Critical limitations on foreign exchange and long-term credit may prevent any adequate satisfaction of existing demand.

"Domestic prices are also a problem, particularly when they far exceed the CIF cost of imports. Korean soybeans, if available, are at least twice the price of imported soybeans.

"It is evident that as late as 1968 only a small portion of soybeans was crushed as a source of oil, and that rapeseed oil, rice bran oil, and sesame oil were the main supply.

"Until a new processing plant began operation in February 1971, most oil processing had been a family or small press-shop enterprise (see photo). Miscellaneous oilseeds were mechanically pressed in small lots, crudely filtered, then sold from the same shops in a raw-unrefined state. Most sales were measured out into buyers' containers or marketed in used bottles ranging from 100 grams to 1,200 grams in size.

"This year, with soy oil available in larger quantities, bulk sales from 55-gallon barrels are being made by the press-shops, along with limited use of packaged goods. Some small supermarkets now have two or three brands of packaged items on the shelves.

"Quality, refined, packaged vegetable oils, especially soy oil, are a new item for Korean homemakers. It takes time and educational exposure to new items before new purchasing habits can become established.

"Domestic and import pattern: Domestic soybean production and planted area have held even or decreased over several years due to low yields and competition from other cash crops. Total production averaged 150,000 to 160,000 m/t from 1960 through 1967. The 1971 production is estimated at 222,000 m/t.

"Government expectations are that the 1972 soybean crop can be built up to 287,000 m/t. Few industry members feel the government target is attainable and, if so, the cost is prohibitive compared to imported soybeans.

The imports of soybeans to Korea have been as shown below (in metric tons):

"1968 17,400 (1,200 for crushing)

"1969 22,000

"1970 36,000

"1971 61,000 (start of Dong Bang)

"1972 50,000 (projection based on targeted 30% increased domestic production to 283,000 m/t)

A large portion of domestic soybeans is never marketed but consumed directly in rural households.

"Competition: The government purchase price for rapeseed production will be increased 15% for 1972. The possibility of importation of Canadian rapeseed also exists.

"On the meal side, fish meal imports were 12,000 m/t in 1969, 19,000 m/t in 1970, and 22,600 m/t for 1971. Fish meal was redesignated from free-import to restricted listing as of January 1972. Total fish meal demand is projected at 27,000 m/t for 1972.

"Purchases of cooking oils accounted for only 6.81% of total food purchases in 1968. The uses of soy oil and soy protein, such as cooking oil, salad oil, margarine, shortening-mayonnaise, soy flour, grits, and meat extenders, are not as yet well known to the Korean housewife.

"Market development: There is without question a firm and growing demand in Korea for feed proteins to support the growing livestock-feed business. Also there is a potential market for soy oil if the consumer can be properly motivated. Salads with salad oil and deep frying are essentially new food habits yet to be introduced.

"Our purpose can be to popularize the reasons why adequate amounts of soy oil can improve the Korean diet. To gain acceptance and change food preferences require an

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educational program to reach the prime target group, the homemaker–through displays, printed materials, cooking exhibits, advertisements, and articles in the mass media. Traditional food patterns and changes affecting the consumer market must be studied to assure that funds are used effectively.

"Research and evaluation are an essential part of launching and continuing a successful soy product market in any country and market.

"During the next 6 to 12 months, the ASI program in cooperation with Foreign Agricultural Service and the agricultural attache in Korea will be implemented around the following activities:

"1–Market research. A survey of oil marketing, packaging distribution, and consumer habits will be conducted to provide specific answers and provide guidelines on whether a soy oil merchandising program can be implemented,

"2–A consumer educational program featuring soy oil and soy foods will get underway with Mrs. Jun-Ryun Wang, president of the Korea Food Development Center. This program will utilize TV cooking shows, radio, newspaper women's columns, urban and rural extension cooking courses, food exhibits, and young women attending regular cooking courses at the Center.

"3–Acquiring services of a qualified Korean representative part-time to represent ASI. He will be responsible for on-going activities.

"4–Establish necessary services for feed manufacturing and live-stock developments through cooperation with the Korean Feed Manufacturers Assn., emphasizing feed and soy meal promotion.

"5–Several influential leaders of women's groups will be selected and invited to Japan for a workshop to observe ASA consumer educational programs, publications, and cooking classes there that can be adapted for similar use in Korea. While in Japan, these leaders will have the opportunity to observe many soy-oil and soy-based food items all the way from manufacturing to the consumer.

"6–An identified soy oil advertising campaign in cooperation with the brand manufacturers who qualify will be explored and may be implemented.

"7–Continued high-level rapport with Korean government officials with the purpose of lowering import barriers, tariffs, and duties, in order to obtain fair treatment with competing imported products as necessary.

"8–Commencing in July 1973, a comprehensive market development plan will be outlined in cooperation with the Foreign Agricultural Service, to cover the activity and funding necessary for a 2 to 3-year plan of action.

"In closing, the photo on page 27 shows how most soy oil is sold in Korea today. It's by dipper in a used 4-oz. bottle. If our activities can lead to sales in new larger packages, and to sales of soy meal to feed manufacturers by the ton instead of by the bag, then Korea can be a market for 100,000 m/t of U.S. soybeans in 1973 and 200,000 m/t in 1974."

Photos show: (1) Vegetable oils in plastic bottles and tin cans at a supermarket in Seoul. (2, page 27) In an oil press shop in Seoul, a Korean boy dips soy oil from bulk into a 4-oz. used bottle. Address: American Soybean Assoc. Far East Director.

723. Kwon, Shin-Han. 1972. History and the land races of Korean soybean. *SABRAO Newsletter* 4(2):107-11. July. [17 ref. Eng]

• ***Summary:*** Note: "This paper was read at Symposium A6 (Exploration and conservation of plant genetic resources) of the 12th Pacific Science Congress held at Canberra, Australia, 18-27 August, 1971."

The earliest record of soybean culture in Korea is found in the Chinese document *Wei-zu* written in 551 A.D. According to this, the five sacred grains, namely millet, rice, barley, wheat and soybean, were grown in "Ok-Jo," an ancient tribal nation covering north-eastern China and the north-eastern part of the Korean peninsula.

According to recent archaeological findings, roasted soybeans are obtained in Bu-Yo, the capital of 'Paik-Je' Dynasty (18 B.C.-676 A.D.), located in the middle western part of the Korean peninsula. The roasted soybeans exhibited in the Bu-Yo Historical Museum are still being excavated from the remains of a burned army storage house of the day. Based on this historical evidence, the author considers the soybean culture in Korea to have started in the 5th to 4th century B.C. or earlier.

"Diversity of land races: The majority of soybean varieties currently grown by Korean farmers are not named; their seeds" have been passed down from their ancestors. "Named local varieties derived from pure-line selection are grown by a limited number of farmers only. Wide variations in morphological and physiological characters are found among the land races. They are particularly variable in plant height and seed size. They also vary widely in flowering time, maturity and oil content while their variability in protein content was relatively small.

"Seed samples collected from remote villages exhibit a great variety of colors, *e.g.* greenish yellow, green, brown, reddish brown, black and different patterns of variegation. Some varieties show a net-like appearance resulting from breakage of the seed coat. The hilum color ranges from pale-yellow to brown or black. Protein content varied from 53.7% to 36.3% with a C.V. of 5.7% (variability coefficient).

"The land races ranged in 100 bean weight from 44 g to 6.7 g. The largest seed size, 44 g/100, exceeds the maximum (40 g) reported by Morse and Cartter (1937) with the large USDA collections. Korean varieties generally have a large seed size as compared with those of other countries."

Tables show: (1) Production, acreage and yield per

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hectare of soybean in Korea. From 1955-64 production (in 1,000 metric tons) was 152, increasing to 229 in 1969. From 1955-64 acreage (in 1,000 ha) was 277, increasing to 305 in 1969. From 1955-64 yield (in kg/ha) was 548, increasing to 751 in 1969. (Source: Year Book of Agronomy and Forestry, Korea 1970).

(2) Character variations of registered local varieties. The characters are: No. of days to flowering (86 max to 59 min.). No. of days to maturity (169 max to 128 min). Plant height (cm) (155 max to 43 min). 100 bean weight (gm) (36.9 max to 11.8 min). Protein content (%) (43.4 max to 38.5 min). Oil content (%) (21.7 max to 16.3 min).

(3) Protein and oil contents and seed size of land races and a wild strain (*G. ussuriensis*). Protein content (%) (53.7 max to 36.3 min). Oil content (%) (21.4 max to 10.9 min). 100 bean weight (gm) (44.0 max to 6.7 min).

Note 1. SABRAO is an acronym that stands for The Society for the Advancement of Breeding Researches in Asia and Oceania.

Note 2. This document contains the earliest date seen for soybeans in Korea, or the cultivation of soybeans in Korea (A.D. 551). The source of these soybeans was probably northeastern China. Note that these are not wild soybeans, even though they are land races.

Note 3. This is the earliest English-language document seen (April) that uses the term "land races" (or "land race," written as two words) to refer to ancient indigenous cultivated soybeans. According to Prof. Ted Hymowitz: A soybean land race is an unimproved line or lines grown out by traditional farmers on their own land or in a village for many generations for food, feed, religious, ceremonial, or medicinal purposes. A cultivar is a line derived by modern plant breeding techniques. Address: Plant Protection Div., Radiation Research Inst. in Agriculture, Office of Atomic Energy, Seoul, South Korea.

724. Lee, Jai Moon; Kim, Yu Sam; Hong, Yun Myung; Yu, Juhyun. 1972. [Studies on the substitution of raw materials in soy sauce. III. Use of corn and barley]. *Korean J. of Food Science and Technology* 4(3):182-86. July. [14 ref. Kor; eng]
• ***Summary:*** "It was found that substitution of up to 60% of the wheat content (30% of the total bean and wheat content) with corn, yielded good quality soy sauce. It was also found that barley can be substituted for 70% of the wheat content (30% of the total content)." Address: Dep. of Food Engineering, College of Science and Engineering, Yonsei Univ., Seoul, Korea.

725. Loring, Kay. 1972. Korean cafes keep growing. *Chicago Tribune*. Aug. 24. p. S_A6.
• ***Summary:*** This is a review of the restaurant Korea House in Chicago, a city where an estimated 10,000 people of Korean ancestry now reside. Four years ago there was only one Korean restaurant in the city; now there four. The main Korean seasonings are garlic, onion, red pepper, soy sauce, and sesame–plus kim chee (kimchi).

"No dairy products are used, because as in Japan and China, there is no room in this thickly populated country for dairy industries. Soy bean curds and soy milk are among substitutes." Vegetable oils, such as sesame oil and [soy] bean oil, are widely used in place of animal fats for cooking.

726. Butz, Earl L. 1972. Setting the pace for agriculture (Continued–Document part II). *Soybean Digest.* Sept. p. 26-28.
• ***Summary:*** (Continued): "Throughout the entire U.S., there are about 60 million acres of unused reserve land–the best kind of strategic reserve the Department of Agriculture can maintain, in my opinion. However, we must recognize that these reserve lands tend not to be our best acreages. Certain portions, including some in the seven major soybean states, may be less than ideal prime farmland.

"The point is, that in order to fill market demands, to keep up with the rising world level of meat consumption, we must have more than acres alone. We need to achieve efficiencies in production and marketing that will enable America to keep its commitments to expanding markets. We need to keep at the job of getting costs down. We need to do our best to make sure that we stay ahead of the competition.

"Uncle can help, as I said, but the real job of accomplishing all this will be yours. As you do this, you can keep posted on the research work being done by the Agricultural Research Service and the states. You can team up for better management in planting rates, weed control, fertilizer use, and harvesting techniques. You will want to influence the scientific community in your states to be on the alert to any and every research program that promises more efficient production.

"For soybeans, yield-increase deserves the highest priority: Whether we are talking about the President's goal of $10 billion in farm exports by 1976 or sooner–and the significant part that soybeans can play in attaining that objective, now that soybean exports have broken the $2 billion mark–or whether we're talking about an average American farmer hoping to get a little more black ink on his balance sheet, what your industry needs most of all is a yield breakthrough.

"Soybean research is just now coming of age. Most of the solid research input took place during the 1960's, and we hope to see research during this decade of the 1970's come up with new concepts, new ideas, and better varieties. We've seen corn yields increase more than 400% from 20 bu/acre in 1930 to 40 bu/a during the 1950's to a national average of 86 bu/a at present We know the contribution that research has made to this advance.

"Over the same years, the improvement in soybean yields has been far more gradual, from 13 bu/a in the 1930's to 28 bu/a today. Where and when a soybean yield

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breakthrough will occur, causing an upward spurt like that which resulted from corn hybridization, nobody can predict. Perhaps some of the answers will come from plant breeding.

"Since January 1969, 17 improved varieties of soybeans have been released by the Agricultural Research Service through state experiment stations. These will have higher yields and greater resistance to nematodes and disease. One is a newly discovered male-sterile line that could lead to hybrid varieties. Next month we plan to send a plant geneticist to Japan and Korea to collect strains of cultivated soybeans and related species, in the continuing quest for a key to the breakthrough we seek. As one of the many promising outcomes of the President's historic Summit Meeting in Moscow, preparations are being made now at the White House level for an agricultural scientific team to visit Russia. This type of undertaking will be based on a mutuality of interest between the farmers of the two nations–it won't be a one-way street, but an investment in agricultural progress.

"Looking farther ahead, it's not inconceivable that as the bamboo curtain moves open a bit wider, some day it may be possible for American scientists to seek higher-yielding soybean strains from Mainland China. Some of the varieties that have contributed most to our soybean plasm [germplasm] resources have come from China–it's been 40 years since we have obtained varieties from the original home of the soybean.

"So the future has much in store. In the meanwhile, every step you take to economize and move up agriculture's high efficiency rate will count.

"Keep trying to do better–and keep on setting the pace for American agriculture."

Photos show: (1) A large portrait of Earl Butz in a circle. (2-5) Small rectangular photos as he speaks with multiple microphones at the podium. Address: U.S. Secretary of Agriculture.

727. Wong, William. 1972. The affair of Archbold and La Choy: How love sprouted, then cooled off. *Wall Street Journal.* Oct. 10. p. 4.
• ***Summary:*** "La Choy Food Products, a division of Beatrice Foods Co.," grows so many [mung] bean sprouts (700,000 pounds a week) in Archbold, Ohio, that it uses 70% of the village's water–about 355 million gallons last year. This (and general growth in the area) is threatening to dry up the village's water supply in Bush Creek Reservoir, which can hold only 308 million gallons.

The average growing cycle is six days from mung bean seed to harvest. The sprouts grow in about 24 70-foot-long bins, each about 5 feet wide and 5 feet deep.

La Choy employs 330 workers and pays $175,000 a year in property taxes. But the villagers don't like the designation "Chinatown U.S.A." which has come to be applied to Archbold–even though the town's Chinese population has been zero throughout its 106-year history.

La Choy started because Wallace Smith, in his mid-20s and a business graduate of the University of Michigan, was running a grocery store in Detroit, Michigan. One of his best-selling foods was mung bean sprouts, grown by Chinese residents of Detroit, and sold to Mr. Smith through Ilhan New, a Korean who had attended college with Mr. Smith. Eventually [by 1920] the bean sprouts in his store sold so well, the Mr. Smith asked Mr. New to grow them for him.

Mr. New agreed to do this. The sprouts continued to sell so well that the two men decided to can them. Sales grew even more and the two men formed a company. The word "choy" means "vegetable" in Chinese.

The company diversified into other Chinese foods and sauces. In 1937, shortly before completion of a new La Choy factory in Detroit, Mr. Smith was killed by lightning. So his wife took his place as a director in the budding company.

After World War II started, the U.S. government declared all of La Choy's products nonessential, denied the company tin for canning, then took over the plant for use in making rifle parts.

It so happens that Mrs. Smith came from Archbold, Ohio–as did her brother and father, both of whom were now important La Choy stockholders. The directors decide to move the company to Archbold and to temporarily enter the business of canning tomato juice–which was essential enough to qualify for tin. After the war, La Choy continued with its former business–but in Archbold.

One day in 1958, in connection with a La Choy celebration, the governor of Ohio and the mayor of Archbold designated Archbold as Chinatown U.S.A. Since then the name has stuck since La Choy has used it in news releases. But the residents still dislike it.

Today Archbold is a village of 3,100 people, two traffic lights, and not a single Chinese.

728. *Soybean News* (*NSCIC*). 1972. Bernard on germplasm collection mission. 24(1):6. Oct.
• ***Summary:*** "Dr. Richard L. Bernard, U.S.D.A. research geneticist at the U.S. Regional Soybean Laboratory, Urbana, Illinois, went to Japan and Korea in September to collect exotic soybean germ-plasm. He will spend approximately a month searching for strains to add to our world soybean germplasm collection. Wild species to be used in expanding genetic diversity will be searched for in eastern Asia.

"Dr. Bernard's work for the past 17 years with the northern germplasm collection makes him especially qualified for this mission. He has provided the original crosses for several of our most prominent northern commercial varieties."

729. Leung, Woot-Tsuen Wu; Butrum, R.R.; Chang, F.H. 1972. A selected bibliography on East-Asian foods and nutrition arranged according to subject matter and area.

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Atlanta, Georgia: Center for Disease Control, U.S. Dept. of Health, Education, and Welfare. vii + 296 p. Dec. 27 cm. [1500* ref]
• ***Summary:*** The references are arranged by country, and within each country by subject. Contents: Map of East Asia. Foreword. Whole region- East Asia. Burma. Cambodia. China, Mainland. China, Republic of (Taiwan). Hong Kong. Indonesia. Japan. Korea. Laos. Malaysia. Philippines. Singapore. Thailand. Vietnam.

Subject matter within each country: General. Food resources. Food composition. Food supplements. Food technology. Food habits. Nutrition and dietary surveys. Nutritional status. Nutrition education. Address: 1. Nutrition Program, Center for Disease Control, Dep. of Health, Education, and Welfare; 2-3. FASEB.

730. Kwon, S.H.; Im, K.H.; Kim, J.R. 1972. [Studies on diversity of seed weight in the Korean land races and wild soybean]. *Korean J. of Breeding* 4(1):70-74. [13 ref. Kor; eng]
• ***Summary:*** "Abstract: This investigation was conducted to determine the variation of seed weight for land races, local named varieties, wild type collections, some introduced varieties, and F2 and F3 generations of a cross between cultivar and wild type of soybeans.

"Land races currently grown by farmers were consisted with distinctly different two groups and averages of seed weight of the groups were 12g and 24g respectively. In general, the soybean seeds grown in southern part of Korean peninsular were smaller than the seeds collected in middle part of the peninsula.

"The cultivars grown in Korea are relatively large in seed size in comparison with the varieties grown in other countries. The seed weight of the collected land races ranged between 44.8 grams per 100 seeds and 6.2 grams and the average weight was 22.2 grams. Seed weight of F2 and F3 generations of a cross between wild and intermediate type ranged between parents and the average weight per seed of F2 generation was close to the value of geometric mean of the parents." Address: Radiation Research Institutes in Agriculture, Office of Atomic Energy, Seoul, South Korea.

731. Kwon, S.H.; Im, K.H.; Kim, J.R. 1972. [Diversity of protein and oil contents of the Korean soybean land races (1)]. *Korean J. of Breeding* 4(1):29-32. [12 ref. Kor; eng]
• ***Summary:*** "Abstract: In order to investigate the fundamental informations on protein and oil contents in the soybean land races currently grown by Korean farmers, over 500 land races were collected from the Korean peninsula. From which 211 lines for protein and 172 lines for oil were analyzed and the results are summarized as follows;

"1. Protein contents range from 36.26% to 53.72% with the variability coefficient of 5.70%. The average of protein content for the 211 lines is 43.65%. In general, land races possess higher protein content as compared to the named local varieties and introductions. Variances for protein of land races are also greater than those in the named local varieties.

"2. Oil contents range between 21.4% and 10.9%, and the average is 17.4 %. This result shows that oil content in the land races is extremely lower than that in the introductions. A negative correlation between oil and protein is found.

"3. These results suggest that the land races possessing high protein content may play an important role in an improvement for protein content in soybean breeding whereas those are of no use in an improvement for oil content. Since the great diversity of the land races, there is some possibilities to find high oil lines if an extensive collection is made." Address: Radiation Research Institutes in Agriculture, Office of Atomic Energy, Seoul, South Korea.

732. Lee, Jai Moon; Hong, W.S.; Kim, Y.S.; Hong, Y.M.; Yu, J. 1972. [Studies on the substitution of raw materials for soy sauce. II. Use of potato and sweet potato]. *Korean J. of Microbiology* 10(2):79-85. [11 ref. Kor; eng]
• ***Summary:*** "The possibility of substituting potato or sweet potato for the wheat, one of the raw materials for soy sauce, was studied by measuring the amylase and proteolytic activities of Koji. Also, optimum conditions of Koji making were determined." Address: Dep. of Food Engineering, College of Science and Engineering, Yonsei Univ., Seoul, Korea.

733. Park, K.I. 1972. [Studies on the N-compounds during chung-kook-jang meju fermentation (1) Changes of soybean protein during Chung-Kook-Jang Meju fermentation]. *J. of the Korean Agricultural Chemical Society* 15:93-109 [Kor]*

734. Park, K.I. 1972. [Studies on the N-compounds during chung-kook-jang meju fermentation (2) Amino acids of oligopeptides formed during Chung-Kook-Jang Meju fermentation]. *J. of the Korean Agricultural Chemical Society* 15:111-142. [Kor]*

735. Binding, G.J. 1972. Everything you want to know about soya beans: Wonder source of protein and energy. New York, NY: Pyramid Books. viii + 64 p. March. 19 cm. Preface by Carlson Wade. Pyramid Healthful Living Series.
• ***Summary:*** This pocketbook, which retails for $0.75, was first published in March 1972. It is basically a reprint of the original 1970 edition, published in London by Thorsons Publishers Ltd. However it has a new Preface by Carlson Wade, and the title is slightly different. Address: England.

736. Gerasimenko, I.; Enken, V. 1972. [Characteristics of induced mutation in some varieties of soya bean]. *Indutsirovannyi Mutagenez u Rastenii* (*Induced Mutagenesis*

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*in Plants; Tallin, Estonian SSR*). p. 168-76. [Rus; eng]*
• ***Summary:*** In little-cultivated fodder varieties of soybeans, the frequency of mutant families varied from 21.3 to 27% and there were 8-12 mutant types, whereas in grain varieties of soybeans, the frequency of families with mutants was between 13.5% and 18.4%, and the number of mutant types was between 6 and 9. The lowest number of mutants was found in a dwarf form of the Korean subspecies, which had 6 to 7 mutant families. The varieties studied could be divided into three groups according to the degree of their mutability.

737. Korean Institute of Science and Technology (KIST). 1972. [Foodstuffs and food additives for industry in Korea]. Seoul, Korea: Ministry of Science and Technology. [Kor]*
• ***Summary:*** In 1971 production of fermented soybean foods in Korea (in 1,000 metric tons) was: Soybean sauce: industrial 107, home-made 116, total 223. Soybean paste: industrial 56, home-made 168, total 224. Red pepper soybean paste: industrial 23, home-made 89, total 112.

738. Korean Society of Plant Protection. 1972. [A list of plant diseases, insect pests, and weeds in Korea]. Suweon, Korea. 424 p. [Kor; Eng]*
• ***Summary:*** A key source of information on soybean insects and other pests in Korea.

739. Kwon, Tai-wan. comp. 1972. Fermented foods in Korea: Annotated bibliography (1917-1971). Seoul, South Korea: Korea Institute of Science and Technology. 185 p. 28 cm. For Fermented Soybean Products, see p. 28-85. [248* ref. Eng]
• ***Summary:*** See next page. One of the best sources on soyfoods in Korea. A very well prepared bibliography. Of the 248 references, 83 are related to soy. Most of the documents cited were published in the 1950s and 1960s; only one (p. 28) was published before 1940.

Contents: 1. Fermented vegetable products (*kimchies* [*kimchi*]). 2. Fermented fishery products. 3. Fermented soybean products (soybean koji {meju, maiju, maeju}, soy sauce {kanjang, ganjang}, soy paste {doenjang, dainjang, dwen-jang}, hot soy paste {kochojang, kochuzang}, etc.). 4. Fermented cereal products (alcoholic beverages). 5. Miscellaneous. Appendix. Author index.

Note 1. Doenjang (Korean soybean paste) is first mentioned on pages 28, 64. Dainjang (Korean soybean paste) is mentioned on page 34. Dwen-Jang (Korean soybean paste) is mentioned on page 42.

Kochojang (Korean red pepper miso) is first mentioned on pages 28, 31, 46. Kochozang (Korean red pepper miso) is first mentioned on page 36. "Red pepper sauce" (Korean red pepper miso) is first mentioned on pages 38, 39. "Red pepper paste" (Korean red pepper miso) is first mentioned on pages 71.

Kanjang (Korean soy sauce) is first mentioned on page 34.

Ganjang (Korean soy sauce) is first mentioned on page 53.

Note 2. This is the earliest English-language document seen (April 2012) that uses the word "Kanjang" or the word "Ganjang" to refer to Korean soy sauce.

Meju (Korean soybean koji) is first mentioned on pages 35, 41, 44, 60. Maiju (Korean soybean koji) is first mentioned on page 34. Maeju (Korean soybean koji) is first mentioned on pages 73, 83. Chung-Kook-Jang (Korean natto) is first mentioned on page 79.

Note 3. This is the earliest English-language document seen (Oct. 2010) that uses the word Chung-Kook-Jang (spelled exactly that way) to refer to Korean-style natto. Address: PhD, Head, Food Resources Lab., Korea Inst. of Science and Technology, Seoul, South Korea.

740. Nakao, Sasuke. 1972. Ryôri no kigen [The origin of foods]. Tokyo: Nihon Hoso Shuppan Kyokai (Japan Broadcast Publishing Association). 225 p. Illust. (some color). Maps. Index. 22 cm. Series: NHK Books No. 173. [Jap]
• ***Summary:*** See page after next. The important chapter titled "The big natto triangle and miso," by Sasuke Nakao (p. 118-27) discusses natto, its relatives and ancestors in East Asia, and the "natto triangle" theory (with a map). Nakao hypothesized that natto (*itohiki natto*, made with one or more strains of bacteria) originated in the monsoon area of Southeast Asia, where there are East Asian evergreen forests. He considered Yunnan province in China to be the hypothetical center of natto's origin.

He states: We don't know much about natto in Japan. Konnyaku was clearly mentioned in the literature of the Heian period [794-1185]. But natto was first mentioned later, during the Muromachi period [1336-1573], therefore I guess it came from Java [sic] at about that time. Many new things from Europe (such as guns) also entered Japan during the Muromachi period.

What I call the "Miso Group" is salted mold-fermented soyfoods–such as miso, shoyu, tamari, and fermented black soybeans (*douchi*)–that originated in northern China outside the Big Natto Triangle, then spread to central China and to other countries such as Japan and Korea. I have shown the Miso Group on the map in an oval to the upper right. So the triangle and the oval shows the locations of these two groups of processed, fermented soyfoods.

In the Big Natto Triangle we find a number of foods that originated in northern China, including konnyaku and sushi. Sake is also fermented with a mold–the koji mold. Bean sprouts (a great Chinese invention, using beans that are hard to cook) also exist in the Miso Oval, but they spread into many areas within the Big Natto Triangle including Burma and Java.

Nyufu [dairy cheese or yogurt; literally "decayed /

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# FERMENTED FOODS IN KOREA

Annotated Bibliography

(1917 ~ 1971)

Compiled by

Tai-wan Kwon, Ph. D.

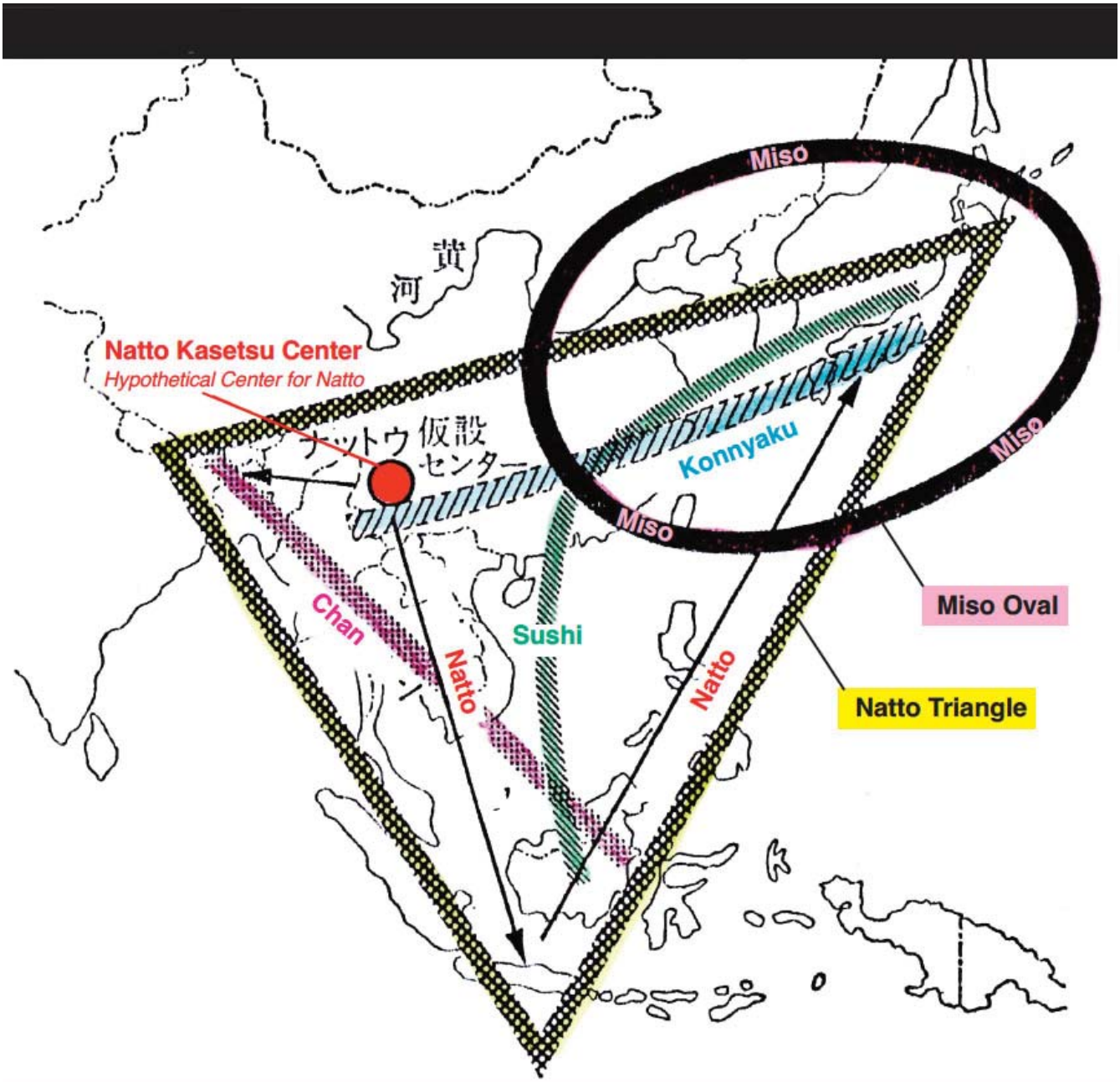
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spoiled milk"] and tofu: Tofu was also a great invention of northern China–an easy way to eat soybeans. Seen from this point of view, European ways of cooking beans are very primitive.

Note: Traditional European beans generally contain too little protein and too much carbohydrates (especially starch) to enable them to be made into tofu.

Mr. Shinoda Osamu has developed the theory that tofu was invented in China but not in ancient times; probably in the middle of the Tang dynasty [618-906], and it became popular in the middle Song dynasty [960-1279], at which time it became an alternative to *nyufu* made from dairy milk. What I call *nyufu* here is different from *funyu* (fermented tofu), which is made by fermenting tofu, appeared after the invention of tofu, and is found today throughout East Asia. It is difficult to know exactly what *nyufu* was; in my opinion it was probably like *dahi* from India. In any case, it is certain that there was a product in called *nyufu* shortly before the Tang dynasty and during the early Tang.

During most of Chinese history, except when the nomadic milk-consuming Mongols ruled China during the Yuan dynasty (1279-1368), animal milks were not part of traditional Chinese culture.

Tofu was in Japan by 1183 AD (see *Diary of Hiroshige*

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*NAKAOMI*, entry for 1183). Maybe tofu was brought in by Buddhist monks and consumed in and around Nara. By the end of the Muromachi period [1336-1573] the center of tofu making and use had moved to Kyoto.

Another interesting thing is that in southern China and in Sichuan province, there is a tofu named *reiki* [*li qi*, pronounced "lichi;" "morning prayer]." The name originally referred to *nyufu* but later it came to refer to tofu. The origin of the word *reiki* was considered to be Sanskrit or some European language. It may have been connected with *nyufu* and/or dahi or India. Also, if we consider *reiki* to be the original name of tofu, then *nyufu* and tofu may have originated in Sichuan or southern China and migrated up to Northern China.

In summary: Nakano's theory is based on the observation that there are many varieties of non-salted fermented soyfoods and soy condiments inside the "natto triangle." Yunnan province in southwest China, Thailand, Myanmar (Burma), Bhutan, Nepal, Indonesia, and Japan all fall within this triangle.

Note 1. This is the earliest English-language document seen (Jan. 2012) that contains the term "natto triangle." Yet this term can be misleading, especially for non-Japanese. Natto is the only non-salted fermented soyfood or soy condiment indigenous to Japan. Natto is made by fermenting whole, cooked soybeans with bacteria (*Bacillus natto*, or *Bacillus subtilis*) in a warm place (ideally 104ºF or 40ºC) for about 24 hours. According to various Japanese legends, natto originated almost 1,000 years ago in northeast Japan when cooked soybeans were placed in a rice-straw sack strapped over the back of a horse. The natto bacteria are found abundantly on rice straw, and the warmth of the horse's body aided the fermentation. Under these conditions, the fermentation would take place naturally, without intentional inoculation.

The "natto triangle" refers to the geographical area within a large triangle in East-, South-, and Southeast Asia–the only place in the world where non-salted fermented soyfoods and soy condiments are indigenous. A number of these–such as tempeh in Indonesia and unsalted fermented black soybeans in China–are fermented primarily with molds (e.g., *Rhizopus, Aspergillus*) rather than bacteria. The triangle has its three corners in northeastern Japan (on the northeast, for natto), northeastern India and Nepal (on the west, for kinema), and in Java (Indonesia, on the south, for tempeh). It is incorrect to think of tempeh as a type of natto–by any definition! Applying this correction to the "natto triangle" causes it to fall apart! Extensive research after 1972 on the early history of tempeh and natto gave no support to the conjecture that natto came from Java.

However the incorrect theory actually turned out to have powerful predictive value, especially as close relatives of natto were discovered in northeast India by Tamang and co-workers starting in 1988, more than 15 years after the "natto triangle" hypothesis was proposed.

Sasake Nakao was born in 1916. The chapter titled *Mame no ryôri* [Bean cookery] is on pages 115-26.

741. National Research Council, Committee on Genetic Vulnerability of Major Crops. 1972. Genetic vulnerability of major crops. Washington, DC: National Academy of Sciences. vii + 307 p. For soybeans, see Chap. 13, p. 207-17. Illust. 23 cm.

• ***Summary:*** Chapter 13, titled "Soybeans and other edible legumes," discusses soybeans, peanuts, and dry beans. Contents for soybeans: Origin and history. Importance of crop. Genetic uniformity. Pests and diseases. Status of breeding for resistance.

Concern with genetic uniformity and vulnerability increased dramatically after 1970, when the U.S. corn crop was struck by Southern corn blight. Yields dropped 15% nationwide and more than 50% in certain major states. From 1924 to 1927 Dorsett collected 1,500 types of soybean in Manchuria, and in 1929-31 he and Morse collected 4,578 varieties and types in Manchuria, Korea, and Japan. This was the only expedition ever made into eastern Asia specifically to collect soybean germ plasm. By 1922-43 of the introductions received were found to be suited for seed production in the U.S., and they were named. Approximately 10,500 introductions have been brought to the U.S. since 1898–many of these have been duplicates, so many have been lost. Since 1943, 87 varieties have been registered by the Crop Science Society of America.

The vulnerability of any crop to epidemics depends upon the genetic uniformity of currently grown varieties. The practices that increase the vulnerability of varieties by restricting the germ plasm base are: 1. The parents used to develop new varieties are restricted to a few that tend to produce superior varieties under "normal" conditions. 2. A very few varieties dominate production. 3. Resistance to a given disease in currently grown varieties traces to a single source.

Most of the currently grown varieties can be related to 11 introductions, listed here in descending order of importance based on frequency of occurrence (percentage) in parentage of currently grown soybean varieties. Three percentages are given for each variety after the year of introduction–Northern frequency, Southern frequency, and total frequency. Northern refers to maturity groups 00-IV:

Mandarin (Pehtuanlintza, Northeastern China; 1911–84, 0, 58).

Richland (Changling, China; 1926–60, 0, 42).

AK [A.K.] (China; 1912–32, 63, 42).

Manchu (Niguta, China; 1911–56, 0, 39).

Tokyo (Yokohama, Japan; 1901–14, 58, 27).

Clemson (Nanking, China; 1927–9, 68, 27).

PI 54610 (Changchun, Liaoning Prov. China; 1921–14, 47, 24).

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Mukden (Mukden, China; 1920–26, 0, 18).

Dunfield (Fancheatun Station, China; 1913–7, 26, 13).

Arksoy (Pingyang [Pyongyang / P'yongyang], Korea; 1914–0, 32, 10).

Roanoke (rogue from Pi 71597, Nanking, China; 1927–0, 26, 8).

The varieties Wayne, Amsoy, Corsoy, Clark or Clark 63, Lee, and Bragg accounted for 56% of the U.S. acreage. Statistics indicate that, for the soybean varieties currently grown, genetic uniformity is pronounced.

742. Smith, A.K.; Circle, S.J. 1972. Historical background (on soybeans and soybean foods). In: A.K. Smith and S.J. Circle, eds. 1972. Soybeans: Chemistry and Technology. Westport, CT: AVI Publishing Co. xiii + 470 p. See p. 1-26. Chap. 1. [53 ref]

• ***Summary:*** Contents: 1. Introduction. 2. U.S. history: Introduction of soybeans, processing for oil, soybean oil. 3. Soybean meal and protein: Animal feed industry, poultry industry, industrial uses. 4. Soybean production. 5. Oriental history: Ancient history, Oriental fermented foods (shoyu, miso, tempeh, ontjom, natto, hamanatto, tao tjo [Indonesian-style miso], kochu chang, ketjap), Oriental nonfermented foods (soybean milk, tofu), wedge press. 6. Soybeans and world food problems: Green Revolution, protein supplements (high protein food formulations, AID funded), amino acids, CSM, cottage industries (tofu, kinako).

Concerning industrial uses (p. 8-9): Soybeans rose in popularity as an agricultural crop in the USA at a time when other crops such as corn, wheat, cotton, and tobacco were being produced in surplus quantities. Soybeans took over much of the acreage vacated by these crops. "At that early period it was the hope of many leaders of agriculture, government, and industry that much of the oil and protein of the soybean could be diverted from the food and feed industries into industrial products such as paints, varnishes, soap stock, plastics, adhesives, plywood glue, paper coating and lamination, paper sizing, textile fibers, and other uses... In 1936 the US organized the Regional Soybean Industrial Products Laboratory for this purpose. These new industrial uses were expected to help relieve the problem of farm surpluses... In 1935 the Glidden Company built the first plant for the isolation of industrial grade soybean protein (transferred to Central Soya in 1958). The largest use of industrial grade protein is in the paper-making industry, for coating and sizing of paper board.

"After World War I, soybean meal, because of its low cost, replaced casein as an adhesive for Douglas fir plywood glue, where it still retains a substantial part of the market for the interior grade product."

"While soybean proteins have several important industrial applications, especially in the paper industry for coating and sizing paper, which are expected to continue for years to come, the original dream of an ever-expanding industrial market [for soy proteins] has faded. In the polymer market it appears that for most applications the proteins cannot be made competitive with the increasing number of low cost, high quality synthetic resins... It is generally recognized that the increasing demand for proteins for feed and food will greatly surpass the anticipated industrial uses."

A graph (p. 1) shows: Soybean production in the United States for seed, 1940-1970. Address: 1. Oilseeds Protein Consultant, New Orleans, Louisiana; 2. Director, Protein Research, W.L. Clayton Research Center, Anderson Clayton Foods, Richardson, Texas.

743. Bernard, R.L. 1973. Soybean breeders need new germplasm. *Soybean News* (*NSCIC*) 24(2):5, 3. Jan.

• ***Summary:*** "The following information is based on an interview with Dr. R.L. Bernard, USDA soybean breeder at the University of Illinois. Dr. Bernard is in charge of the U.S. world soybean germplasm collection. He went to Japan and Korea last September on the first major collection mission since 1931.

"Less than 40 varieties account for over 99% of the commercial soybean acreage of United States and Canada. Furthermore, many of these are closely interrelated. Only about 20 introduced varieties comprise the complete ancestry of today's commercial varieties. Faced with this rather narrow germplasm base, where does the soybean breeder turn for breeding material to produce higher yielding varieties for the future and for resistance to disease and insect pests?

"USDA Soybean Collection: The USDA has maintained since 1949 a germplasm collection of soybeans brought from all over the world and especially from eastern Asia where the soybean originated. Today there are approximately 3500 strains in this collection, 2500 early ones (maturity group IV or earlier) maintained at the U.S. Regional Soybean Laboratory, Urbana. Illinois, and 10000 late ones (group V or later) at the Delta Branch Experiment Station, Stoneville, Mississippi. Thousands of seed packets of these strains are sent out each year to breeders and other researchers throughout the U.S. and the world. They are tested for yielding ability, disease or insect resistance, seed composition, etc., and the promising ones are being put into breeding programs to develop new varieties.

"How good is this collection and does it have sufficient diversity to sustain continued variety improvement? Compared to other major crops (such as wheat with over 15,000 lines in the USDA wheat collection), the soybean collection is rather small. This is especially critical since the U.S., with 75% of the world's soybean production and most of the rest of it in communist China, cannot rely on breeding work and collections in other countries as with more widely grown crops.

"In the last 20 years we have done an adequate job of maintaining the soybean collection and making it available to

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researchers, but no large-scale attempt to gather all soybean germplasm has been made since the Dorsett and Morse expedition to Asia in 1929-31. These two USDA researchers spent two years traveling through Japan, Korea, and northern China (including Manchuria) and collected about 4500 soybean strains. Unfortunately the soybean was not yet an important crop here and all but about 1,000 of these were discarded before the present collection was established.

"Native wild species and varieties disappearing: In the countries of eastern Asia where soybeans have been grown for centuries, farmers have grown a great diversity of varieties and types in the past. We don't know for sure just how much diversity is still present in these countries that is not represented in the USDA collection. We do know that this diversity is rapidly disappearing as improved experiment station selections replace the diverse primitive varieties, and unless researchers preserve it in germplasm collections it will be lost forever.

"Another and largely untapped source of diversity in eastern Asia is the wild soybean. Although of no economic value in itself, it will cross readily with cultivated soybeans and is therefore a potential source of disease or insect resistance and possibly other traits of usefulness in soybean breeding. It, too, is disappearing in some areas as a result of man's agricultural or building developments.

"Base expanded 30-50 percent by Bernard mission: In view of this, plans have been proposed to have soybean breeders from this country visit all of the countries of ancient soybean culture during the next few years and obtain all available soybean varieties and wild soybeans. As a start, Dr. Richard Bernard of the U.S. Regional Soybean Laboratory visited Japan and Korea this fall, collected wild soybeans from over 100 places, and met with Japanese and Korean soybean breeders, who have generously agreed to supply us with perhaps as many as 2000 native varieties.

"Collection opportunities: Major collecting jobs that remain to be done are:

"1. More thorough collecting of wild soybeans and direct collecting of native varieties in Japan and Korea.

"2. Collecting of soybean varieties and wild soybeans in China, which is the original home of the soybean and the center of genetic diversity. This makes it the most important area in the world for soybean germplasm. Almost all of U.S. commercial varieties trace their origins to China. Current political developments suggest that travel to China may be possible in the near future.

"3. Other areas of eastern Asia where soybean collections should be made:

"3a. North Korea along with China is a center of genetic diversity and its latitude corresponds with our Midwest production center. We have as yet no wild soybeans from there.

"3b. In Siberia adjacent to China very early soybeans have been grown for a long time. Also the very earliest wild soybeans come from there.

"3c. Taiwan and the Ryukyu Islands of Japan have some very primitive soybeans and are the southernmost range of the wild soybean and the northernmost range of wild perennial species closely related to soybeans.

"3d. Southeast Asia has some areas of ancient soybean culture and some wild perennial species related to soybeans.

"4. Other parts of the world (Africa, South America, Europe) may contain soybean germplasm not now available in its eastern Asian homeland. Australia, Africa, and Oceania contain perennial species closely related to soybeans that are of interest to those studying the evolutionary history of the soybean. These are not well known and are in need of more research.

"If these proposed trips can be carried out, it will make a major contribution to the procurement and preservation of soybean germplasm which is so essential to future variety development and to the maintenance of stable and efficient soybean production in this country."

A small portrait photo shows Dr. Richard Bernard.

Note: After this article was written, Prof. Theodore Hymowitz (soybean geneticist at the Univ. of Illinois) took many expeditions collecting wild perennial relatives of the soybean. Address: Univ. of Illinois.

744. Meals for Millions Foundation. 1973. Annual report 1972. Santa Monica, California: MFM Foundation. 16 p. 22 cm.

• ***Summary:*** Submitted by Mark M. Sterner, the new Executive Director. Cover is printed in beige, gold, and dark brown ink showing a stylized Mercator projection map of the world on a white background. The pages are unnumbered.

Contents: A letter from Charles Sweeney, President. Meals for Millions–an idea whose time has come [a phrase later used by the Hunger Project, founded by Werner Erhard, 1977]. Technical assistance: Ecuador (including growing soybeans), Sri Lanka (grow soybeans, make a soy beverage), Korea (developing a soy beverage in Santa Monica). Education: Training school, nutritional instruction. Nutritional programs: United States, overseas. MPF distribution during calendar year 1972: 145,395 lb were sent to 16 countries overseas and 31,215 lb were sent to locations in the USA for a grand total of 176,610 lb [71% as much as last year]. MFM in the news. Balance sheet (as of 31 Dec. 1972): Contributions and other revenues $399,147. Expenses $380,000. Assets and liabilities. History. Volunteers support MFM. Northern California advisory board. Bay Area committee. Board of Directors. A letter from Mark M. Sterner, Executive Director.

Photos show: (1) Charles Sweeney, President. (2) Mark M. Sterner. Plus many small photos. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California 90406. Phone: 870-0451.

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745. Bongartz, Roy. 1973. Lost in deepest America. *Saturday Review of Society* 1:61-63. April.

• ***Summary:*** About La Choy Food Products Co., of Archbold, Ohio–which calls itself "Chinatown U.S.A." Located 40 miles west of Toledo, Ohio, Archbold is a nice little town of 3,000 surrounded by cornfields. Yet no men or women of Chinese ancestry were to be found. The La Choy plant uses about 360 million gallons of water a year–so much it has nearly dried up the town's reservoir. It buys none of its food locally.

The company was started in 1920 in Detroit. Two classmates at the University of Michigan, Ilhan New (Korean) and Wallace Smith (American) had started a company making bean sprouts after they graduated; soon the company was also selling a lot of soy sauce and canned foods. Mr. New eventually left the company and in 1937 Mr. Smith was struck by lightning and killed. Smith's wife, a native of Archbold, moved the business back home to Ohio, where it has remained to this day. In 1947 [sic, Sept. 1943], La Choy was purchased by Beatrice Foods, a conglomerate.

La Choy believes it is the only company in America that knows how to grow bean sprouts. The writer and his guide pass through big steel doors into a room where mung beans are sprouted in "bins 5 feet wide, 5 feet deep, and 70 feet long." The mung beans, which are subjected to "various pressures of water spray and degrees of temperature," take 6 days to sprout. The little olive-green beans are transformed "into glorious, yellowish-white, fresh, long sprouts,..." which will soon be canned. The company harvests 40 tons of mung beans a day. Each year La Choy makes a total of 100 million cans of 30 different food products.

But why do they call it Chinatown U.S.A.?

Note: This is not the *Saturday Review* that began publication in 1920. Rather *Saturday Review of Society* (ISSN 0091-8571) was a short-lived magazine that ended up merging with other magazines: World (New York. 1972) ISSN 0049-8009; Saturday Review of Education, ISSN 0091-8555; Saturday Review of the Arts, ISSN 0091-8563; and: Saturday Review of the Sciences, ISSN 0091-8547; to form: Saturday review. World, ISSN 0091-620X.

746. Mogi, Yuzaburo. 1973. Kikkoman–American plant project–From planning to start up. Paper presented at the Governor's Conference on Business Development. 14 p. Held 16 May 1973 at American Baptist Assembly, Green Lake, Wisconsin.

• ***Summary:*** With an introduction by William C. Kidd, Secretary, Department of Business Development, Wisconsin. Mr. Mogi earned a B.A. degree from Keio Univ. in Japan, and a Master's of Business Administration (MBA) at Columbia University in New York City.

"Kikkoman soy sauce was first shipped to Hawaii in the 1860's... Kikkoman also had extensive operations in Asian countries until 1945. We had production plants in China, Korea, Malaysia, and some other countries. Our exports reached a peak before the war in 1939 and sales in the United States were about 50% of the total sales in foreign countries at that time. After the war we again started exporting in 1950. However, we lost the market in China, and in addition, because of an import duty and restrictions, it became quite difficult for us to export to other Asian countries...

"At the present time, our main overseas market is America where we are selling more than 60% of our total export... The main consumers of Kikkoman soy sauce in the United States before World War II were Japanese Americans... Our sales increased as the number of Japanese immigrants increased... After the war, we changed sales targets. Instead of limiting ourselves to the Japanese-American market we started to aim for the general American. In order to penetrate the American market we decided to market small size bottles. Before the war we sold soy sauce only in large bottles, casks, and cans... In 1957, we established an American subsidiary for Kikkoman International Incorporated, with its head office located in San Francisco. The purpose of Kikkoman International is to import Kikkoman products and distribute them in the United States. In the 1950's our first efforts were concentrated in large cities on the West coast, mainly in San Francisco and Los Angeles. The Los Angeles branch office was opened in 1958. In the early 1960's we started to approach large cities on the East coast, for example, New York City. We opened a branch in New York in 1961... and one in Chicago in 1965...

"In order for us to effectively penetrate the American market it was a must for us to have the services of good food brokers. Fortunately we have found very good brokers in various parts of the United States. For example, Myers and Sumder in California are the outstanding food brokers in the nation... Three years ago Kikkoman bought about 55% of the stock in Japan Food Corporation (JFC), the largest Oriental wholesaler in the United States...

"As to the advertising,... in 1956 when Eisenhower was elected President, Kikkoman bought election day T.V. time for vote-count announcements in San Francisco all day long... As we came to spend more money for advertisement we have broadened our advertising strategy. Now we have some national and continuous campaigns...

"About three years ago we built a test kitchen and cooking center in San Francisco, adjacent to the head office of Kikkoman International. We now have home economists there. We have been utilizing these facilities to develop new recipes for soy sauce and to educate customers as to how to use soy sauce not only for Oriental food but also American food...

"In December, 1970... we sent the first investigation team to America. The task of this team was to gather data to enable us to compare the cost of having an American plant rather than exporting the product from Japan. Then it was to find the cost difference among different possible locations

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for the plant, whether in the West coast, the Mid-West, or the East coast. We asked Mr. Mark Pennington, a consultant in New York, to act as a consultant for the project... We decided that it should be in the Mid-West. The reasons why we made the first decision are as follows: 1. Sales of Kikkoman soy sauce, as I mentioned, have been increasing steadily and have almost reached the stage of making it economically feasible to build a plant. 2. We have to get out from a heavy freight burden. We have been buying most of our main raw materials from the United States, mainly soy beans and wheat from the Mid-West... These freight rates have been increasing sharply every year. Still more, almost every year we suffer from strikes of dock workers. 3. Gradually the cost advantage of Japanese business over the American business has been disappearing. In the past,...labor costs in Japan were much lower than those in the United States... We do not have cheap labor in Japan any more. 4. The yen was devalued. The yen devaluation was not the main factor in our decision...

"The reasons why we made the decision to build the plant in the Mid-West are the following: 1. The present main market for Kikkoman products is the West coast... However, we can expect by looking at the various marketing indexing factors, that there is more market potential for our product in the Mid-West and the East coast. Having a plant in the Mid-West means that we are able to ship the product from there both to the present main market and to the future potential market easily... 2. Our main raw materials are soy beans and wheat, as I mentioned. The Mid-West is the main center for growing these grains. By having the plant there, we can expect to be able to buy the raw materials at lower costs. 3. In the Mid-West there are many food companies. We can expect to sell our product to them for industrial use.

"We chose the Austin Company, Des Plaines, Illinois, as the general contractor... In September, 1971, the president and other top people from Kikkoman, Tokyo, visited the United States and compared six final candidates for the plant site. Then we finally chose Walworth, Wisconsin. The reasons for the decision are as follows: 1. The labor climate there is excellent. 2. The local people are quite friendly. 3. Walworth is a convenient place for transportation. We can expect to keep freight cost and warehousing costs to a minimum... 4. The state of Wisconsin was receptive to Kikkoman from the beginning. I first visited this state in December, 1970, as a member of the first investigation team... 5. The state of Wisconsin is regarded as a state which produces the best quality foods... 6. In Wisconsin we can enjoy beautiful nature. The air is clean, the water is pure, and we have a lot of green here...

"The total investment will be about 9 million dollars." Address: Vice-President, Kikkoman Foods, Inc., Walworth, Wisconsin.

747. Lee, Kap Sang; Chung, Dong Hyo. 1973. [Effects of *Bacillus natto* on Korean soybean paste]. *Korean J. of Food Science and Technology* 5(3):163-68. June. [33 ref. Kor; eng]
• ***Summary:*** "In order to study on the effects of *Bacillus natto* on the soybean paste used to make natto, there were determined the contents of total nitrogen, amino acid, ammonia-nitrogen, total acid, reducing sugar and proteolytic activity etc.

"The results are summarized as follows;

"1. Fermentation of natto paste was faster than koji paste and the fermentation period were sufficient in thirteen days.

"2. The chemical components, color, taste and flavor of natto paste (added 15% natto) were much better than the other soybean paste.

"3. The contents of ammonia-nitrogen and amino acid of soybean paste were gradually increased during thirteen days in the fermentation, while total nitrogen contents were decreased.

"4. After thirteen days of the fermentation, the contents of amino acid were decreased.

"5. The contents of amino acid of natto paste were much more those of koji paste.

"6. Total acid and reducing sugar contents indicated a rapid increase from nine to fifteen days during the fermentation, and a slower and decrease after fifteen days.

"7. Total acid and reducing sugar contents of natto paste were somewhat higher than those of koji-paste.

"8. No significant difference was observed in the contents of reducing sugar and total acid according to the amount of natto added.

"9. The contents of reducing sugar and amino acid were proportional to the proteolytic activity.

"10. A good soybean paste may be produced by adding 15% natto to the raw material in thirteen days of the fermentation." Discusses *Bacillus subtilis.* Address: Kang Won College, College of Agriculture, Chung-Ang University, Korea.

748. *Washington Post, Times Herald.* 1973. The soybean embargo (Editorial). July 2. p. A22.
• ***Summary:*** Excellent analysis. "The administration's soybean embargo is a staggering confession of incompetence. To say that the embargo had become necessary does not render it desirable. It only demonstrates how far our government had let matters slide. This administration lurches from one economic crisis to the next, reacting in haste, with little evidence of thought or careful planning."

Last summer the USDA got an expensive lesson in the costs of carelessness in promoting farm exports, when the Russians unexpectedly bought a billion dollars worth of grain; it sat on its hands while grain traders sold off the nation's wheat stocks. This year they continued to do nothing while traders sold off our soybean stocks. If the USDA didn't know what was happening, the market surely did. The price of soybean meal and soybeans skyrocketed. Why? Because

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professional brokers realized that, between foreign and domestic sales, they had sold more soybeans than there were to sell.

Earlier this month, the administration was forced to freeze food prices.

"The soybean has become, over the past two decades, crucial to the nutrition of Americans and a large part of the world's population overseas. It is the cheapest and richest of all the sources of protein."

"Particularly in East Asia, soy products are an important part of the human diet. The embargo cuts off the flow of protein to people in Japan and Korea in order to control the prices of eggs and beef in the United States." The administration has made a "sudden and drastic decision to tear up our commitments to deliver the food supplies that we have already sold."

749. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-$A_2$ in the USDA soybean germplasm collection. *Crop Science* 13(4):420-21. July/Aug. [6 ref]
• ***Summary:*** First work on geographic distribution of alleles determined by electrophoretic techniques. Hymowitz reports that the soybean's Ti-b (trypsin inhibitor) allele is present at a much higher frequency in Japanese and Korean soybean germ plasm

germplasm than in soybean populations from other areas of the world.

Note: This is the earliest document seen (Nov. 2003) with the term "soybean germplasm collection" or "USDA soybean germplasm collection" in the title. Address: Dep. of Agronomy, Univ. of Illinois.

750. Smith, Nancy. 1973. UI researcher seeks increased soybean yields: To satisfy world food demand. *News-Gazette* (*Champaign, Illinois*). Aug. 26.
• ***Summary:*** Discusses the work of soybean breeder Dr. Richard Bernard. He notes that soybean research has lagged behind that of other crops. "Many private companies employ corn researchers and hundreds of state and federally supported scientists are engaged in corn research and breeding while soybean research has been carried on by a handful of men." All the leading soybean varieties grown in the North Central states "have been produced by about four breeders."

Between 1952 and 1972, nationwide corn yields increased 132% compared with only 35% for soybeans. This is because, until quite recently, there has been almost no privately financed soybean research, and state experiment stations have shied away from soybean research. But Dr. Bernard reports that the soybean research is now intensifying and the future looks bright.

Dr. Bernard, who is in charge of the USDA germplasm collection for the northern half of the USA, is interested in wild soybeans. He recently visited Japan and Korea to collect samples of cultivated and wild soybeans. He collected almost 600 cultivated Korean soybean varieties and more than 150 wild varieties. His trip will net more than 1,000 new samples of soybean germplasm. "This is the first time in more than 40 years that the U.S. has obtained a large collection of new soybean stock from the Far East" [East Asia]. A photo shows Dr. Bernard checking the growth of a wild soybean plant in a UI greenhouse. Address: News-Gazette Farm Editor.

751. **Product Name:** [Vegimil Vegetable Milk {Soymilk; Renamed Vegemil in 1984} (Vegemil A, Vegemil B, or Vegemil C)].
**Foreign Name:** Vegimil.
**Manufacturer's Name:** Dr. Chung's Foods Company, Ltd.
**Manufacturer's Address:** 194-24 Hwoi Hyun-dong 1-ka, Chung-ku, Seoul, South Korea.
**Date of Introduction:** 1973 October.
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** Soya Bluebook. 1981. p. 60. "Vegimil Soy Milk. Other location: 296-5 Hagal-ri, Kihyeung-myon, Yong In-kun, Kyungki-do." Soya Bluebook. 1983. p. 63. "Vegimil."

Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics. Soya Bluebook. 1984. p. 62. "Vegemil Soy Milk." Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 16, 81-83. This was Korea's first commercial soymilk to be produced on a large scale and bottled. In 1981 their output was estimated at 432 tonnes, increasing to 46,373 tonnes in 1983. STS. 1985. Containers for Soymilk. Shows bottle, green lettering, 180 ml.

Photocopy of Label sent by Anders Lindner. 1989. 200 ml. "Sweet Vegemil B, Soybean Milk."

Note: This is the earliest known commercial soy product made in Korea.

752. **Product Name:** Soft Tofu (Pressed Silken Tofu with Calcium Sulfate), Yaki-dofu (Grilled Tofu), Tubu (Korean-Style Soymilk Curds), Atsuagé (Deep-fried Tofu Cutlets), Agé (Deep-fried Tofu Pouches).
**Manufacturer's Name:** Denver Tofu Co.
**Manufacturer's Address:** 6150 N. Federal Blvd., Westminster (N. Denver), CO 80221. Phone: 808-538-1305.
**Date of Introduction:** 1973-1975.
**New Product–Documentation:** Shurtleff and Aoyagi. 1979. Tofu & Soymilk Production. p. 194. "Tofu cutlet pouches. Firm tofu containing no expanding agent is cut into slices midway in size between the slices for tofu pouches and for tofu cutlets, then fried in a conveyorized deep-fryer in two temperatures of oil causing then to expand somewhat, but not as much as for tofu pouches. Thus they can be used either as soft cutlets or substantial pouches."

Talk with Haru Yamamoto. 1988. Aug. 25. Gives product names and approximate date of introduction.

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753. Snyder, Harry E. 1973. [A simple technique for inhibiting production of green, beany flavor in soybeans]. *Korean J. of Food Science and Technology* 5(1):33-35. [7 ref. Eng; kor]
• ***Summary:*** "If soybeans are presoaked, two minutes heating at 100ºC is sufficient to inhibit production of objectionable green beany flavors; with dry beans, three minutes heating at 100ºC accomplishes the same inhibition." However these brief heat treatments are not enough to inactivate growth inhibitors. Address: Food Technology Department, Iowa State Univ., Ames, Iowa.

754. Fairbank, John K.; Reischauer, Edwin O.; Craig, Albert M. 1973. East Asia: Tradition and transformation. Boston, Massachusetts: Houghton Mifflin Co. xvi + 969 p. Illust. Index. 24 cm.
• ***Summary:*** One of the best books ever written on the history of East Asia–a classic.

Note: Edwin Reischauer, born in Tokyo to missionary parents, was a professor of Far Eastern Languages at Harvard University and the author of a number of influential books on the relationships among the U.S., Japan, and China when he was called to the diplomatic corps by President John F. Kennedy. He served as U.S. ambassador to Japan from 1961 to 1966. He died in Sept. 1990 at La Jolla, California. Address: Harvard Univ.

755. Hartwig, Edgar E. 1973. Varietal development (in soybeans). In: B.E. Caldwell, ed. 1973. Soybeans: Improvement, Production, and Uses. Madison, Wisconsin: American Society of Agronomy. xviii + 681 p. See p. 187-210. Chap. 6. [68 ref]
• ***Summary:*** Contents. 1. Introduction. 2. Maturity classification. 3. Photoperiod response: Latitude, light quality. 4. Early history. 5. Growth habit. 6. Germplasm collection: Range of maturity, seed size (seed weight), percent protein and oil, oil quality, protein quality, seed holding (pod dehiscence and shattering), seeds per pod, pubescent type (pubescence density and erectness, glabrous), response to minerals, source of genes for pest resistance (disease resistance).

7. Varietal development: Introduction and history, the northern states (Lincoln, Harosoy, Clark, Hark, Amsoy, Corsoy, Wayne), the southern states (Ogden, Roanoke, Jackson, Palmetto, Lee), mid-Atlantic states. 8. Genetic background for major U.S. varieties. 9. Breeding for special qualities: Phytophthora rot, brown stem rot, cyst nematodes, resistance to feeding by insects, differences in oil and protein content, vegetable types, height of lower pods, adaptation to short-day regions [i.e. southern latitudes]. 10. Comments.

"Varietal development" has been of great importance in establishing the soybean as a major crop in the USA. Understanding photoperiodism in relation to varietal development has also "been of extreme importance. For no other major crop is photoperiodism as important in determining area of adaptation" (p. 187).

Maturity classification: In the early 1900s, soybeans were often classified on a scale from early to late, and the number of days to maturity was given. But various studies, starting with Haberlandt (1877), including Mooers (1908), and especially those by Garner and Allard (1920-1930) on the significance of day length on flowering behavior (photoperiodism), indicated that "days to maturity was not an adequate means of describing these types. Also, it was not adequate to describe them as early or late"–unless the latitude and date of planting was given, since the average days maturity for any given variety depends strongly on both of these variables. As a method of describing this responsiveness to day length, ten maturity groups were developed. For example, groups OO, O, and I are adapted to the longer days in the northern areas of adaptability in the USA and Canada. Varieties classed in Group VIII are adapted to the southernmost portions of the continental United States.

Early history: Discusses–Perry expedition to Japan (1854), Ball (1907–recognized 23 varieties), Piper & Morse (1910–described 47 soybean types and listed 280 types that had been grown in the Washington, DC, area). By 1922 more than 800 introductions had been made by the USDA and tested in various parts of the United States (Piper & Morse 1923). Some 43 introductions, which were found to be suited for production in the USA, were given names. Suitability for forage production was emphasized. During the 20-year period from 1907 to 1927, more than 2,000 lots of seed received from China, Japan, Korea, Siberia, and India were introduced by the USDA for testing (Morse 1927). Dorsett (1927) collected nearly 1,500 seed lots from northeastern China (39-53º north latitude) during a 2½-year period prior to 1927.

Because of the growing interest in soybeans in the United States, the USDA organized the Dorsett-Morse expedition to the northeast prefectures of China, Korea, and Japan during the years 1929 to 1931. This was the only plant exploration program for which the primary objective was soybean collection. A total of 4,578 seed lots were collected. Of these, 3,379 (74%) were from Korea, 622 (14%) were from China, and 577 (13%) were from Japan. Many of the soybeans from Japan were "large-seeded, vegetable types. Several of these were named in anticipation of their acceptance by the U.S. public, but few were ever grown extensively. One of these, PI 80481 named Rokusun, has a 100-seed weight of 55 gm, the largest seed size known in soybeans."

Germplasm collection: "Prior to 1949, no organized effort was made to maintain soybean introductions. Many were discarded after their initial observation if an immediate use was not recognized. Since that time an effort has been made to catalog the characteristics of each introduction and

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maintain viable seed."

Seed size: The 100-seed weight for soybean varieties currently produced in the USA ranges from 12-18 gm. Varieties classified as vegetable types will usually have a 100-seed weight greater than 20 gm. The seeds of *Glycine max,* the cultivated soybean, range in weight from 4 to 55 gm per 100 seeds. The wild annual soybean, *Glycine ussuriensis,* has very small seeds (1.2 to 1.8 gm/100 seeds).

Concerning vegetable types: "No clear-cut distinction exists to define a vegetable-type soybean. In general, seed size is in excess of 20 gm per 100 seeds and the beans have a milder flavor. Several vegetable-type varieties with somewhat improved agronomic qualities have been released in recent years. Disoy is of Group I; Magna and Prize are of Group II; and Kim, Kanrich, and Verde are of Group III in maturity. Verde produces seed having green cotyledons on maturity, which is assumed to be an advantage when immature seeds are used for canning or freezing."

Tables: (1) Effect of latitude and day length on maturity date of the soybean variety Lincoln planted about May 20. The table shows location, latitude, date it is mature. (2) Approximate length of effective photoperiod at various latitudes for an assumed adapted variety that would be planted May 20 and would mature Sept. 20 at each latitude. (3) Soybean varieties recognized in the U.S. in 1907 and classified as to seed color. There were 6 black, 4 brown, 2 mottled, 2 green, 3 yellowish green, and 6 yellow.

(4) Soybean varieties registered by the Crop Science Society of America since 1942 according to maturity groups and approximate distribution of U.S. acreage by maturity groups. For example, maturity group 00, consisting of Acme, Portage, Flambeau, Altona, and Norman, accounts for only 0.1% of U.S. acreage. Maturity group II counts for 29.0%, III counts for 17.0%, IV counts of 12.0%, etc. (5) Parentage of the ten soybean varieties most widely grown in the U.S. in 1971. For example, Wayne, No. 1, of maturity group III, had as its parentage L49-4091 x Clark.

Note: This chapter was later cited as an early study that classified soybean varieties into different maturity groups based on their photoperiod requirements. Address: Agricultural Research Service–USDA, Stoneville, Mississippi.

756. Office of Rural Development. 1973. Introduction to soybean culture and directions of the research in Korea. Suweon, South Korea. *

• ***Summary:*** In 1923 local varieties were systematically collected in Korea and selections from them were attempted. In 1943 a variety from Japan, Yookoo 3, was released to Korean farmers as an improved variety with high yield.

757. U.S. Department of Agriculture. 1973. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1972. Washington, DC: U.S. Government Printing Office. See p. 103-10.

• ***Summary:*** Table 18 is titled "Title II, Public Law 480, total commodities shipped by program sponsor, fiscal year 1972." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), WRC (World Relief Commission). Each of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here. The foods containing soy protein were sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa (8,131 CSM and 5,311 WSB): Botswana (2,198 CSM), Burundi (99 CSM), Cameroon (220 CSM and 245 WSB), Central African Republic (153 CSM), Gabon (33 WSB), Gambia (271 CSM), Ghana (1,056 CSM and 150 WSB), Guinea (100 CSM), Liberia (243 CSM and 111 WSB), Malawi (132 CSM), Morocco (676 CSM and 54 WSB), Nigeria (867 CSM and 4,124 WSB), Rwanda (173 CSM), Senegal (300 CSM), Sierra Leone (1,510 CSM), Tanzania (96 CSM), Tunisia (4 CSM and 43 WSB), Upper Volta (33 CSM and 41 WSB), Zaire (510 WSB and 30 soya flour).

Near East-South Asia (348,766 CSM and 97,345 WSB): Afghanistan (699 CSM), Ceylon (1,462 WSB), Gaza [occupied by Israel since 1967] (1,622 CSM and 1,410 WSB), India (234,993 CSM and 27,006 WSB and 8,726 soya flour), Jordan (2,137 CSM), Jordan-West Bank [occupied by Israel since 1967] (758 CSM and 1,067 WSB), Lebanon (385 CSM), Nepal (55 WSB), Pakistan (1,197 CSM and 325 WSB), Syria (570 CSM), Turkey (275 WSB), NESA regional; emergency feeding of East Pakistani children by UNICEF (106,405 CSM and 65,745 WSB).

Note: This is the earliest document seen (Oct. 2010) concerning soybean products (CSM, WSB) in Bangladesh after it became an independent country. This document contains the earliest date seen for soybean products in Bangladesh (1972); soybeans as such have not yet been reported.

Far East [East Asia] (27,014 CSM and 4,121 WSB): China, Republic of [Taiwan] (15 CSM), Indonesia (6,791 CSM and 2,380 WSB), Korea (2,347 CSM), Laos (1,699 CSM and 1,741 WSB), Malaysia (102 CSM), Philippines (9,107 CSM), Vietnam (6,953 CSM).

Latin America (63,980 CSM and 31,274 WSB): Bolivia (2,197 CSM and 660 WSB), Brazil (25,171 CSM and 11,204 WSB), British Honduras [Belize] (507 CSM and 215 WSB), Chile (300 CSM and 2,812 WSB), Colombia (6,284 CSM

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and 4,608 WSB), Costa Rica (3,042 CSM), Dominica (2 CSM), Dominican Republic (8,118 CSM and 3,309 WSB), Ecuador (2,013 CSM and 1,722 WSB), El Salvador (1,195 CSM), Grenada (11 CSM), Guatemala (2,037 CSM and 962 WSB), Guyana (370 CSM and 474 WSB), Haiti (1,121 CSM), Honduras (716 CSM and 51 WSB), Jamaica (364 CSM and 198 WSB), Nicaragua (375 CSM and 760 WSB), Panama (409 CSM and 639 WSB), Paraguay (759 CSM), Peru (7,850 CSM and 3,806 WSB), St. Vincent (17 CSM), Surinam (2 CSM), Uruguay (950 CSM and 284 WSB).

Grand total by commodity: 447,891,000 lb of CSM and 138,051,000 lb of WSB. Agencies distributing the most CSM and WSB (in million lb): CARE 268, UNICEF 174, CRS 89.

Concerning "veg oil" (soybean oil) shipped under P.L. 480 Title II in fiscal year 1972: India received 196.069 million lb [88,029 metric tons] (p. 106).

Note: This is the earliest document seen (Aug. 2009) concerning soybean products (Corn-Soy Meal) in Botswana. This document contains the earliest date seen for soybean products in Botswana (1972); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

758. Research Libraries Group (RLG). 1973--. RLIN (Research Libraries Information Network) (Computerized bibliographic database). 1200 Villa St., Mountain View, CA 94041. [19000000* ref]

• ***Summary:*** This database is more academic than OCLC [WorldCat]. According to the *Directory of Online Databases* (July 1990), this database comprises nearly 19 million cataloging records from LC MARC tapes, GPO (Government Printing Office) tapes, National Library of Medicine tapes, tapes of member libraries, etc.

Talk with Jennifer Heartsill of RLIN. 1990. Sept. 27. The database was developed at Stanford University and originally named BALLOTS (Bibliographic Automation of Large Library Operations using a Time Sharing system). Jennifer was there while it was being developed. RLIN originated at about the same time as OCLC; the two were developed independently and in parallel. OCLC took a very different approach to how they capitalized and began operations. RLIN first became available for use in 1973. Shortly thereafter they became the system of choice for RLG, which originated on the East Coast. BALLOTS preceded slightly RLG; they were separated by the continent. Then the system began to grow, with much of the funding from members. In 1989 the system became free of debt. Each user pays a fee for use; formerly this was on a transaction basis, now it is on a search basis. In RLG, there are now 34 governing members, 3 principal members, 60 special members, and a multitude of users–any library or individual can use RLIN. RLIN was originally located on the Stanford campus, but recently the organization moved to nearby Mountain View. RLIN, a non-profit group, still uses the Stanford computers. There is a flat annual fee for members.

OCLC has a large database and each record in it is for a unique title; appended to the record are holding symbols which show which libraries own that title. In RLIN, any library can have a complete record for its copy of a title, and include any special notes about the work (such as branch library location, autographed copy, etc.). Thus RLIN contains over 40 million bibliographic records, but only about 15 million unique titles, compared with 20-22 million for OCLC. RLIN has some unique databases, such as citations files, and the holdings of archival repositories. There are 9 bibliographic files in RLIN based on "material type": books, archival and manuscripts control (which have notes like abstracts), citations, maps, sound recordings, the 18th century Short Title Catalog (everything published in English or in an English-speaking country up to the year 1800), art, research in progress, etc. Both subscribe to the same records that the Library of Congress (LC) and the National Agricultural Library (NAL) put out on tape, but LC enters some records directly into the RLIN database for some things such as East Asiatic and Hebrew vernacular via Multiscript Workstations. They are now going out and looking for machine readable data. They have just added a new "citations file" from Engineering Information Inc. that gives article level information within serials and proceedings. RLIN and OCLC both use the MARC format, with numbered fields, and both now have a CJK (Chinese-Japanese-Korean) language service.

Update: Talk with reference librarians at Cal-Berkeley and Cal-Davis. 1991. March. RLIN is having serious financial troubles. It may either try to merge with OCLC (but OCLC may not want to buy it) or it may just die. The cost for cataloging has been too high. It started out being used only for cataloging, then backed into being a reference tool.

Article in Information Today. 1991. April. p. 24. "RLG board sets course for 1990s." They plan "major expansion of bibliographic access to archival holdings, computer files, and visual materials." RLG president is James Michalko.

Update from Western Archives Institute. 1993. June. RLIN is generally considered a better quality database design than OCLC and catalogers like it better; it allows more subject headings and longer record length. But OCLC is a stronger organization and it is easier to do interlibrary loan on OCLC.

Talk with research librarian at University of California at Berkeley. 1994. July 20. The records in RLIN are of better quality and done to a higher standard than those in OCLC; many of the OCLC records are entered by public libraries. RLIN also has a much better search engine. Address: Mountain View, California. Phone: 800-537-7546.

759. Sterner, Mark M. 1974. Low-cost protein foods: Increasing their supply and acceptance in developing countries. *Cereal Science Today* 19(1):14-17. Jan. [2 ref]

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• ***Summary:*** Contents: Introduction. Poverty and hunger. Population factors. Inexperienced leadership. Culture-oriented protein foods. Soy products. A total-development approach. New solutions needed. The tragedy of protein deficiency. Technical assistance and training.

World population is growing at about 1.5% each year while world agricultural production is increasing at the rate of about 2% annually. However, the heart of the problem of world protein supply is not what is happening on average or on the whole. "It is the fact that there are great differences in the consumption of proteins between countries, between socioeconomic groups within a country, and between family members in the home."

Today 64% of the world's population are "protein hungry." They do not consume enough protein. Sterner lived in Korea until 5 months ago and has seen the problem first hand. To his surprise, he was told by the administrator of a college in Sri Lanka, Ceylon, that the school's small soy-milk plant (put there by the father of soy milk, Dr. Harry Miller) is kept running at full capacity, when soybeans are available, to keep up with the demand of the college cafeteria. He explained that the students much prefer this unsophisticated form of soy milk to the dried soy milk (DSM) provided by CARE.

The article discusses the work of Meals for Millions and contains four photos related to that organization. Address: Exec. Director, Meals for Millions Foundation, Santa Monica, California.

760. Meals for Millions Foundation. 1974. Annual report 1973. Self-help for a hungry world. Santa Monica, California: MFM Foundation. 6 p. 28 cm.
• ***Summary:*** Submitted by Mark M. Sterner, Executive Director. Cover is printed in orange and black ink on white, as if this were one issue of the *Meals for Millions Newsletter.* In the upper left corner is MFM's new symbol [logo], a plant growing out of mounded soil in a bowl which is half of a globe. Below that: "Self-help for a hungry world." The pages are unnumbered.

Contents: Introduction, by Mark M. Sterner ("As most people the world over now recognize, any long-range view of a solution to the world's global hunger problem must rest on the premise of *improvement through self-help.* To reflect this commitment more precisely, MFM looks with pride to its new symbol image adopted formally by its Board of Directors this past fall" [of 1973]). MFM converts goals into action! Vigorous four point program stresses: technical assistance, through education, through on-going programs & emergency relief, through research and development. MFM reaches out in Friendship (To Mexico {Mexican MPF is named *Protea*}, Mississippi, Brazil, American Southwest).

How MFM spent its donor dollars in 1973. Income: $377,000. Expenses: $446,000 of which 4.64% for administration, 19.29% used for fund raising, 12.58% for public relations, and 81.95% [sic, 63.49%] for programs. Board of Directors.

Photos show: (1) Drilling a well in Ecuador with MFM's mobile well-drilling rig. (2) Mark Sterner with students around a Wenger X-5 extruder–as part of a 4-month intensive training program at MFM's International Institute of Protein Food Technology (IIPFT)®. Plus many other photos. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California 90406. Phone: 870-0451.

761. *Soybean Digest.* 1974. The Far East. May. p. 10-13.
• ***Summary:*** The countries of Korea, Taiwan, and Japan have long been important customers of U.S. soybeans. American Soybean Assoc. market development efforts in each of these countries are discussed. In Japan, the main goals are to increase consumption of soybean oil and meat. "In July 1972, a contract was signed between ASA and Yoshihara Oil Mill Ltd., one of Japan's leading oil manufacturers, to test market and promote identified 100% soy oil on a joint basis. Under the contract, ASA reimburses Yoshihara for 50% of their advertising costs up to a set figure.

"Yoshihara came out with three newly designed packs in varying sizes with the Japanese word 'Daizu' which means 'soybean' on the container front which are being marketed in the Tokyo and Osaka areas. Yoshihara has exercised maximum efforts in merchandising their new products...

"During the first phase of the joint ASA/Yoshihara program, Yoshihara sold 2,200,000 lbs. of identified soy oil, not including oil that was sold through Mitsui brand nor the identified soy oil sold as part of gift sets. Yoshihara has set a precedent by identifying their oil products which, most likely, will be followed by other processing companies in Japan."

Also discusses ASA efforts to introduce new soy foods in Japan through the school lunch program. In 1973 the item given the top rating was "Sloppy Joe," which contained 70% hamburger and 30% soy protein.

"Korea: Millions of Koreans are being introduced to improved cooking methods and high-protein recipes using soy foods through an American Soybean Assn. (ASA) market development project.

"ASA works with the Korean Food Development Center director, Mrs. Jun Wang, in instructing urban and rural homemakers, young women attending cooking classes and university and high school students on improved cooking methods and recipes.

"ASA has been associated with the program since 1970 and its success and acceptance has caused an expansion of activities.

"The program is the initial phase of an expanded market development effort to be implemented when Korean economic indicators are favorable. Koreans are being educated in preparing relatively inexpensive meals high in protein. By showing the people that high-protein meals

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made from soybeans or cooked in soy oil are tasty, the U.S. soybean producer has been able to expand another one of the world's soybean markets.

"ASA participation, in cooperation with FAS/ Washington, is made possible through market development funds contributed by U.S. soybean producers. Stepped-up ASA participation in the program has provided funds for operating a kitchen bus used in mobile cooking demonstrations, cookbooks, recipes and consumer education materials. Following the cooking demonstration, samples of the prepared dishes using soy products are distributed to members of the audience. Improved cooking methods and high-protein recipes are nutritional areas on which Koreans place much emphasis.

"Newspapers, magazines, radio and television stations and schools are constantly seeking more information on the program. Koreans realize the importance of good nutrition and are educating as many as possible through all available sources.

"Mrs. Wang followed a schedule in the last 6 months of 1973 that made her an often-quoted and familiar face on Korean television. During this time her cooking methods and recipes were featured in 12 magazine articles, 9 newspaper features, 50 television and radio programs, 21 'itinerant' cooking demonstrations, 42 kitchen bus demonstrations and 14 exhibits and classes.

"Korean television and radio officials estimate the programs she has appeared on have been received by millions of Koreans. The newspaper and magazine articles also circulate to millions of Koreans."

762. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). 1974. Koreans expand soybean output by planting rice paddy dikes. July 8. p. 8-9.
• ***Summary:*** Korea, which doubled its imports of U.S. soybeans last year, is again promoting a program to boost domestic oilseed production by planting soybeans on rice paddy dikes. This practice, which was mandatory under the Japanese occupation, had been abandoned until revived last year. In 1973, "dike-bean" acreage was estimated at 86,485 acres. The Ministry of Agriculture and Forestry (MAF) estimates that the maximum area for dike-beans now ranges from 93,900 to 135,900 acres. A significant portion of the crop harvested daily in the summer to be consumed as a cooked, green vegetable, much as Americans eat lima beans. Nearly all of Korea's soybean production is consumed as food. Industry sources estimate that 70% is used in homes for making soy sauce and paste, 20% for bean curd, and 10% for bean sprouts. Address: Office of U.S. Agricultural Attaché, Seoul.

763. *Soybean Digest.* 1974. Korea expands soybean output. Aug. p. 35.
• ***Summary:*** "Despite Korea's efforts to bolster domestic oilseed production by planting soybeans on rice paddy dikes, permanent market growth for U.S. soybean sales in Korea can still occur, according to Agriculture Department officials.

"In 1973, 'dike-bean' acreage was estimated at 86,485 acres, well above the total 'rise in soybean planted area of 68,188 acres. Also in 1973, Korea imported some 81,000 MT of soybeans, all from the U.S., and more than double the 36,680 tons imported in 1972.

"Soybeans led all other Korean oilseed crops last year. Acreage rose by 10% to total 769,963 acres, while production was reported at 245,822 tons.

"Korea estimates the maximum area for dike-beans now ranges from 93,900 to 135,900 acres.

"Production goals for 1974 envisage a 56% increase in oilseed production with soybeans accounting for 82% of the goal. Soybean outturn in 1974 is targeted at 323,000 tons, a gain of 31%, with area planted at 946,000 acres, an increase of 23% of 1973."

764. *Soybean Digest.* 1974. The international outlook of the soybean market. Oct. p. 8-10.
• ***Summary:*** Contents: Introduction. Western Europe. Italy (Ferruzzi). Japan. Taiwan and Korea. Latin America.

"Italy: ASA's [American Soybean Assoc.] already made a solid start in expanding soy oil prospects in Europe with an identified soy oil campaign now in its second year in Italy. Watts calls the agreement with Ferruzzi and Company the one outstanding market development activity carried out in Europe recently.

"'Di Soia Si Vivra' (with soy we live), Italian housewives heard again and again during the advertising campaign. And soy oil sold. 'After 7 months, over 50% of the Ferruzzi production at his two plants was identified soy oil. After 12 months, 96% of it was identified soy,' Watts says. 'In the 12 months of the campaign about 20 million lbs. of soy oil were sold to the Italian people.'

"A major competitor began a similar campaign on its own only a few weeks after Ferruzzi started his promotion effort. 'Now, at least 11 brands of soy oil are on the shelves in Italy,' reports Watts."

Note: This is the 2nd earliest document seen (Aug. 2020) concerning the work of Ferruzzi and Co. with soybeans.

Page 10: Karl Sera is now ASA animal nutritionist in Japan.

A pie chart shows 1974-75 U.S. soybean sales commitments: EEC 45%, other Western Europe 6.1%, Japan 21.9%, China 4%, other 4%, undesignated 19.5%.

Tables show: (1) U.S. soybean exports (July to June fiscal year basis) for two years (1972-73, and 1973-74) in quantity (million bushels) and value (million dollars) to: EEC, Spain, Canada, Israel, Japan, Soviet Union, China, Taiwan, unidentified (transshipments), other. (2) U.S. soybean meal exports; the five biggest buyers are West

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Germany, Japan, Italy, Netherlands, and Poland-Danzig. (3) U.S. soy oil exports; the five biggest buyers are Pakistan, Peru, Mexico, Canada, and Yugoslavia.

765. *Soybean News* (*NSCIC*). 1974. Dr. Bernard on U.S. science team visiting PRC [People's Republic of China]. 26(1):6. Oct.
• ***Summary:*** "A plant Science Mission, under the auspices of the National Academy of Sciences and led by Dr. Sterling Wortman, Rockefeller Foundation, departed late August for the People's Republic of China (PRC). The Mission will observe firsthand scientific developments in PRC agriculture, and this will help initiate a closer relationship between scientists of the two countries. Later this year a PRC delegation will visit the United States.

"Members of the Mission include: Dr. Richard L. Bernard, Dr. Norman E. Borlaug, Dr. Glenn W. Burton, Dr. Nyle C. Brady, John L. Creech, Dr. Jack R. Harlan, Dr. Arthur Kellman, Dr. Henry M. Munger, and Dr. George F. Sprague.

"Dr. Bernard is in charge of the U.S. world soybean germ plasm collection. He made a collection trip in Japan and Korea in the fall of 1972." Address: Urbana, Illinois.

766. Im, Yon-t'aek. 1974. Changyu yangjo e issoso ui hyoso chep'um iyong e kwanhan yon'gu [Studies on the utilization of enzyme preparations for the fermented process of soy-sauce]. M.A. thesis, Koryo Taehokkyo. iii + 34 p. Nov. 30. [37 ref. Kor; eng]
Address: South Korea.

767. Phatak, Hemant Chintaman. 1974. Seed-borne plant viruses–Identification and diagnosis in seed health testing. *Seed Science and Technology* 2(1):3-155. [216* ref]
• ***Summary:*** Soybeans and soybean mosaic virus (*Maphiflexus sojae*) are discussed on pages 39-46, and p. 114-18. "Sixteen samples [of soybeans] from four countries, seven each from India and Korea, and one each from Lebanon and Lesotho, were tested during 1969 to 1971. Dry examination revealed morphological abnormalities in some samples, especially the one from Lebanon... The soybean sample from Lebanon had several discolored seeds." Five of the 7 seeds from India, 4 of the 7 from Korea, and the 1 from Lebanon were found to be infected with a virus. Also discusses *Myzus persicae* (an insect; Homoptera: Aphididae).

Note: It is not clear whether or not the soybeans from Lebanon had been cultivated in Lebanon. Address: Danish Government Inst. of Seed Pathology for Developing Countries, Ryvangs allé 78, 2900 Hellerup, Copenhagen, Denmark; Present address: Div. of Mycology and Plant Pathology, Indian Agricultural Research Inst., New Delhi-12, India.

768. Wood, R. Bruce. comp. 1974. Soviet soybean varieties: An annotated bibliography. Urbana, Illinois. 187 p. Photocopied from 5 x 8-inch typed file cards. [20 ref. Eng]
• ***Summary:*** Chapters are divided by regions. A history of the named regional varieties developed is given, along with the source of the germplasm, the name of the plant breeder(s), and the organization with which he or she worked, a description of the plant (incl. morphology, maturity, composition, seed weight {weight of 1000 seeds}, yield), citations for the source of the above information, and in some cases a translation and/or explanation of the name in English. Amur region (Amur Oblast and Khabarovsk Kray) grain varieties and fodder varieties (p. 1-27). Maritime (Primorskiy) Kray grain and fodder varieties (p. 28-36). Central Asian fodder varieties (p. 37-38). Georgian grain varieties (p. 38). North Caucasian grain varieties (within Russia; p. 48-54). Ukranian grain varieties (p. 55-64). Moldavian grain varieties (p. 65-68). Prospective varieties and/or those undergoing trials (p. 68-154). Baltic varieties (Latvia and Lithuania; p. 154-64). Varieties of undetermined origin (p. 164-).

Page 1 states that a number of varieties were developed at the "former Amur Oblast State Agricultural Experiment Station in Blagoveshchensk, now the All-Union Scientific Research Institute of Soy." Many of the stock plants were chosen during the period from 1930 to 1939. Page 43 notes: "Imeretinskaya (mestnaya): This old-variety population is one of three major ecologic types grown for more than 90 years [i.e. since 1884 or before] in the Georgian SSR. (The other two variety populations are Guriyskaya and Chiaturskaya.) This material was originally imported from China, Korea, and Japan. Attempts were made during the 1st Five-Year Plan (1928-32), when the USSR first began to cultivate soy on a large scale, to subject these local populations to the selection process in order to develop purer lines with stable and more desirable characteristics. These were then used for hybridization. According to Enken (1971, 125), these crosses did not yield positive results. The breeders were apparently successful, however, in developing purer strains of the local material, for Imeretinskaya mestnaya was in commercial production by 1930 (Vul'fson, 1935, 59), and first regionalized for the Georgian SSR in 1933 (Generalov, 1968, 146). As such it was one of the first Soviet domestic soy varieties, and one of several original varieties still having regional status after more than 40 years."

The Amur Oblast State Agricultural Experiment Station was organized in 1923-24. "The Amur Yellow Population should not be confused with the soy population used by the pre-Revolutionary Amur Experiment Station in 1912-18, which had a different composition."

Page 188 shows the leading Soviet soybean varieties in 1970, ranked by sown acreage: Salyut 216, Amur region, 346,900 ha (hectares). Khabarovskaya 4, Amur region, 141,267 ha. Amurskaya 41, Amur region, 100,995 ha.

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Primorskaya 494, Maritime Kray, 76,191 ha. Primorskaya 529, Maritime Kray, 65,233 ha. Primorskaya 762, Maritime Kray, 21,300 ha. Amurskaya 310, Amur region, 18,321 ha. Yubileynaya, Amur region, 14,755 ha.

Table 2 lists the names of all soybean varieties entered in the 1962-69 state variety trials, together with the organization that developed each variety. Each of the many Amurskaya varieties was developed by The All-Union Scientific Research Institute of Soy [soybean research institute] (Far Eastern Region, Amur Oblast, city of Blagoveschchensk).

Note: This is the 2nd earliest document seen (Oct. 2015) concerning the cultivation of soybeans in Latvia. This document contains the earliest date seen for the cultivation of soybeans in Latvia (1974). The source of these soybeans is unknown. Address: Urbana, Illinois.

769. Hun, Kim E. 1974. [Changes in carbohydrates of soybean seeds]. *Kangwon Taehak Yongyu Nonmunjip* (*Research Bulletin of Kang Won University*) 8:24-26. (Chem. Abst. 85:139816u). [Kor]*

• ***Summary:*** The changes were measured using thin-layer chromatography. As germination proceeded, the contents of glucose, fructose, and galactose increased, whereas the contents of raffinose and stachyose (both oligosaccharides, which cause flatulence) decreased. Stachyose disappeared by the end of 96 hours of germination. This shows that sprouting improves the digestibility of soybeans and increases their potential for use as human foods. Address: South Korea.

770. Korea. 1974. Seoul, Korea: International Publicity Corp. 68 p. Illust. (color). 24 cm. [Eng]*

• ***Summary:*** Soybeans can be used to make six different foods: Soy sauce, soybean mash, roasted soy flour, soy sprouts, tofu, and soybean oil. Many Koreans still make their own soy sauce at home, starting in the fall. A detailed description of the process is given.

771. Kwon, S.H. 1974. [Soybean culture under tropical environment]. *Korean J. of Breeding* 6(2):56-59. [Kor] Address: Applied Genetics Lab., Korea Atomic Energy Research Inst., Seoul, South Korea.

772. Park, Yeon-Kyu. 1974. [Effects of varieties and seeding dates on the yield components, protein and oil content in soybean]. *Korean J. of Crop Science* 15:77-83. [33 ref. Kor; eng]

• ***Summary:*** "The major results were as follows.

"1. Yields were less by the late seeding. When early seeded the plants had many branch pods, and had high proportion of empty pods, and one grain pods, but on main stem, the proportion of the number of two and three grain pods was higher than that of branch pods. Among varieties, Chung Buk Baek had a high proportion of two and three grain pods, Keum Doo and Chang dan Beak Mok had a higher proportion of one and two grain pods, and Iksan had a high proportion of one and three grain pods.

"2. Protein content was highest in the plots seeded on May 15th, but oil content was highest in the plots seeded on June 25th, Chang dan Baek Mok had the highest proportion of protein content and Iksan had the highest proportion of oil content." Address: Chung Buk College, Korea.

773. Yang, Charles Y. 1974. Soybean rust. *AVRDC, Seminar Series.* 22 p. *

• ***Summary:*** A good overview of soybean rust. This fungal disease "has been recorded in the northeastern, central, and southwestern provinces of China. It has also been reported in the USSR, Korea, Okinawa, Taiwan, the Philippines, Australia, Ceylon, India, Malaysia, Thailand, Cambodia, and Vietnam. Cultivated varieties of soybean known to be rust resistant in the past are now susceptible. Taichung 4 had much more field tolerance to soybean rust, with relatively fewer pustules, than other cultivated varieties. Two physiological races of this rust have been identified through their characteristic pathogenic reactions... It is believed that there can be 6-8 cycles of the rust produced within one growing season" (from AVRDC 1992, #452). Address: Kyushu Univ., Japan.

774. Hsiao, Liang-lin. 1974. China's foreign trade statistics, 1864-1949. Cambridge, Massachusetts: East Asian Research Center, Harvard University. Distributed by Harvard University Press. xvi + 297 p. 29 cm.

• ***Summary:*** Table 3 (p. 80-82) shows "Principal exports of China 1867-1941, 1945-1948," tracks "Beans and peas," "Bean cake" and "Yellow bean." For each of these three it gives statistics for quantity (in piculs) and value (before 1874 in taels, 1874-1932 in Haikwan taels, 1933-1947 in dollars, 1948 in gold yuan. 000 omitted). The definitions of the three basic products, which change frequently, are explained in detail at the bottom of each page.

The peak year for exports of "Beans and peas" was 1929 (45,588 piculs), with a collapse in exports of "Beans and peas" in 1933.

Statistics for "Bean cake" exports started to be recorded in 1894 and the peak year was 1926 (26,055 piculs), with a collapse in bean cake exports in 1933.

Statistics for "Yellow bean" [soybean] exports started to be recorded in 1913 and the peak year was 1929 (41,015 piculs), with a collapse in yellow bean exports in 1933.

Similar tables show: Kaoliang, millet, wheat, wheat flour (p. 83). Groundnuts, groundnuts–shelled, sesamum seed (p. 99-100).

"China's imports and exports by principal countries 1864-1941, 1946-1948," shows imports, exports and total for Italy, Japan, Korea (p. 152-53).

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"China's imports and exports by principal ports 1867-1941, 1946-1948," shows imports, exports and total for Antung, Canton, Dairen, Hankow, Harbin and Tsingtao" (p. 168-73).

"Foreign exchange rates 1862-1941 (Equivalent of one Haikwan tael before 1933, one dollar from 1933 to 1941)" shows rates for the British pound (from 1862), American dollar (from 1868), French franc (from 1868), Reichmark (from 1886), Hong Kong dollar (from 1881), Japanese yen (from 1903), Mexican dollar (from 1881), Russian ruble (from 1913), and Indian rupee (from 1895).

775. U.S. Department of Agriculture. 1974. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1973. Washington, DC: U.S. Government Printing Office. See p. 94-101.

• ***Summary:*** Table 18 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1973." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here. The foods containing soy protein were sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa (24,340 CSM and 6,8857 WSB): Algeria (1 WSB), Botswana (1,398 CSM), Burundi (464 CSM), Cameroon (47 CSM), Central African Republic (67 CSM), Chad (1 CSM and 1 WSB), Congo (115 WSB), Dahomey (124 CSM), Ethiopia (395 CSM), Gabon (46 WSB), Gambia (211 CSM), Ghana (843 CSM and 1,272 WSB), Ivory Coast (546 WSB), Kenya (409 CSM and 400 WSB), Lesotho (299 WSB), Liberia (1,247 CSM and 487 WSB), Malagasy (365 CSM and 2 WSB), Malawi (210 CSM), Mali (230 CSM), Mauritania (235 CSM), Morocco (908 CSM and 890 WSB), Niger (289 CSM), Nigeria (1,197 CSM), Rwanda (82 CSM and 570 WSB), Senegal (643 CSM), Sierra Leone (2,309 CSM), Sudan (3,826 CSM), Swaziland (57 CSM), Tanzania (3,991 CSM and 5 WSB), Togo (1,083 CSM and 1,562 WSB), Tunisia (2,368 CSM and 485 WSB), Upper Volta (878 CSM and 14 WSB), Zaire (419 WSB and 190 WSB), Zambia (44 CSM).

Europe (27 CSM): Malta (27 CSM).

Near East-South Asia (269,188 CSM and 94,141 WSB): Afghanistan (1 CSM), Bangladesh (99794 CSM and 54,631 CSB), Egypt (3,593 CSM and 2 WSB), Gaza [occupied by Israel since 1967] (1,509 CSM and 3,564 WSB), India (156,216 CSM and 15,768 WSB and 775 soya flour), Iraq (997 CSM), Jordan (2,319 CSM and 536 WSB), Jordan-West Bank [occupied by Israel since 1967] (549 CSM and 1,186 WSB), Lebanon (227 CSM and 411 WSB), Nepal (1,000 CSM and 55 WSB), Pakistan (9,933 WSB), Sri Lanka (1,000 WSB and 50 soya flour), Syria (470 CSM and 473 WSB), Turkey (6,582 WSB), Yemen (People's Democratic Republic of Yemen, or South Yemen) (151 CSM), Yemen (Yemen Arab Republic) (2,513 CSM).

East Asia (41,450 CSM and 20,694 WSB): Fiji (2 CSM and 2 WSB), Indonesia (268 CSM and 12,981 WSB), Korea (1,997 CSM), Laos (2,378 CSM and 750 WSB), Macao (29 CSM), Malaysia (1,124 CSM and 65 WSB), Philippines (22,416 CSM), Singapore (10 WSB), Vietnam (13,236 CSM and 6,886 WSB).

Latin America (94,598 CSM and 42,404 WSB): Bolivia (1,534 CSM), Brazil (33,197 CSM and 5,676 WSB), British Honduras [Belize] (333 CSM and 110 WSB), Chile (548 CSM and 6,038 WSB), Colombia (13,043 CSM and 5,202 WSB), Costa Rica (2,792 CSM), Dominica (78 CSM), Dominican Republic (11,584 CSM and 3,486 WSB), Ecuador (2,253 CSM and 5,446 WSB), El Salvador (1,343 CSM and 2,466 WSB), Grenada (41 CSM), Guatemala (4,007 CSM and 1,090 WSB), Guyana (631 CSM), Haiti (1,581 CSM and 3,395 WSB), Honduras (1,297 CSM and 1,523 WSB), Jamaica (1,150 CSM and 657 WSB), Nicaragua (6,850 CSM and 4,126 WSB), Panama (853 CSM and 699 WSB), Paraguay (3,385 CSM), Peru (7,522 CSM and 1,993 WSB), St. Lucia (81 CSM), St. Vincent (51 CSM), Trinidad and Tobago (2 CSM and 1 WSB), Uruguay (442 CSM and 496 WSB).

Grand total: 429,603,000 lb of CSM and 164,124,000 lb of WSB. Agencies distributing the most CSM and WSB (in million lb): CARE 204, UNICEF 163, CRS 151.

Concerning "veg oil" (soybean oil) shipped under P.L. 480 Title II in fiscal year 1973: India received 61.881 million lb [28,069 metric tons] (p. 97).

Note: This is the earliest document seen (March 2021) concerning soybean products (soy flour, CSM, or WSB) in Chad, Mauritania, and Niger. This document contains the earliest date seen for soybean products (cereal-soy blends) in Chad, Mauritania, and Niger (1973); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

776. American Soybean Assoc. 1974? Soybeans: From America's fertile soils the worlds versatile protein resource. Hudson, Iowa. 16 p. Undated. No page numbers. All color.

• ***Summary:*** On a page titled "Utilization," color photos show many soy products including: Milnot (can), Worthington Soyameat (can), Nabisco Sociables (paperboard box), Candied Pernuts: Toasted Soybeans (paperboard box), Bac*Os (glass jar), Crisco (shortening; can), Hain Soy Oil

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(glass jar), Dream Whip: Whipped Topping Mix (paperboard box), Hamburger Helper (paperboard box), Worthington Veja-Links (can), RG Lecithin (jar), Yoshihara Oil Mill, Ltd. Golden Soybean Salad Oil (can, 2 sizes), and 3 brands of bottled soymilk made in Korea. Another page shows Soyor bottled soy oil. The addresses of American Soybean Association offices in Hudson, Iowa (USA), Tokyo (Japan), Taipei (Taiwan), Brussels (Belgium), Hamburg (West Germany), Vienna (Austria), and Mexico City (Mexico) are given. Address: Hudson, Iowa.

777. *Honolulu Advertiser* (*The*) (*Hawaii*). 1975. Deer Garden is home of authentic Korean cuisine. Jan. 19. p. 128-29.
• ***Summary:*** Deer Garden is on the second floor of the Waikiki Resort Hotel. "A most exotic 'meal in a bowl' is Bi Bim-Pahb..."

"Chilis, mushrooms, denjang (Korean miso), seaweeds,... and red hot bean paste all brought from Seoul or purchased from local importing Korean stores."

"One other dish that must be described here however is Sin Sul Lo, which tops the menu at $7.50, and is suitable as a dish to share. This is an ancient royal food of Korea, always containing nine different ingredients. Prepared at table in the exquisite and traditional Korean brass cooking pot with a little flame heater in the middle it contains seasoned beef strips or sliced chicken breasts or shrimp, with fresh mushrooms, bean curd [tofu], fresh egg noodles..."

778. Canupp-Penrod, R. Lewis. 1975. Soy you want soy sauce [Make yer own]. *Mother Earth News* No. 31. Jan. p. 36-37. [2 ref]
• ***Summary:*** The author is writing a book on soybean products. "Perhaps the best description of the basic chemical process involved [in making soy sauce] was given by a traveler named Bishop, who visited Korea between 1894 and 1897. He wrote, 'Oil of sesamum is largely used in cooking, as well as vinegar, soy and other sauces of pungent and objectionable odors, the basis of most of them being capsicums and fermented rotten beans.' In Bishop's time, Koreans made soy sauce in the fall, after the harvesting of the dried soybeans." He proceeds to describe the ancient Korean process for making mei-ju [meju, soybean koji] and from it soy sauce.

Then he describes briefly how to make Korean miso (*toin-chang* {*doenjang*}), tofu (*yu-bu*), soybeans boiled in soy sauce (*kong-cha-ban*), dry roasted soynuts, soy sprouts, and pickled soy sprouts.

Illustrations show: (1) A truncated cone of pounded soybeans, 8-10 inches high by 12 inches in diameter, as it begins its period of fermentation on a homemade mat of cattail leaves. (2) The cone is later enclosed in tapered strips of unbleached muslin and hung from a hook–as under the eaves or a rafter.

779. Meals for Millions Foundation. 1975. The question is not whether we will help, but how [Annual report 1974]. Santa Monica, California: MFM Foundation. 6 p. 28 cm.
• ***Summary:*** Mark M. Sterner is Executive Director. Cover is as if this were one issue of the *Meals for Millions Newsletter.* In the upper left corner is MFM's logo (slightly redesigned) of a plant growing out of mounded soil in a bowl which is half of a globe. Below that: "Self-help for a hungry world." The pages are unnumbered.

Contents: MFM provides the "how" in Korean beverage plant (The plant began regular operation in July 1974, producing Super D soy beverage, bottled and inexpensive enough to compete with soft drinks. Mr. Jong-Yoon Chun is president of Sam Yang Foods). MFM sends seeding machine to Ecuador for planting soybeans. MFM moves into new self-help project in Midwest (Bootheel, Missouri). MFM's International Institute of Protein Food Technology (Patricia Stevens, program director, says "the course will bear the official title of 'Low-Cost, High Protein Foods'"). Tennessee. Uganda. New Mexico. Shipments of MPF to drought victims in countries bordering the rainless Sahara.

How MFM spent its donor dollars in 1973. Income: $486,544 (up 28.9% from last year) of which 3.4% used for general administration, 9.5% for public relations, 17.5% for fund raising, and 69% for programs.

Photos show: (1) Mark Sterner with Mr. Chun in Korea. (2) Korean woman operating bottling equipment. (3) Two Korean boys holding bottle of Super D beverage. Hank Sterner, MFM's Pilot Plant Supervisor, loading agricultural equipment for shipment of Ecuador. (4) Starving African children. Address: 1800 Olympic Boulevard (P.O. Box 1666), Santa Monica, California 90406. Phone: 870-0451.

780. Ene, L.S.O. 1975. A potential for soybean (Glycine Max. Linn. Merrill) production in parts of the Eastern States of Nigeria. *Nigerian J. of Science* 9(1):111-29. March. [7 ref]
• ***Summary:*** "Yield trials in various locations indicate that there exists a reasonable potential for soybean production in some parts of Eastern States of Nigeria... A yield of 2000 kg/hectare dry beans was considered economic...

"The main soybean growing area in Nigeria is the Southern Guinea zone of Northern Nigeria." The author screened 71 soybeans varieties (1 from Ogoja, Nigeria, 7 from Korea, 35 from the USA, and 10 from Ceylon) for 2 years in 7 centers (Umudike, Adani, Ogoja, Obubra, Abakaliki, Igbariam, Ohaji) for yield performance and agronomic traits. The trials started in 1965, were discontinued from 1968-71, then resumed in 1972. The best seed yield was from Bossier, 3,389 kg/ha. Address: Federal Agricultural Research and Training Station, Umudike, Nigeria.

781. Razowski, Józef; Yasuda, Tosiro. 1975. On the Laspeyresiini genus *Matsumuraeses* Issiki (Lepidoptera,

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Tortricidae). *Acta Zoologica Cracoviensia* (*Krakow, Poland*) 20(2):89-106. July 31. [17* ref. Eng]
• ***Summary:*** The known species of the genus *Matsumuraeses* are reviewed. A key for the identification of the males based on the genitalia is included. One new species is described and redescriptions or notes are given of others. The genus was originally established as monotypic by Issiki in 1957. The host plants are mainly *Papilionaceae.* Only *Matsumuraeses phaseoli* (Matsumura; originally named *Semasia phaseoli* Matsumura in 1900) and *M. falcana* (Walsingham; originally named *Eucelis falcana* Walsingham in 1900) are pests of the soybean.

*M. phaseoli* uses as its host plants: Azuki beans and soybeans (*Glycine max* and *Glycine hispida*). Distribution: Japan (Hokkaido, Honshu, Shikoku), North Korea (Phiongjang-si district), and USSR (Amur district).

*M. falcana* uses *Glycine max* as one of its hosts. Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu), China (Zi-kawy), Taiwan, Nepal.

*M. capax* is a new species, which uses as its host the leaves of *Astragalus membranaceus* Bunge in March and April. Its distribution includes Mongolia. It is not clear in which countries the insects were found growing on soybeans. Address: 1. Inst. of Systematic and Experimental Zoology, Polish Academy of Sciences, Krakow, Slawkowska 17 [Poland]; 2. Entomological Lab., College of Agriculture, Univ. of Osaka Prefecture 7491: Mozuumemachi, Sakaim Osaka, Japan.

782. Shuttleworth, John. 1975. Eastern procedures with soybeans are not difficult: Mother Earth news. *Sun* (*Baltimore, Maryland*). Aug. 30. p. A8.
• ***Summary:*** First describes, in prose format, how Korean soy sauce is made at home. Then describes, in recipe format, how to make it at home today. Finally describes, in prose format, how to make Korean tubu ("Japanese tofu, or bean curd") at home.

A very similar version of this article, with two small illustrations of Korean meju (soybean koji, in the shape of a truncated cone) appeared in the *Chicago Tribune* on Sept. 28 (p. N_A11).

Note. This is the earliest English-language document seen (April 2013) that uses the term "tubu" to refer to Korean-style tofu.

783. *Soybean Digest.* 1975. Korean / German teams study soy protein [on U.S. tour]. Nov. p. 29.
• ***Summary:*** "A Korean Soy Protein Team recently visited the U.S. on a 16-day study tour to help acquaint them with the latest developments in using soy protein and oil in foods. The group studied the uses of soy protein products–textured soy protein, soy flour, meat analogues and dairy analogues–as a means of improving human diets. "'For centuries soybeans have been a major source of protein in the Korean diet,' said ASA Market Analyst Kyung Lee who accompanied the team. 'However, this consumption of soybeans has been through the traditional Oriental foods, which account for 70% of the total Korean soybean consumption.'

"Team members, Mrs. Jun Ryun Wang of the Korean Food Development Institute; Mr. Churl Woo Park, a government food policy official; and Mrs. Kyung Hwa Chun, a member of the Korean press, will relay information on new soy protein developments to the government, food industry and public.

"Their visit, which included stops in Minnesota, Illinois, New York, Missouri and California, was arranged by ASA in cooperation with the Foreign Agriculture Service. Places visited during the trip included: the department of food science at the Univ. of Minnesota; General Mills in Minneapolis, Minnesota; Central Soya, Chicago, Illinois; the Univ. of Illinois, Champaign; Nabisco International Co., New York; and Ralston Purina, St. Louis, Missouri.

"According to Dr. Lee, the demand for better diets including more protein can be met partially by the soy protein foods which have been developed in recent years.

"A team of country feed dealers from West Germany also visited Iowa and Nebraska during the month of September to update their knowledge of mixed feed production, grain elevator operation, livestock production and animal science research. The group of 23 spent time at the Story Cooperative at Story City, Iowa; the Don Newby hog operations in Bondurant, Iowa; the Livestock Exchange in Omaha, Nebraska; and at the Univ. of Nebraska in Lincoln.

"'In 1973, U.S. agricultural exports to West Germany amounted to $1.5 billion of which $570 million was for soybeans,' said Dr. Lee, who helped arrange the trip. 'These soybeans imported are consumed for livestock feed and in this respect, the role of country feed dealers in the soybean industry in Germany is very important,' he said."

784. Shurtleff, William; Aoyagi, Akiko. 1975. The book of tofu: Food for mankind. Hayama-shi, Kanagawa-ken, Japan: Autumn Press. 336 p. Illust. by Akiko Aoyagi. Index. Dec. 15. 28 cm. Rev. ed. 1977 Autumn Press, Brookline, MA. [53 ref]
• ***Summary:*** This pioneering work started the "tofu revolution" in America. Contents: Preface. Acknowledgments. Part I. Tofu: Food for mankind. 1. Protein East and West. 2. Tofu as a food: Introduction, rich in high quality protein (NPU, biological value, protein score, amino acid content), high protein complementarity (tofu contains an abundance of lysine, an essential amino acid that is deficient in many cereal grains; increase usable protein by combining tofu with wheat, rice, corn, etc.), easy to digest, an ideal diet food, low in saturated fats and free of cholesterol, rich in vitamins and minerals, a health-giving

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natural food, backbone of the meatless / vegetarian diet, free of chemical toxins, low in cost, easily made at home, quick & easy to use, versatile.

3. Getting started: Introduction, buying and storing tofu, basic ingredients (whole-wheat flour, miso {rice-, barley-, and soybean miso, special Japanese miso, Chinese chiang}, oil, brown rice, salt, shoyu {natural shoyu, shoyu, Chinese soy sauce, synthetic or chemical soy sauce}, sugar, vinegar, monosodium glutamate {MSG}), Japanese kitchen tools (each illustrated), preparatory techniques (salt rubbing, rinsing and pressing leeks and onions, soaking burdock root, reconstituting dried sea vegetables {dried hijiki, wakame, agar}, wheat gluten and kampyo [kanpyo], parboiling, cutting tofu and vegetables, using sesame seeds, toasting nori, preparing a steamer), basic recipes (soup stocks and broths {dashi}, basic shoyu dipping sauces {*tsuke-jiru*}, miso toppings {sweet simmered miso / *nerimiso*, miso sauté / *abura miso*, special miso toppings and dipping sauces, finger lickin' miso, and regular miso}, miso salad dressings, nut and seed butter toppings (incl. sesame butter or tahini, peanut butter), spreads and dressings, basic sauces, rice, noodles and other basic preparations).

Our favorite tofu recipes (lists about 80 recipe names for each of the different types of tofu, plus soymilk, yuba, whole soybeans, gô, okara, and curds; very favorites that are also quick and easy to prepare are preceded by an asterisk).

Part II. Cooking with tofu: Recipes from East and West (500 recipes). 4. Soybeans: History of soybeans and "soybean foods," cooking with whole dry soybeans, roasted soybeans (*iri-mame*), fresh green soybeans (*edamame*, incl. a recipe for "Sweet emerald bean paste {*Jinda*}),*"* kinako (roasted full-fat soy flour, incl. Japanese health food treats such as *kinako amé, gokabo, kokusen, kankanbo,* and *abekawa mochi*), soybean sprouts (*daizu no moyashi*), natto ("sticky fermented whole soybeans," with "gossamer threads"), tempeh (fermented soybean cakes), Hamanatto and Daitokuji natto (raisin-like natto), modern western soybean foods (natural soy flour [full-fat], soy granules, defatted soy flour and grits, soy protein concentrates, soy protein isolates, spun protein fibers, textured vegetable protein {TVP}, soy oil products). 5. Gô (a thick white puree of well-soaked uncooked soybeans). 6. Okara or Unohana. 7. Curds and whey. 8. Tofu (includes history, and preparatory techniques: Parboiling, draining, pressing {towel and fridge method, slanting press method, sliced tofu method}, squeezing, scrambling, reshaping, crumbling, grinding, homemade tofu (basic, from powdered soymilk, fermentation method related to soymilk yogurt), tofu quick and easy {incl. Chilled tofu–Hiya-yakko}, tofu dressings, spreads, dips and hors d'oeuvre {incl. Creamy tofu dressings and dips, Tofu mayonnaise dressing, Tofu tartare sauce, Tofu cream cheese, Tofu sour cream, Tofu cottage cheese, Tofu guacamole}, tofu in salads {Western style and Japanese style salads incl. Shira-ae}, tofu with sandwiches and toast, tofu in soups {Western style and Japanese style soups, incl. miso soup}, tofu in sauces, tofu in breakfast egg dishes, tofu baked, tofu sautéed, stir-fried or topped with sauces {incl. Mabo-dofu [Ma Po doufu]}, deep-fried tofu, tofu with grains, tofu broiled {incl. Tofu dengaku}, tofu simmered in one-pot cookery and seasoned broths, tofu steamed, tofu desserts {incl. Tofu whipped cream or yogurt, Banana tofu milkshake, Tofu icing, Tofu ice cream, Tofu cheesecake, Tofu-peanut butter cookies}).

9. Deep-fried tofu: Thick agé or nama-agé (incl. *atsu-agé* meaning "thick deep-fried tofu," "three-cornered agé" {*sankaku-agé*} in Kyoto, agé cubes {*kaku-agé*}, "five-color agé" {*gomoku-agé*}), ganmo or ganmodoki (incl. *hiryozu / hirosu*, "Flying Dragon's Heads," "treasure balls," "Ganmo treasure balls"), agé or aburagé (incl. *kiji*, "agé pouches," "crisp agé", *kanso aburagé*, "agé puffs," "fried soybean cakes," "hollow agé cubes," "Smoked tofu," p. 189-91, 197).

Note 1. This is the earliest English-language document seen (April 2013) that contains the following terms related to deep-fried tofu (p. 180-90): "Thick agé," *nama-agé, atsu-agé, Hiryozu*, "Dragon," "Flying Dragon's Heads," "treasure balls," "five-color agé," *gomoku-agé*, "Ganmo treasure balls." "fresh or raw deep-fried tofu," "three-cornered agé," *sankaku-agé*, "agé cubes," *kaku-agé, kiji.* "agé pouches," "crisp agé," *kanso aburagé*, "agé puffs," "fried soybean cakes," or "hollow agé cubes."

10. Soymilk. 11. Kinugoshi ("*Kinu* means 'silk'; *kosu* means 'to strain'; well named, kinugoshi tofu has a texture so smooth that it seems to have been strained through silk." It is made from concentrated soymilk). 12. Grilled tofu (incl. sukiyaki). 13. Frozen and dried-frozen tofu. 14. Yuba (incl. many meat alternatives such as Yuba mock broiled eels, Buddha's chicken, Buddha's ham, sausage). 15. Tofu and yuba in China, Taiwan, and Korea (incl. Savory tofu {*wu-hsiang kan*}*;* see p. 258 for illustrations of many meat alternatives, incl. Buddha's fish, chicken, drumsticks, and duck, plus vegetarian liver and tripe, molded pig's head, and molded ham). One type of Korean soybean miso is called *kotsu jang* [sic, *kochujang*]. When tofu is served with miso [Korean-style, *Tenjang*] as the dominant seasoning, and with rice, "it becomes the popular *Tenjang Chige Pekpem"* (p. 262). 16. Special tofu.

Note 2. This is the earliest (and only) English-language document seen (March 2009) that uses the word "Tenjang" to refer to Korean-style soybean jang (miso).

Part III–Japanese farmhouse tofu: Making tofu for more and more people. 17. The quest. 18. Making community tofu. 19. The traditional craftsman. 20. Making tofu in the traditional way.

Appendices: A. Tofu restaurants in Japan; many are vegetarian: In Tokyo: Sasa-no-yuki / Sasanoyuki, Goemon, Hisago, Sanko-in, Shinoda-zushi, Dengaku (south of Tokyo in Kamakura). In Kyoto: Nakamura-ro, Okutan, Takocho, Izusen, Junsei, Nishiki, Hakuun-an, Rengetsu, Sagano,

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Sorin-an. Tea ceremony cuisine (*Kaiseki ryori*), Zen temple cookery or Buddhist vegetarian cookery (*Shojin ryori*), Tea ceremony cookery from China (*Fucha ryori*), Wild gathered cookery (*Sansai ryori*). A directory of these and others, with addresses and phone numbers, is given (p. 312).

B. Tofu shops in the West (Directory of 43 shops in the USA, 3 in Europe, and 3-7 in Latin America {Mexico City, Rio de Janeiro and Sao Paolo, Brazil}). C. People and institutions connected with tofu. D. Table of equivalents. Bibliography. Glossary. Index. About the authors (autobiographical sketches; a photo shows Shurtleff and Aoyagi, and gives their address as New-Age Foods Study Center, 278-28 Higashi Oizumi, Nerima-ku, Tokyo, Japan 177). Sending tofu in the four directions.

Pudding recipes include: Rice pudding with gô and apple (p. 76, incl. 2 cups soymilk). Tofu chawan-mushi (p. 147; Steamed egg-vegetable custard with tofu). Tofu fruit whips (p. 148). Tofu rice pudding (p. 150, incl. 1 cup soymilk). Tofu custard pudding (p. 152). Soymilk custard pudding (p. 208). Brown rice pudding (p. 208, with 2 cups soymilk). Soymilk chawan-mushi (p. 209). Chawan-mushi with yuba (p. 249).

Dessert recipes include: Tofu whipped cream or yogurt (p. 148; resembles a pudding or parfait). Tofu ice cream (p. 149, with chilled tofu, honey, vanilla extract and salt). Banana-tofu milkshake (p. 149). Tofu cream cheese dessert balls (p. 149). Tofu icing (for cake, p. 149). Tofu cheesecake (p. 150). Tofu-pineapple sherbet (p. 151). Also: Soymilk yogurt (cultured, p. 205). Healthy banana milkshake (p. 206). On p. 160 is a recipe for "Mock tuna salad with deep fried tofu."

Note 3. This is the earliest English-language document seen (Sept. 2013) that uses the term "Tofu ice cream" to refer to soy ice cream or that contains a recipe for "Tofu ice cream."

Note 4. This is the earliest English-language document seen (April 2013) that uses the term "Tofu Cheesecake" and the first to give a recipe for a tofu cheesecake.

Note 5. This is the earliest English-language document seen (Oct. 2013) that uses the term "Tofu sour cream" (p. 109) or that contains a recipe for "Tofu sour cream."

Note 6. This is the earliest English-language document seen (April 2013) that uses the term "tofu milkshake" or that gives a recipe for a shake made with tofu.

Note 7. This is the earliest English-language document seen (Jan. 2012) that uses the term "sticky fermented" to refer to natto.

Note 8. This is the 2nd earliest English-language document seen (April 2013) that uses the term "dried-frozen tofu."

Note 9. This is the earliest English-language document seen (April 2013) that describes preparatory techniques for tofu (p. 96-98).

Note 10. This is the earliest English-language document seen (April 2013) that contains the term "smoked tofu."

Note 11. This is also the earliest English-language document seen (April 2013) that uses the term "kinugoshi tofu" to refer to silken tofu.

Note 12. As of March 2007, the various English-language editions of this book have sold more than 616,000 copies.

Note 13. This is the earliest English-language document seen (Aug. 2011) that contains the term "Modern Western soybean foods" (see p. 69), a term that Shurtleff would soon (by 1983) replace by the more accurate "Modern soy protein products."

Note 14. This is the earliest published English-language document seen (Jan. 2012) that contains the term "creamy tofu dressings" (or "dressing").

Note 15. This is the earliest English-language document seen (Sept. 2012) that contains the term "Soymilk yogurt."

Note 16. This is the earliest document seen (Oct. 2012) that contains an adequate or detailed description of how to make yuba at home.

Note 17. This is the earliest English-language document seen (June 2013) that contains the term "whole dry soybeans."

Note 18. This is the earliest published English-language document seen (Oct. 2013) that contains the term "Tofu whipped cream" (regardless of capitalization). This term appears on pages 113, 148 (with recipe), 149, 153, and 179.

Note 18. For a biography and genealogy of William Shurtleff and Akiko Aoyagi see: *The Shurtleff and Lawton Families: Genealogy and History* (2005). Free on the web in PDF format. Address: c/o Aoyagi, 278-28 Higashi Oizumi, Nerima-ku, Tokyo 177, Japan. Phone: (03) 925-4974.

785. Shurtleff, William; Aoyagi, Akiko. 1975. Tofu, soymilk and yuba in China, Taiwan, and Korea (Document part). In: W. Shurtleff and A. Aoyagi. 1975. The Book of Tofu. Hayama-shi, Kanagawa-ken, Japan: Autumn Press. 336 p. See p. 250-64.

• ***Summary:*** Contents: Introduction. Three varieties of tofu. Doufu: Known as *tojo* or *tokua* in the Philippines, or as *tahu* in Indonesia. Pressed tofu (*doufu-kan*)*:* Savory tofu (*wu-hsiang kan*), soy-sauce pressed tofu (*chiang-yu doufu-kan*), pressed tofu sheets (*pai-yeh*, incl. pressed tofu noodles or "beancurd shreds" {*doufu-ssu, kan-ssu*}, pressed tofu loops {*pai-yeh chieh*}, Buddha's Chicken {*su-chi*} or Buddha's Ham {*suhuo-t'ui*}, salted dry tofu {*doufu-kan*}). Chinese soft kinugoshi (*shui-doufu, sui-doufu, nen-doufu, nan-doufu, shin-kao doufu*). Warm soymilk curds: Chinese smooth curds (*doufu-nao, dou-nao;* often served for breakfast by street vendors), curds-in-whey (*doufu-hua*). Deep-fried tofu (*yu-doufu, cha-doufu, doufu-kuo, kuo-lao doufu*). Frozen tofu (*tung-doufu, ping-doufu*).

Note 1. This is the earliest English-language document seen (April 2013) that uses the term *tung-doufu* or the term

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A soymilk vender

*ping-doufu* to refer to frozen tofu.

*Doufu-ru* [fermented tofu]: white fermented tofu (*pai doufuru,* incl. 5 different types such as red pepper, sesame oil and red pepper, five-spice, etc.), red fermented tofu (*hung doufuru, nanru, nanyu,* made by adding Chinese red fermented rice [red rice koji] {*ang-tsao*} to the brining liquor to give it a deep red color, thick consistency, and distinctive flavor and aroma; soy sauce is generally used in place of rice wine; another variety is rose essence fermented tofu), stinky fermented tofu (*tsao-doufu, ch'ou doufu,* incl. green stinky fermented tofu), chiang-doufu (prepared by pickling firm cubes of tofu for several days in either Chinese-style miso {*chiang*} or soy sauce).

Soymilk (*doufu chiang, dou-chiang, dou-nai, dou-ru*)*:* Widely enjoyed as a spicy hot breakfast soup (p. 204) or a warm, sweetened beverage (p. 207). Sometimes sold bottled by street vendors.

Yuba: Yuba is much more popular and much less expensive in China and Taiwan than it is in Japan. There are hundreds of yuba shops throughout Taiwan and probably thousands in China, and yuba plays an important role in the nutritional life of the people in home and restaurant cookery. Called bean curd "skin" or "sheets" in most Chinese cookbooks, yuba is known in Mandarin as *doufu-p'i* ("tofu skin") or *doufu-i* ("tofu robes"). "One of the obvious differences between the uses to which yuba is put in China as compared to Japan is the remarkable ingenuity and inventiveness employed by the Chinese in giving yuba the semblance of meat. Imagine walking by the display case of attractive restaurants or marketplace yuba shops and seeing perfect replicas of plucked hens, roosters, and ducks, light-brown fish (complete with fins, gills, eyes, and mouth), juicy hams, tripe, liver and rolled meats–all made from yuba (fig. 111). Rich red sausage links hang in rows and deep-fried drumsticks are handsomely arranged on a large platter–together with a life-sized pig's head. Most of these imitation meat dishes are prepared by pressing fresh yuba into a hinged (wooden or aluminum) mold," clamping the mold closed, then steaming it until the yuba's shape is fixed. Served at *su-tsai* restaurants which specialize in Buddhist vegetarian cookery, each has its own well-known name: Buddha's Chicken (*suchi*), Buddha's Fish (*suyu, sushi*), Buddha's Duck (*suya*), Vegetarian Tripe (*taoto*) or Liver (*sukan*)*;* Molded Pig's Head (*tutao*), Molded Ham (*suhuo*), Sausage Links (*enchan*), Buddha's Drumsticks (*sutsai tsui*), Deep-fried Duck (*suya*). A full-page illustration (p. 258) shows these products. Fresh yuba. Dried yuba (*kan doufu-p'i,* incl. sweet yuba and Bamboo yuba {*fuchu* [*dried yuba sticks*]}). Tofu and yuba in Chinese cookery: Mandarin cookery, congee (rice porridge), "red broiled" sauces (*hong-sao*), meatless days, vegetarian restaurants.

The Chinese tofu shop: Description of the process for making tofu. Tofu in Korea. Recipes: Fermented tofu dressings, spreads, dips, and hors d'oeuvre. Fermented tofu in sauces, egg dishes, and with grains.

Illustrations show: (102) A woman cutting doufu at the marketplace. (103) Making pressed tofu using a hand-turned screw press. (104) Pressed tofu noodles. Buddha's chicken. (105) Street vendor selling soymilk curds. (106) Pressing tofu in forming boxes using stone weights. (107) Deep-frying agé triangles in a wok. (108) Threaded thick-agé cubes. (109) Net-like thick agé. (110) A soymilk vendor carrying bottled soymilk using a shoulder pole. (111) Yuba mock meats. (112) Yuba steaming pots. (113) Steam-heated drum can cooker in Chinese tofu shop. Doufu-ru [fermented tofu] cubes on plate, in bottle, in can. Woman selling tofu, seated by the street side.

Note 2. This is the earliest English-language document seen (April 2013) that uses the word "doufu" to refer to Chinese-style tofu.

Note 3. This is the earliest English-language document seen (Oct. 2012) that uses the word *fuchu* or the word *suohuo* or the term *suohuo-t'ui* or the term "tofu robes" or the term "tofu skin" to refer to yuba. Address: Lafayette, California.

786. Shurtleff, William; Aoyagi, Akiko. 1975. The book of tofu: Food for mankind (Illustrations–line drawings). Hayama-shi, Kanagawa-ken, Japan: Autumn Press. 336 p. Illust. by Akiko Aoyagi. Index. Dec. 28 cm. Rev. ed. 1977 Autumn Press, Brookline, MA. [53 ref]

• ***Summary:*** Continued: Illustrations (line drawings, both

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numbered and unnumbered) show: A hearth in a traditional Japanese farmhouse with tofu dengaku roasting around a bed of coals in a sunken open-hearth fireplace. An old Japanese plum tree blossoming in winter. Three pieces of skewered tofu dengaku with a sansho leaf atop each in a special serving box. A sprig of sansho with berries. Stylized top of a soybean plant in a circle. Fig. (4) Tofu products available in the West (tofu, dofu, kinugoshi, thick agé triangles, cubes, and cake, agé and agé puffs, hollow agé cubes, soymilk, tofu pudding, doufu-ru {white and red}, ganmo {patties, small balls, and treasure balls}, grilled tofu, dried-frozen tofu, instant powdered tofu, okara, dried yuba, soymilk curds, pressed tofu, savory tofu). A wooden cutting board and Japanese broad-bladed vegetable knife (*nagiri-bôcho*) with vegetables and tofu on a woven bamboo tray.

Note 1. This is the earliest English-language document seen (April 2013) that uses the term "treasure balls" to refer to Chinese-style tofu mixed with various finely-chopped vegetables, rolled into balls, and deep-fried tofu. (8) A wooden keg of red miso and a plastic bag of barley miso. (9) Shoyu in a metal can, wooden keg, glass bottle, and table-top dispenser. Traditional Japanese kitchen tools: *Miso-koshi* (woven bamboo strainer used in making miso soup). cutting board, Japanese vegetable knife, wooden spatula, bamboo rice paddle (*shamoji*) and spoon, woven bamboo colander or tray (*zaru*), suribachi, Japanese grater (*oroshi-gané*), *sudaré* (bamboo mat), pressing sack for tofu or soymilk, serrated tofu-slicing knife, tawashi scrub-brush (made of natural palm fiber), wok with draining rack and wooden lid, stir-frying ladle and spatula, long cooking-chopsticks, mesh skimmer, deep-frying thermometer, Chinese bamboo steamer (*seiro*), charcoal brazier (*konro, shichirin*), broiling screen. Covered pot steamer. Small lidded pottery pot. More kitchen tools (p. 50-51). (10) A soybean measuring box (*isshô-bako*). (11) The soybean plant. Two views of a soybean seed with seed coat, hilum, and hypocotyl labeled. A bag full of soybeans. Roasted soybeans in a woven bamboo tray (*zaru*). Edamamé in the pods. Three shapes of kinako treats. Soybean sprouts. Natto on a bamboo mat (*sudare*). Natto wrapped in rice straw as it ferments. A hand holding chopsticks that lift natto up from a bowl of natto–connected by gossamer threads. Tempeh (round and square pieces). Wrapping a small packet of inoculated soybeans to make tempeh. (15) Two Japanese women in traditional clothing using hand-turned grinding stones (quern) to grind soaked soybeans when making tofu. (16) Push-pull grinding stones. (17) Motor-driven grinding stones. (18) Water-powered millstones. (19) Wind-powered millstones. (20) Unohana. (21) A tofu maker sitting on a traditional lever press that presses soymilk from the okara in a pressing sack on a rack. A heavy iron skillet. (22) Folding okara omelet pouches. Okara doughnuts. (23) A bamboo colander. (24) A tofu maker weighting a colander with a brick so that whey will collect in it. (25) Ladling whey from curds; it foams! (27) A horse drinking whey from a wooden vat. Soymilk curds in a bamboo mat. (28) Ladling curds for Awayuki. (29) Fresh tofu in a plastic tub. (30) A tofu maker placing a weight on pressing lids as tofu is pressed in settling boxes (forming boxes). Transferring tofu-filled settling box to sink. Cutting a block of tofu into cakes under water. Eggplant halves in a yin-yang dance. Preparatory techniques used with tofu (slanting press, sliced tofu, squeezing, scrambling, reshaping, crumbling). (32) Utensils for making tofu at home. (33) Three designs for a homemade settling container. (34) Preparing homemade tofu (a-l). (35) Removing tofu from a farmhouse-style settling container (forming box). (36) Chilled tofu. Iceberg chilled tofu. A hot, moist, white towelette (*o-shibori*) is used to wipe the face and hands before (or occasionally after) a meal. Tofu salads in three Japanese pottery dishes. Japanese soups in three types of containers. (37) Chrysanthemum tofu. (38) Tofu poached egg. Tofu-stuffed green peppers. A wok. (39) Filling a wok with oil. (40) Testing oil temperature in a wok. (41) Deep-frying tofu tempura–and (42) Serving it in a shallow bamboo basket. (43) Making *Kaki-agé.* (44) *Dengaku Hoshi* (from *Tofu Hyaku Chin*). (45) Skewered Tofu dengaku. Preparing Tofu dengaku in old Japan (from Hokusai's sketchbooks). (46) A variety of skewers. (47) Chinese firepots. (48) A Simmering Tofu wooden serving container heated by coals from within. (49) Miso oden. (50) Tofu wrapped in rice straw. (51) Nanzenji wrapped tofu. (52) Gisei-dofu. (53) Serving freshly deep-fried agé. (54) The deep-frying area of a traditional tofu shop. (55) Deep-frying tools. (56) Wooden bamboo tray with raised sides. Chinese cleaver. (57) Nori-wrapped sushi with agé (making and serving; six drawings). Eating noodles from old Japan (from Hokusai's sketchbook). (58) Preparing homemade noodles. (59) The Oden man on a winter's eve. A pottery bowl of Oden. Kombu rolls. (60) Making konnyaku twists. (61) Nishime in a multi-layered lacquerware box. (61) Pressing tofu for thick agé in a tofu shop. (62) Deep-frying tofu for thick agé. (63) A tofu maker with deep-fried thick agé triangles on screen trays.

Note 2. This is the earliest English-language document seen (May 2012) that contains the terms "deep-fried thick agé triangles" (p. 181) or "hollow agé cubes" (p. 23).

(64) Stuffing thick agé. (65) Thick agé stuffed with onions. (66) Pressing tofu for ganmo. (67) Adding seeds and vegetables. (68) Deep-frying ganmo. (69) A farmhouse open-hearth fireplace with nabe kettle. (70) Preparing homemade ganmo. Ganmo balls in a draining tray. Ganmo cheeseburger. (71) Cutting tofu to make agé slices (*kiji*). (72) Deep frying agé. (73) Opening agé into pouches. Agé treasure pouches.

Note 3. This is the earliest English-language document seen (April 2013) that contains the term "treasure pouches" or the term "Agé treasure pouches" They refer to a Kyoto-style delicacy made with deep-fried tofu pouches.

(74) Agé pouches sealed with foodpicks. Inari shrine with Shinto torii. (75) Kampyo-tied pouches [kanpyo]. (76)

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Making rolled agé hors d'oeuvre. (77) Tofu maker ladling gô (fresh soy puree) into a cauldron. (78) Stirring down the gô. Pressing soymilk from okara with a hand-turned screw press. (79) Serving fresh soymilk in a tofu shop. Six Japanese commercial soymilk products. Little girl at The Farm (Summertown, Tennessee) seated on a small chair drinking a cup of soymilk. Chinese breakfast soymilk soup with deep-fried crullers (*Siento-chiang* with *yu-chiao tsao pi*). (80) Takigawa-dofu. (81) Tofu maker pouring the soymilk for kinugoshi tofu. (82) Adding solidifier. (83) Trimming kinugoshi from sides of box. (84) Modern lactone kinugoshi (with GDL). (85) Modern kinugoshi factory. (86) Sasa-no-Yuki's Gisei-dofu container. (87) Kinugoshi with ankake sauce. The entrance way to a traditional Japanese restaurant featuring tofu. Traditional metal skewer for making grilled tofu. (88) Traditional tofu maker grilling tofu over a charcoal brazier (*hibachi*). Grilling tofu in a traditional open hearth. (89) An early method of elaborate grilling. Pieces of tofu on different types of skewers. Farmhouse sukiyaki with grilled tofu. (90) Tying frozen tofu with rice straw. (91) Drying farmhouse frozen tofu. (92) Pressing frozen tofu at home. (93) Deep-fried frozen tofu with cheese. (94) Making deep-fried frozen tofu sandwiches (*Hakata-agé*). (95) Frozen tofu wrapped in kombu. (96) Steaming table in a yuba shop. Ten different types / shapes of yuba. (97) Lifting yuba away from soymilk. (98) Yuba sashimi. (99) Yuba envelopes. (100) Deep-fried yuba dengaku. (101) Folding yuba into bundles. Trimming half-dried yuba from a skewer. (102-113) Tofu and yuba in Taiwan, China, and Korea (see separate record). Sesame tofu in pottery bowl. (114) Traditional farmhouse tofu, tied into a package with rice straw rope. (115) Shirakawa-go farmhouses with water-powered rice-dehusker in foreground. (116) Making seawater tofu at Suwanose. Mortar and pestle for pounding mochi. Making community tofu: Western metal hand mill, hand-turned stone mill apparatus, faces of upper and lower stones, colander and cloth, two shapes of cooking pots, Japanese farmhouse earthen cooking stove, cooking pot set on cut-off oil drum, ladle, two wooden paddles, pressing rack, pressing okara, lever press, pressing sack, wooden settling [forming] container with cloths. (117) Making nigari with salt in bamboo colander, a traditional "salt boat" for refining salt of nigari. (119) Country farmhouse tofu (5 illust.). (121) Morning shopping at a tofu shop. (122) Diagram of a tofu-shop floor plan. (123) Modern pressure with hydraulic press. (124) Modern centrifuge with 3 soymilk barrels. Thirty-one unnumbered illustrations showing every step in making and selling tofu in a traditional Japanese shop (p. 299-306). (125) Cutting tofu for Dengaku (from *Tofu Hyaku Chin*). (126) Ladies busy making dengaku (from *Tofu Hyaku Chin*). (127) Hearth at Nakamura-ro. (128) The garden at Okutan. Six types of Japanese sea vegetables: Hijiki, aonori, wakame, agar, nori, kombu. (129) Japanese vegetables (27 illustrations). Address: c/o Aoyagi, 278-28 Higashi Oizumi, Nerima-ku, Tokyo 177, Japan. Phone: (03) 925-4974.

787. Shurtleff, William; Aoyagi, Akiko. 1975. Sukiyaki (Document part). In: W. Shurtleff and A. Aoyagi. 1975. The Book of Tofu. Hayama-shi, Kanagawa-ken, Japan: Autumn Press. 336 p. See p. 224-25.

• ***Summary:*** "A Japanese cookbook written over 350 years ago contains the following recipe for Sukiyaki: 'Obtain either wild goose, wild duck, or antelope, and soak the meat in *tamari* shoyu. Heat a well-used Chinese plow (*kara-suki*) over an open fire. Place the meat on the plow, garnish with thin rounds of *yuzu*, and broil on both sides until the color changes. Serve and be happy.'

"The word sukiyaki–pronounced skee-ya-kee–means 'broiled on the blade of a plow.' Although the modern preparation generally features beef as the basic ingredient, sukiyaki was traditionally prepared with wild game, fowl, fish, or shellfish. Wild boar was also a favored ingredient, and seafoods such as tuna, yellowtail, whale, wreath shells, and scallops were and, in areas such as Kyoto, still are widely used in the dish.

"Before reaching its present form, sukiyaki passed through a number of unusual historical transformations. The earliest preparation was undoubtedly developed by farmers, hunters, and fishermen who broiled their catch over an open fire using a plow or whatever other utensil was available. Since the earliest plow, the predecessor of the present *nabe*, was nothing but a flat iron plate, it was unable to hold cooking liquids. It was probably for this reason that the meat came to be marinated or basted with tamari shoyu, a technique that is still practiced in some Japanese restaurants. Gradually, sake or *mirin* came to be used in the marinade, various vegetables and grilled tofu were broiled with the meat, and the traditional flat plow or griddle became inadequate to hold the juices of this cornucopia of new ingredients. A new container was needed, and at this point, the ancient tradition of broiling wild meat on a plow merged with the newly-imported tradition of *shippoku*, a type of beef-*nabe* cookery which originated about 300 years ago, just after the first contact with Western traders and missionaries.

"Developed in the international port town of Nagasaki, *shippoku* was said to have its historical culinary roots in Holland, Portugal, China, and Korea. As a result of the merger, the original sukiyaki ingredients eventually came to be cooked in heavy iron or Korean-style stone pots, and the dish was served as a one-pot meal prepared at the table. Consequently 'sukiyaki' became a misnomer, for the new dish was neither broiled nor prepared on a griddle-like plow. But neither was the new sukiyaki a true *nabe* dish, since its ingredients were not simmered in a seasoned broth. Rather, this unique Japanese creation straddled three categories: it was a broiled dish insofar as the meat was first cooked in a sizzling-hot pan; it was a *nabe* dish since it was a one-

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pot prepared at the dining table; and it was a *nimono,* or simmered dish, insofar as the meat and vegetables were simmered together in a rich mixture of shoyu, sake, and dashi.

"Up until this time, the Japanese had never apparently considered using beef or other livestock in sukiyaki. According to a popular legend, *kamado-gami,* the god of the kitchen hearth, is said to have instructed the Japanese people in ancient times to refrain eating the meat of all four-legged animals, especially of livestock. This admonition was reinforced by the nation's emperors and the vegetarian teachings of Buddhism, so that for about 1200 years–from the 8th century until the 19th century–most Japanese did not eat meat. However with the arrival of Christianity in the 16th century, the eating of beef was also forbidden, and sukiyaki was once again prepared exclusively with seafood, wild game, or poultry. Those who developed a longing for broiled meat, but who were not allowed to prepare it in the family's common pot or in the presence of those who kept the faith, were compelled as a last resort to prepare their sukiyaki the traditional way, substitution using a plow or mattock for the kettle and enjoying the forbidden delicacy alone and in secret in the barn, field, or forest. This tradition of 'underground sukiyaki' is said to have continued until about 1900.

"With the opening of Japan to the West in the mid 19th century and the relaxation of traditional prohibitions, meat eating gradually became fashionable in the cities. Yet most Japanese tasted their first beef with considerable trepidation, having been warned by priests and traditionalists that their action was an affront to their ancestors and that dire consequences would befall them. Little by little, however, beef sukiyaki came to be accepted.

"The first Japanese who worked up the courage to actually eat beef did not prepare it Western-style as steak or roast beef. Rather, they cut the meat into paper-thin slices, employing the same method they had used for centuries to prepare *sashimi,* or raw fish. And they seasoned this meat with shoyu in much the same way they would season simmered vegetable or tofu dishes. Many Japanese probably ate their first beef in the form of sukiyaki, and different parts of the country soon developed unique styles of serving it. To this day in the Kyoto area, restaurants place dispensers of shoyu, *mirin,* and sugar on the table and allow each guest to season his food to taste, whereas restaurants in Tokyo have developed their own unique mixtures of these ingredients to form standard cooking liquids.

"Throughout the world people now associate sukiyaki with fine Japanese cookery. In a sense, this is ironic because Japanese cuisine makes relatively little use of meat, and much of sukiyaki's historical influence came from abroad. The ancient delicacy of Japanese hunters and the imported *nabe* preparation have now been totally transformed to become Japan's most famous international dish. And although tofu plays a relatively inconspicuous role in creating the flavor of this dish, sukiyaki has nevertheless been the vehicle whereby thousands of Westerners have had their first taste of 'soybean curd.'

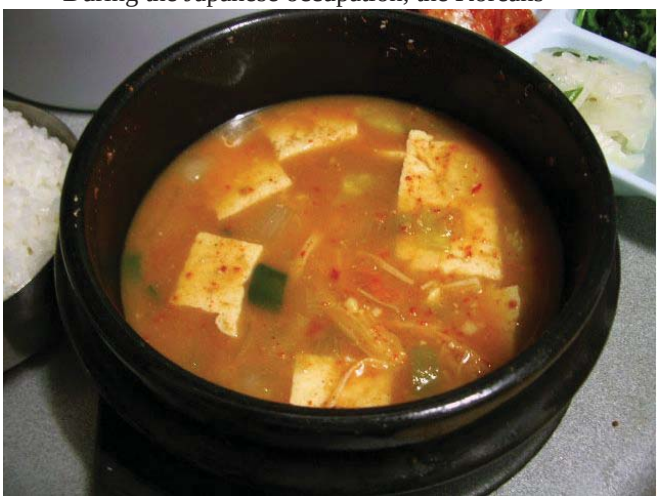
"Although most present-day sukiyaki uses beef as the featured ingredient, our recipe uses ganmodoki–mock goose–in deference to the earliest traditions of using wild fowl. Homemade frozen tofu and frozen thick-agé, the textures of which resemble that of tender beef, make excellent substitutes. Although regular tofu is occasionally used in sukiyaki, grilled tofu is generally preferred for its ability to absorb the flavors in the rich broth; its substantial, almost meaty texture; its ability to keep its form during the frequent stirring; and its barbeque flavor. In Japan, more grilled tofu is used in sukiyaki than in any other type of cuisine." A recipe follows. Address: Lafayette, California.

788. Shurtleff, William; Aoyagi, Akiko. 1975. Tofu in Korea (Document part). In: W. Shurtleff and A. Aoyagi. 1975. The Book of Tofu. Hayama-shi, Kanagawa-ken, Japan: Autumn Press. 336 p. See p. 262.

• ***Summary:*** "Although tofu is an important staple in Korean cookery, it does not play quite the essential role that it does in China, Taiwan, and Japan. Koreans eat about one-third as much tofu as do the Japanese. This tofu is made at the more than one thousand small tofu shops (*tubu kongjang*) scattered throughout the country, 150 of which are located in the capital city of Seoul. Most shops use a fire-heated cauldron and calcium sulfate solidifier. A great deal of tofu is still prepared at home in farmhouses, especially on festive occasions.

"Regular Korean tofu, called *tubu,* is slightly firmer than its Japanese counterpart but not as firm as Chinese tofu (*doufu*). This tofu is widely sold in outdoor marketplaces. Shopkeepers and venders buy flats of tofu from tofu shops in returnable wooden boxes, each 10 by 13 by 2 inches deep. The tofu is placed on wooden pallets, then cut into cakes weighing 12 to 16 ounces. Tubu is the only traditional variety of Korean tofu.

"During the Japanese occupation, the Koreans



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developed a number of varieties of deep-fried tofu (*tofu kuii* or *twigin tubu*). Agé strips (*yubu*) are pieces of deep-fried tofu about 7 by 1 by 3/4 inches. Ten strips are sold together in a sealed plastic bag. This food is unlike any deep-fried tofu in Japan or China. Agé pouches (*fukuro*) are similar to Japanese agé but are sold in different sizes; the smallest is 2½ inches square, the medium size is 4½ by 2½ inches, and the largest size is 8½ by 3 inches. Each variety can be opened and filled with various stuffings, and many are used to make Inari-zushi (p. 194) or Oden Kinchaku (p. 196).

"Okara (*piji* [*biji*]), soymilk curds (*sun tubu* [*soondubu*]), and whole soybeans (*kung kong*) are used widely in Korean cookery. Fermented tofu (*tubu kuppa*), available mostly in Chinese food markets, is not. Kinugoshi, grilled tofu, soymilk, and yuba are rarely if ever seen.

"Korean cuisine is extremely hot and spicy. Tofu serves to soften the flavors of red peppers and other strong seasonings while lending body and protein to soups, stews, and sautéed vegetable dishes. The most famous Korean tofu dish is *Tubu Chige* [*Dubu Jjigae*] or "tofu soup," a fiery preparation containing tofu cubes, thin slices of beef, and shellfish seasoned with red and green hot peppers, ground red peppers, Korean soybean miso (*kotsu jang* [*gochujang*]), and soy sauce. The soup is served bubbling hot in a small iron pot set on a wooden platter. When it contains miso as the dominant seasoning and is served with rice, it becomes the popular *Tenjang Chige Pekpen* [*Doenjang Jjigae*]. When seasoned with *kimchi* pickles, it is known as *Kimchi Chige*, and when it contains more broth and is prepared with less salt, it is known as *Tubu Kuk.* Tofu is also sautéed in oil until golden brown, then cooked with vegetables for 5 to 10 more minutes to create the favorite household preparation *Tubu Puchim.* Sautéed with soybean sprouts, tofu becomes the dish known as *Konamul Kuge Tubu"* [sic, *Kongnamul Kuge Dubu*]. Address: P.O. Box 234, Lafayette, California 94549.

789. Kim, Z.U.; Cho, S.H. 1975. A study on the manufacture of soysauce by the combined use of *Aspergillus sojae* and *Bacillus subtilis. J. of the Korean Agricultural Chemical Society* 19(1):1-9. [Eng; Kor]*

790. Kwon, S.H.; Oh, J.H.; Kim, J.R.; Song, H.S.; Kim, B.W. 1975. [Diversity and oil contents of the Korean native soybean seeds. II.]. *Korean J. of Breeding* 7(1):40-44. [15 ref. Kor]*
Address: Korea Atomic Energy Research Inst., Seoul, South Korea.

791. Circle, S.J.; Smith, A.K. 1975. Soybeans: processing and products. In: N.W. Pirie, ed. 1975. Food Protein Sources. Cambridge, London, New York, Melbourne: Cambridge University Press. xx + 260 p. See p. 47-64. [88 ref]
• ***Summary:*** Contents: Introduction. Agronomy: Varieties, cultivation, yields. Soybean composition. Protein nutritional value. Traditional processing into nonfermented foods: Soybeans as a table vegetable ("cooked green soybeans. "Certain large-seeded varieties are often referred to as 'garden' or 'vegetable' type soybeans in contrast the better known {smaller seeded} 'field' type"), soy milk, tofu (soybean curd), yuba, kinako, salted soybeans, soybean sprouts. Traditional processing into fermented foods: Miso and shoyu, tempeh. Others (p. 55) include: natto, hamanatto, sufu (soy cheese), tao-tjo, kochu chang, ketjap, ontjom, and yogurt-like products.

Contemporary processing without defatting: 'Debittering' by aqueous treatment, whole bean processing, full-fat flour ("Extrusion cooking to produce full-fat soybean flour has received considerable attention"), soy milk and curd. Contemporary defatting processes: Defatting by aqueous processing, defatting with organic solvents, composite flour ("Substitutes or extenders for wheat flour in baked goods and pasta products are termed 'composite flours,' whether or not they contain some wheat." Many of these include soy protein products), soy flours, protein concentrates, protein isolates and textured soy products (Based on "protein fractionation after hexane defatting of soy meal." Recipes for using soy protein products in foods are available from several publications–which are listed). Address: Anderson Clayton Foods, W.L. Clayton Research Center, 3333 Central Expressway, Richardson, Texas 75080.

792. Pak, Ki-Hyuk; Gamble, Sidney D. 1975. The changing Korean village. Seoul, Korea: Published for the Royal Asiatic Society, Korea Branch by Shin-hung Press. 222 p. Plus 4 unnumbered leaves of plates. Illust. Map. Index. 24 cm. [35* ref]
• ***Summary:*** Preface: "Most of the field research for this study was conducted during 1961 and 1962. Dr. Sidney D. Gamble, who had published several books on Chinese villages, suggested I undertake similar research on villages in Korea and made a generous grant for that purpose." A map (at front of book) shows the location of the three villages

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studied.

The soybean is not mentioned in the index of this book. However in Chapter 4, "Park village" (located in southwest Korea, not far north of Korea's largest port, Pusan), the section on crops and land (table 9, p. 104-05) shows that rice, barley and wheat are the three major crops and cash crops. Besides these, "the farmers grew other grains such as rye, hulled barley, millet, sorghum and corn. Other crops are pulses, soybean, red bean, green bean..." Address: 1. Korean scholar of agricultural economics, Seoul, Korea.

793. U.S. Department of Agriculture. 1975. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period July 1, 1973 through June 30, 1974. Washington, DC: U.S. Government Printing Office. See table 17.

• ***Summary:*** Table 17 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1974." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), CSB (corn soya blend), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas:

Africa: Botswana, Burundi, Cameroon, Central African Republic, Chad, Congo–Belgian, Dahomey, Ethiopia, Gabon, Gambia, Ghana, Ivory Coast, Kenya, Lesotho, Liberia, Malagasy, Mali, Mauritania, Morocco, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somali Republic, Sudan, Swaziland, Tanzania, Togo, Rhodesia, Upper Volta, Zaire, Zambia.

Near East–South Asia: Bangladesh, British Solomon Islands, Egypt, Gaza, India (incl. soy flour), Gaza, Jordan–East, Jordan–West Bank, Nepal, Pakistan, Sri Lanka, Turkey, Yemen, Palestine Refugee Program.

East Asia: Cambodia, Indonesia, Korea, Laos, Malaysia, Philippines, Singapore, Vietnam.

Latin America: Antigua, Bolivia, Brazil, British Honduras, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, St. Kitts, St. Lucia, St. Vincent, Uruguay.

Concerning "veg oil" (soybean oil) shipped under P.L. 480 Title II in fiscal year 1974: India received 43.325 million lb [19,652 metric tons] (p. 84). Address: Washington, DC. Phone: 703-875-4901 (1991).

794. La Choy Food Prods. 1975? Brief history of La Choy. 2 p. Undated. Unpublished manuscript.

• ***Summary:*** "Archbold, Ohio, with a population of only 2,500 is the home of La Choy Food Products, largest producer of canned Chinese foods in the world–including China!

"The business actually was started in 1920, by Wally Smith and Ilhan New, who became friends while attending the University of Michigan. Smith had a grocery store in Detroit and wanted to sell fresh-grown bean sprouts. New, a Korean, knew how to grow them [mung bean sprouts].

"Sometime later, the pair conceived the idea of canning bean sprouts in glass jars. The next logical step was to use metal cans, and this was accomplished in 1922 when the company was incorporated. New left the company shortly after 1930 and Smith was killed by lightning in 1937.

"After several moves, each time to larger quarters, the first La Choy plant was built in 1937 in Detroit. This was sold to the government at the start of World War II and the firm moved to its present 25 acre Archbold site. The La Choy plant today covers approximately 7½ acres under roof.

"'Chinatown, U.S.A.' is more strategically located for the efficient and economical production of Chinese foods than a glance at a map would indicate. Just to the north are the famed celery beds of Michigan. La Choy is the largest single user of Michigan celery in the nation. More than 5,000 tons are used annually in the new process developed by La Choy which produces up to 50 tons a day of extra-fancy fine cut celery for chop suey and chow mein dishes.

"To the east is the famed Pennsylvania mushroom belt, and La Choy is among the largest users of fresh mushrooms in the nation." Note: An attached photocopy of an ad (with no date or source) titled "La Choy operates the world's largest Chinese food plant," contains two photos: (1) Large aerial view of the La Choy plant in Archbold, Ohio. (2) Portrait photo of Gordon E. Swaney, General Manager. He was named General Manager of La Choy Food Products in 1962. He joined La Choy 18 years ago after graduating from Indiana University.

The text below the photo of the plant states: "This multimillion dollar facility was expanded in 1958 and doubled La Choy production. No other Chinese food processing plant anywhere approaches it in output." The plant is situated on 25 acres.

"La Choy became a division of Beatrice Foods Company in 1943, a year after it moved from Archbold, Ohio, from Detroit, Michigan, where the company was started in 1920." Since it became a Beatrice unit, sales have increased more than 700%. Address: La Choy.

795. Meals for Millions. 1975? Meals for Millions presents: In their own way. A dramatic presentation of MFM's current

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work in Africa, Egypt, Korea (Leaflet). Santa Monica, California. 3 panels each side. Each panel: 21.5 x 9.5 cm. Undated.
• ***Summary:*** On the cover is a photo of an African woman seated, preparing food. Printed black on light blue.

"This slide show presentation... also focuses on a soy beverage plant in Korea which is making possible a low-cost, high-protein drink for the poor."

"This free 20 minute slide show comes complete with: (1) Narration on reel-to-reel tape and cassette tape. (2) Carousel with color slides. (3) Script with complete directions for handling on any standard projector (4) Literature for audience distribution." One panel is an order form. Address: P.O. Drawer 680, Santa Monica, California 90406. Phone: (213) 829-5337.

796. Kennedy, Shawn G. 1976. The Korean greengrocer: Produce is more varied. *New York Times.* Feb. 18. p. 36.
• ***Summary:*** During the last year or so, many new Korean-run fruit and vegetable shops, selling fresh produce, have opened throughout New York City. "The real bonus for the shopper is the Oriental vegetables, spices and specialty items they offer as well. It is not unusual, for example, to find Chinese cabbage, bean sprouts [Koreans prefer soybean sprouts], tofu (bean curd) and hunks of fresh ginger..."

797. Kozaki, Michio. 1976. Fermented foods and related microorganisms in Southeast Asia. *Proceedings of the Japanese Association of Mycotoxicology* No. 2. p. 1-9. March 20. [16 ref]
• ***Summary:*** Table 1, "Main fermented foods using molds, yeasts or bacteria in Southeast Asia," contains four columns: Name of fermented food, raw materials, main related microorganisms, and remarks (incl. names in other countries). Fermented foods listed include amazake (tapé / tapeh in Indonesia, with *Rhizopus* spp. instead of *Aspergillus oryzae*), tempeh, sufu, ontjom, natto (soy bean fermented with *Bacillus subtilis* var. *natto;* Teranatto [fermented black soybeans] is same as original miso, Taosi in Philippines).

Table 2, "Main fermented foods using molds plus bacteria, molds plus yeasts, yeasts plus bacteria and molds, or yeasts plus bacteria in Southeast Asia," contains the same four columns. Fermented foods listed include soy sauce (*Aspergillus oryzae*, *Saccharomyces rouxii, Pediococcus halophilus;* called Jan [kanjang] in Korea and Thua nao [sic] in Thailand), Miso (same 3 microorganisms as in soy sauce). Address: Tokyo Univ. of Agriculture, Dep. of Agricultural Chemistry, 1-1, Suragaoka, Setagaya-ku, Tokyo.

798. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). 1976. Outlook better for soybeans in three Far East markets. March 22. p. 2-4.
• ***Summary:*** The improved forecast is for Japan, Taiwan, and South Korea. Once virtually free of competition for the important Japanese soybean market, the U.S. must now reckon with Brazil as a competitor, while facing Malaysian palm oil in the vegetable oil market. Brazil's soybean exports to Japan last year, for instance, probably totaled only about 60,000 tons, compared with the 2.8 million tons of U.S. beans. The cost of shipping Brazilian beans to Japan in 1975 averaged $5-$10 per ton more than from the U.S. This difference reflected the longer distances from Brazilian ports, plus Brazil's use of smaller ships. The 10-day-longer shipping time from Brazil is especially important in Japan, where timeliness of cargo is a key market factor.

There is only one major oilseed crusher and meal supplier in Korea. The Government production plan calls for self-sufficiency in soybeans and the country has launched a strong drive in this direction. Current Korean production of soybeans totals about 311,000 tons. The low-oil variety of bean produced in Korea is best suited for food use (e.g. miso).

Taiwan is the largest per capita consumer of soybeans in the Far East, with a per capita soybean oil consumption of about 11 pounds in 1975 (out of 13 pounds for all vegetable oils).

799. Ito, Hiroshi. 1976. Hamanattô [Hamanatto]. *Nippon Jozo Kyokai Zasshi* (*J. of the Society of Brewing, Japan*) 71(3):173-76. March. [Jap; eng+]
• ***Summary:*** Contents: Introduction. A brief history of Hamanatto. Methods of production: Yamaya and Horinji methods, Daifukuji method. The microbiology and chemistry of Hamanatto fermentation. Hamanatto's special characteristics. Serving Hamanatto. Conclusion. Acknowledgments.

Two flowcharts show Hamanatto production methods at Horinji and Daifukuji. Tables: 1. Distribution of various microorganisms in Hamanatto (cells per gram) at Yamaya, Horinji, Daifukuji. 2. Nutritional composition of Hamanatto (from Yamaya, Horinji, and Hamana), Daitokuji natto, and regular sticky natto. 3. Composition of free amino acids (mg per 100 gm defatted, and gm per 10 gm protein) in Yamaya Hamanatto, Daitokuji natto, Yamaya Hamanatto, soybean miso (temperature controlled- and natural fermentations), and Hatcho miso. 4. Composition of Hamanatto fats. 5. Volatile acids in Hamanatto. 6. Aromatic compounds in Hamanatto.

In Japan, there are basically two types of natto: Regular natto (*itohiki-natto*) and salty natto (*shiokara-natto*). Generally the word 'natto' refers to the former but in Shizuoka prefecture in and around Hamamatsu city a type of salty natto called *hamanatto* is famous. Totally unrelated to regular natto except in name and the fact that both are fermented soyfoods, it is actually a close relative of soybean miso in terms of its flavor and the way it is produced. However unlike miso, the soybeans retain their original form, uncrushed, and the product has its own unique flavor

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and aroma. Another type of salty natto is Kyoto's Daitokuji-natto.

A brief history of hamanatto: Hamanatto originated in ancient China and is one of the progenitors of today's miso and shoyu. Many old documents show that its relatives *kokusho* ('grain chiang') and *teranatto* ('temple natto') were brought to Japan from ancient China. A type of fermented, salt-preserved cooked soybeans called *tou-ch'ih kyo* was excavated together with articles buried with one *Mao-tai,* a ruler of the early Han dynasty who lived about 2200 years ago. This was the earliest form of hamanatto. According to the first scholars and envoys from Japan to T'ang dynasty China, *chiang* and *kuki*, both progenitors of miso and shoyu, were introduced to Japan from China. Records show that the great T'ang dynasty Buddhist master Ganjin, who came to Japan by boat in 753, brought with him 1428 gallons of 'sweet kuki,' an early type of salty natto. The first mention of salty natto in Japan appears in Fujiwara Akihara's *Shinsaru Gakki / Shin Sarugakuki*, written in 1286 [Note: Others give the date as 1068]. The first character of the word 'natto' means 'to pay, supply, or dedicate;' the second means 'bean or soybean.' According to the *Honcho Shokkan,* written in 1697, the first character was derived from the fact that natto were first prepared in Japanese temple kitchens which are known as *na-ssho,* the place which supplied the monk's food. Since the propagation of salty natto throughout Japan was done primarily by temples, they also came to be known as 'temple natto' (*tera-natto*). They served as an important source of protein and savory seasoning in the Buddhist vegetarian diet. Kyoto's Daitokuji-natto, Ichimei Ikkyuji-natto, and Tenryuji-natto, each made in temples, and the Hamanatto made at Daifukuji and Horinji temples in and around Hamamatsu city are popular to this day. Hamanatto first became known when the monks of Daifukuji temple presented some to the seventh Ashikaga shogun, Ashikaga Yoshikatsuko, during the 1400s. during the Warring States Period (1467 to 1568) they also presented Hamanatto to lords of the families of Imagawa Toyotomi, and Tokugawa.

Note: This is the earliest document seen (Nov. 2011) that mentions "Ikkyuji" or "Ichimei Ikkyuji" in conjunction with Daitokuji natto.

Because of its unique flavor and aroma and good keeping qualities, hamanatto became known throughout Japan. in some cases the skin of sansho seeds (Japanese pepper; *Zanthoxylum piperitum*) were mixed in and the product called *kara-natto* ('spicy natto'). When Toyotomi Hideyoshi undertook his Korean campaigns, he took lots of hamanatto with him. When he arrived in the ancient province of Hizen in northwest Kyushu, just before his soldiers embarked in boats to Korea, he gave this food the same name, *kara-natto,* but written with characters which mean 'beans for subjugating T'ang dynasty Korea.' This name, he hoped, would bring him luck in his campaign. After returning to the Hamamatsu area in central Japan, he donated land to makers of hamanatto to encourage their craft.

Later, when Tokugawa Ieyasu took over Hamamatsu castle, he used hamanatto as soldiers' provisions. Each year the local monks gave hamanatto as a gift to the shogun, who in turn used it as a New Year's offering. Still later, produced by temple cooks and craftsmen, it was given as a New Year's gift to parishioners; it also had a symbolic meaning since the word for soybeans (*mamé*) has also come to mean healthy and robust. In 1968 Yamaya, a producer of tamari shoyu (soy sauce) under the direction of Suzuki Yasuke, attempted to make an improved version of the product previously prepared at Daifukuji temple and first affixed the name 'hamanatto.' Thus the name of the product developed in the following order: *shiokara-natto* ('salty natto). *kara-natto* (T'ang dynasty natto), *hamana-natto,* and *hama-natto.* To this day, Daifukuji has maintained its own special method of production, but this too has been commercialized.

Methods of production: Today hamanatto is prepared by two methods: the traditional method handed down from generation to generation since ancient times, and the modern industrialized method which made improvements on the traditional method without harming the special flavor and aroma. Yamaya company and Horinji temple use closely related methods; the former is industrialized while the latter is a handmade process using koji starter. Daifukuji uses a different traditional process without koji starter since the ancient incubation room, wooden trays, and rice-straw covering mats are each permeated with starter mold spores. The soybean koji (molded soybeans) is combined with brine and put into vats for the second fermentation in September. Since the room temperature during the koji making (first fermentation) is 20º to 25ºC (68-77ºF) no special incubation heat source is needed. Yet since the molds propagate naturally, without special inoculation, the koji making takes a long time, up to ten days.

There are numerous points of difference from regular miso production; when making salty natto [fermented black soybeans] the soybeans are not crushed; the koji is incubated with brine in a keg or vat with a heavy pressing lid; and the final product is sun-dried. At the factory, the soybeans are only partially reconstituted [by soaking in water] until they reach 1.5 to 1.6 times their dry weight; this takes 2 hours in winter and 1½ hours in summer. They are then drained and allowed to stand for 4-5 hours so the absorbed water penetrates deeper. If they are drained for too long, the beans become hard. They are then steamed for 4-5 hours [at atmospheric pressure] and allowed to stand overnight in the steamer. At Daifukuji, the unsoaked beans are dropped into boiling water, parboiled for 7-8 minutes, steamed for 7-8 hours in a 2 meter deep steamer, then allowed to stand in the steamer until the next morning. Care is taken that the beans are not crushed or dehulled. Nowadays, since it is known that the process of leaving the beans overnight in the steamer lowers their net protein utilization and makes

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them more difficult for the enzymes to digest, this step is generally omitted. Traditionally it was always used to darken the beans; there were apparently no problems with bacterial contamination, perhaps because the reaction of sugars and amino acids under heat produces substances which reduce the proliferation of bacteria and yeasts. In fact, the overnight period in the steamer may have been done expressly to encourage this effect. Continued.

800. Ito, Hiroshi. 1976. Hamanattô [Hamanatto (Continued–Document Part II)]. *Nippon Jozo Kyokai Zasshi* (*J. of the Society of Brewing, Japan*) 71(3):173-76. March. [Jap; eng+] • ***Summary:*** (Continued): The steamed beans are then spread on a thick rice straw mat (*mushiro*), drained well, sun dried, sprinkled with roasted barley flour, and mixed until each bean is well coated. The straw mat helps to absorb excess water. In factories, the roasted flour is premixed with koji starter (*Aspergillus oryzae* mold spores). They dried the straw mat and used it year after year. Molds such as *A. oryzae, A. soyae,* and *Rhizopus* species inoculated the beans during mixing with the flour. The mixture is covered for one night with rice straw mats, then the next day transferred to wooden koji trays, which are arranged in the koji incubation room to make koji. Care must be taken that excess heat does not develop during fermentation, lest alien bacteria proliferate and the product's flavor and aroma decline. To prevent this, the koji mycelium is broken up three times by hand in the trays during the incubation.

At factories, the finished koji is sun-dried for 4 to 5 hours in winter (Hamamatsu is famous for its dry fall winds) or for 2 hours in summer so that the moisture content is reduced to below 30 to 35 percent. IF this drying is insufficient, after the beans have been put into the vats they easily get crushed. The vat used is a 19-gallon wooden vat or a small wooden tub. The koji is divided among several vats, brine made by combining salt with boiled water is added, a pressing lid equal to twice the weight of the vat contents is set in place, and the mixture is allowed to ferment for 80 to 90 days in summer or 150 days in winter. (In some places (Daifukuji), unpasteurized shoyu is used in place of brine).

The use of a heavy pressing lid is preferable since it causes the fermentation to proceed slowly; a light one helps it to go faster, but the soybeans more easily lose their form. At temples they sliver the middle skin of sansho seeds and place these at the bottom of the vat, then add the finished koji and finally the brine. In factories they add a more concentrated brine and ferment the mixture for at least 2 months. The fermentation room (*kura*) should have good air circulation and ventilation, otherwise the product may develop and unpleasant moldy or musty odor.

After draining off the brine scooping the beans out of the vats, they are spread on rice straw mats (traditionally *mushiro* from the Ryukyu islands; today *tatami* matting), sun-dried, and sifted to remove small pieces, which are discarded. In a separate process, gingerroot is cut thinly, soaked in boiling water, sun dried, and soaked in moromi (shoyu mash) for about 10 days to make pickled gingerroot. Sansho seeds are also added to some types.

The microbiology and chemistry of Hamanatto fermentation: The molds found in fresh hamanatto koji and commercial hamanatto, in addition to *Aspergillus oryzae,* include *Rhizopus* species and *A. niger.* Hamanatto such as that made at Daifukuji using a low incubation temperature (20-25ºC) and a long time contains a large proportion of *Rhizopus* on the surface of the soybeans. Moreover the amylase and protease enzymes in these molds are weaker and less active than those from the koji used for commercial shoyu or miso. For this reason the soybeans are not broken down, but rather remain in their whole form. If the koji is made mechanically, the enzyme strength and quality increases. The incubation proceeds more quickly in summer since the temperature is higher; the koji is ready in 3 days.

In general during the koji production, amylase, protease, and pepsidase activity reach a maximum at 50 hours, but in order to dry it, it must be left longer which causes the activity to decrease. In addition to molds, lactic acid bacteria and film yeasts, which are related to *Pediococcus,* are found in all hamanatto; they are mixed in during contact with the straw mats. If air circulation during koji production is poor, lactic acid bacteria proliferate more than usual. Unlike most lactic acid bacteria, they ferment soybean sugars creating undesirable effects, but do not ferment lactose. After the koji-brine mixture is in the vats, film yeasts proliferate among the various flavors; at 45 days they are most abundant, then later decrease. Especially on the surface of vats with poor air circulation, they are found as a white mold. These yeasts produce hamanatto's unique aroma.

Hamanatto's special characteristics: Because the fermentation time is long, the color turns a dark brown. The form of the beans is well preserved. The composition of nutrients is shown in figure 2. Compared with regular natto, hamanatto has less moisture and more salt. Free amino acids are shown in figure 3. Those abundant are glutamic acid, leucine, and proline, while cystine, tryptophan and methionine are the most scarce. Compared with soybean miso, arginine, cystine, and histidine are also relatively scarce. Since soybean miso undergoes an even longer fermentation than hamanatto the difference is the amino acids freed from the soybeans, which is particularly enhanced by protease enzymes from the koji molds. Hamanatto flavor is rich and full-bodied, somewhat like that of soybean miso, but with a special aroma, more tartness, and a unique flavor component that Japanese call *egumi.* The latter, related to oil rancidification, imparts what some describe as a subtle harsh or unpleasant stimulation to the tongue or throat. Kiuchi et al, in 1976, in an analysis of hamanatto lipids, found that this egumi originates from linoleic acid. Hamanatto fats, unlike those of regular natto,

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are more than 70 percent of free fatty acids. The majority of fats in both natto and soybeans are triglycerides, with other fat components being relatively low. The lipase in hamanatto koji breaks down a large percentage of the fats but the composition of the resulting fatty acids is not different from those found in soybeans; in both cases, linoleic acid comprises more than 50 percent of the total.

Hamanatto's volatile acids and aromatic compounds are shown in figures 5 and 6. The aroma of Yamaya's hamanatto was superior to that of Daifukuji or Hamana. This aroma was very poor just after the koji was made but during the ripening of various flavors, isobutyl aldehyde, isobutyl alcohol, and various amines decrease together with a decrease in the poor aroma. However if the air circulation is bad while making koji or during the vat fermentation, alien microorganisms proliferate, leaving an undesirable aroma.

801. Ito, Hiroshi. 1976. Hamanattô [Hamanatto (Continued–Document Part III. Continued)]. *Nippon Jozo Kyokai Zasshi* (*J. of the Society of Brewing, Japan*) 71(3):173-76. March. [Jap; eng+]

• ***Summary:*** (Continued): Serving Hamanatto: Hamanatto is used both as a seasoning and as a protein source. Like Daitokuji-natto it is sprinkled as a seasoning over hot rice in a small bowl, then doused with hot green tea to make the popular Ochazuke. It may also be served as an hors d'oeuvre with sake, used in place of tea cakes with whisked green tea as Chauke, or served as a rice seasoning in box lunches like shoyu-simmered kombu. Since ancient times it has been used in Zen Temple Cookery as a source of subtle flavor, diced and mixed with grated daikon, sprinkled with vinegar, or used in the Chinese tofu dish Mabo-dofu. Its abundance of glutamic acid and nucleic acids enrich the flavor of any food with which it is served.

Conclusion: Hamanatto, a progenitor of today's miso and shoyu, has been made by traditional methods since ancient times. Long lasting, it embodies the fermentation and nutritional wisdom of our forebears. Thus its scientific study reveals new and valuable information. In its traditional processing methods there are points that should be improved, yet today it is a long lasting food with its own distinctive characteristics.

Acknowledgements: I would like to thank the Yamaya and Hamana companies for supplying documents and samples, and allowing me to quote selected portions; Professor Kayo Kon of Shizuoka Women's University; and my colleagues at the National Food Research Institute, Kan Kikuchi, Teruo Ota, and Shinkuni Sasachi.

Figures show: (1) Hamanatto production methods: Flow charts of the Yamaya-Horinji method (Horinji is in parentheses), and of the Daifukuji method.

Tables show: (1) Distribution of microorganisms in Hamanatto made by Yamaya, Horinji, and Daifukuji. For each maker, there is one column for surface and another for interior. The types of microorganisms are: General bacteria, micrococcus, streptococcus, pediococcus, halophilic lactic acid bacteria, firm-forming yeasts, and molds (Mostly *Aspergillus oryzae* and *Rhizopus* species).

(2) Nutritional composition of three varieties of Hamanatto (Yamaya, Horinji, Hamana), Daitokuji natto, and regular "stringy" (*itohiki*) natto.

(3) Composition of free amino acids in various fermented foods: (A) Yamaya Hamanatto, Daitokuji Natto (both in mg per 100 gm defatted); (B) Yamaya Hamanatto, Daitokuji Natto, Soybean miso (made at controlled temperature), Soybean miso fermented at natural ambient temperature (all four in gm per 100 gm of protein); (C) Hatcho miso (in mg per gm). In the far left column 18 amino acids are listed.

(4) Composition of Hamanatto lipids. The four vertical columns are: TG = Triglycerides. DG = Diglycerides. ST = Cholesterol. FFA = Free fatty acids, MG = Monoglycerides. The four horizontal rows are: Soybeans, dry. Soybeans, steamed. Natto. Hamanatto.

(5) Hamanatto volatile acids. (6) Hamanatto aromatic compounds.

802. Rasmussen, Wayne D.; Baker, Gladys L.; Ward, James S. 1976. A short history of agricultural adjustment, 1933-75. *USDA Economic Research Service, Agriculture Information Bulletin* No. 391. 21 p. March.

• ***Summary:*** The concept of "agricultural adjustment involves "supporting the prices of farm products and encouraging farmers to adjust production to demand,..."

Contents: Origin of adjustment programs. The Agricultural Adjustment Act of 1933. The Soil Conservation and Domestic Allotment Act of 1936 (in response to the Supreme Court's ruling against the production control provisions of the Agricultural Adjustment Act of 1933). The Agricultural Marketing Agreement Act of 1937. The Agricultural Adjustment Act of 1938. Wartime measures [World War II]. Post-war price supports. The Korean War. Levels of price support–Fixed or flexible? The Soil Bank (designed to take farmland out of production). Farm programs of the 1960s (pilot food stamp plan, expand school lunch program, make better use abroad of American farm surpluses). The Food and Agricultural Act of 1965. The Agricultural Act of 1970. The Agriculture and Consumer Protection Act of 1973.

These acts were passed by Congress, signed into law by the president, then administered by the U.S. Department of Agriculture (USDA). In the USA, this type of legislation began with the Agricultural Adjustment Act of 1933, during the Great Depression, which struck first and hardest at the farm sector of the economy. "For agriculture and rural America, it was the worst economic-social-political wrenching in history... Foreclosures were the order of the day." In 1932, realized net income of farm operators was less

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than one-third of what it had been in 1929. Farm prices fell more than 50%. Before World War I, the U.S. was a debtor nation; after the war she was creditor nation–owing money to others. In the summer of 1920, the relative decline in the farmers' position began. For "a decade they were caught in a serious squeeze between the prices they received and the prices they had to pay before the situation became critical and a major element of the Depression."

The Agricultural Marketing Act of 1929 established the Federal Farm Board; it hoped to help cooperative marketing organizations. The main crops benefited by these programs were those with large surpluses such as wheat, cotton, tobacco, wool, rice, sugar, peanuts, tobacco, milk, and feed grains (corn, grain sorghum, barley).

Soybeans (p. 20) will be aided to alleviate distress caused by natural disaster. During the past few years there has been greatly increased foreign demand for U.S. agricultural commodities. Address: National Economic Analysis Div., Economics, Statistics, and Cooperatives Service, USDA.

803. *Soybean Digest.* 1976. Mrs. Wang chosen by experts. March. p. 40.
• ***Summary:*** "Mrs. Jun Ryun Wang, ASA consultant in Korea, has been named one of the seven Korean women expected to contribute the most in their own area in 1976.

"The seven areas were writing, music, fine arts, fashion designing, developing food, social work and women leaders. Three experts from each area chose the one lady they thought most likely to make noted accomplishments in her field. Mrs. Wang was chosen in the area of food developing."

804. Sterner, Mark; Sterner, Hank. 1976. 2 techniques cut costs of vegetable protein. *Food Engineering* 48(3):59-61. March. [2 ref]
• ***Summary:*** Contents: Introduction. Meals for Millions. Solving vapor control in Extrusion. Non-extrusion texturizing: A Korean prototype (Feb. 1973), it works on full fat. Five photos show extrusion equipment and products. Address: Meals for Millions Foundation, 1800 Olympic Blvd., Santa Monica, California 90406.

805. *Times* (*London*). 1976. Dinner at the home of the calypso: Good food guide. April 17. p. 7.
• ***Summary:*** A review of restaurants in Kingston, the capital of Jamaica. At the Korea Restaurant, the mixed vegetables "had the slightly sweet taste characteristic of Korean and Japanese soya sauces. The seaweed, deep fried, would not have been missed."

806. Sterner, M.M.; Sterner, M.H.; Zeidler, G. 1976. Non-extrusion texturizing of soy meal. *PAG Bulletin* (*Protein Advisory Group, WHO / FAO / UNICEF*) 6(2):33-34. June. [2 ref]
• ***Summary:*** Contents: Introduction. Textured vegetable proteins in developing countries. Non-extrusion cooked textured vegetable proteins. Operation of a simple texturizer. A unique MFM breakthrough: Texturizing full fat soy flour. Short and long range results.

In Feb. 1973 Meals for Millions (MFM) began testing the practicability of texturizing protein in a simple apparatus used for many years in Korea. Address: Meals for Millions Foundation, 1800 Olympic Boulevard, P.O. Box 60, Santa Monica, California 90406.

807. Mustakas, Gus C. 1976. Trip report on visit to Meals for Millions (MFM) Foundation, 1800 Olympic Boulevard, Santa Monica, California 90406, on June 21-22, 1976. Peoria, Illinois. 3 p. July 16. Typed, with signature on letterhead. [1 ref]
• ***Summary:*** This is a report for the ED [Engineering and Development Laboratory] files. Contents: Personnel contacted: Mark Sterner, Hank Sterner, and Gideon Zeidler. What is MFM? Examples of six projects in various countries: (1) Soy milk project in Korea; (2) Soy beverage project in Cairo, Egypt; (3) Weaning food in Ghana; (4) Leaf protein in India; (5) Food processing project in Jamaica; (6) Soy beverage project in Ecuador. NRRC cooperative program with MFM–Soy beverage in Ecuador. Training institute: International Institute of Protein Technology (IIPFT; offers two 4-week courses in Santa Monica roughly twice each year). Extruder and texturized soy protein research. Patent policy. Future research at MFM. Future research cooperation with NRRC. Address: USDA ARS Northern Regional Research Center, Peoria, Illinois 61604.

808. Shurtleff, William; Aoyagi, Akiko. 1976. The book of miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. Sept. 23. Illust. by Akiko Aoyagi. Index. 28 cm. Revised ed. 1981. New York, NY: Ballantine Books, 620 p. [60 ref]
• ***Summary:*** Contents: What is miso? Preface. Acknowledgments. Part I. Miso: Savory, High Protein Seasoning. 1. Soybeans, protein and the world food crisis. 2. Miso as a food. 3. The miracle of fermentation. 4. The varieties of miso: Introduction. An overview: Natural vs. quick miso, salty vs. sweet miso, red vs. white miso, chunky miso and koji miso vs. smooth miso, expensive vs. inexpensive miso, miso from the provinces.

Regular Miso: Rice miso (red / aka, light-yellow / shinshu, mellow red / amakuchi akamiso, mellow beige / amakuchi tanshoku, mellow white / shiro koji, sweet red / edo or edo ama-miso, sweet white / Kyoto shiro miso), barley miso (karakuchi mugi, mellow barley / amakuchi mugi), soybean miso / mamé miso (miso-dama, Hatcho miso, soybean miso / mame miso, tamari miso). Special Miso: Finger lickin' miso / Namemiso (Kinzanji miso, moromi miso, hishio, namémiso, natto miso, goto miso),

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sweet simmered miso / nerimiso. Modern Miso: Akadashi miso, dehydrated or freeze-dried miso, low-salt / high-protein miso.

Part II. Cooking with Miso (400 recipes). 5. Getting started. 6. Recipes from East and West: Miso toppings, miso in dips & hors d'oeuvres, miso in spreads & sandwiches, miso dressings with salads, miso in soups & stews, miso in sauces, miso with grains, beans & tofu, miso in baked dishes, miso sautéed & simmered with vegetables, miso in grilled dishes, miso in deep-fried dishes, miso & eggs, miso in desserts, miso pickles, koji cookery.

Part III. The Preparation of Miso. 7. Making miso at home and in communities. 8. Japanese farmhouse miso (incl. miso-dama). 9. The traditional miso shop. 10. The modern miso factory.

Appendixes: A. A brief history of chiang, miso, and shoyu: Introduction, Chinese chiang, early Japan, the Nara Period (710 A.D. to 784 A.D.), the Heian Period (794 A.D. to 1160 A.D.), the Kamakura Period (1185 A.D. to 1333 A.D.), the Muromachi Period (1336 A.D. to 1568 A.D.), tamari–the forerunner of shoyu (Priest Kakushin returns to Japan from China, where he learned how to make Kinzanji miso, settles at Kokoku-ji temple near town of Yuasa, discovers tamari), miso during the Edo Period (1603 A.D. to 1867 A.D.), the development of shoyu the Meiji and Pre-war Periods (1867 A.D. to 1941 A.D.), modern times, transmission to the West.

B. The varieties of Chinese chiang, Korean jang and Indonesian Tao-tjo. C. The chemistry and microbiology of miso fermentation: Introduction, koji starter molds, making koji starter, making koji–the first fermentation, cooking the soybeans, preparing the miso–the second fermentation, the finished miso. D. People and institutions connected with miso: In Japan–Miso research scholars and institutes, exporters of natural miso and koji to the West, traditional or semi-traditional shops making natural miso, Japan's ten largest miso factories (gives the production in tons/year for several companies), other well-known miso makers. Makers of koji starter and koji, Japanese restaurants specializing in miso cuisine. North America–Miso research scholars and institutes, commercial miso makers, companies importing Japanese miso, koji, or koji starter, individuals interested in miso. Europe (Belgium, England, France, Germany, Holland, Italy, Portugal) and Latin America (Brazil, Costa Rica, Mexico, Venezuela). E. Miso additives. F. Miso with seafoods, chicken, and meat. G. Table of equivalents. H. So you want to study miso in Japan? Bibliography. Glossary. About the authors (autobiographical).

Note 1. This is the earliest English-language book seen (April 2021) that has the word "miso" in the title. It is also the first book in the Western world written entirely on the subject of miso.

Note 2. This is the earliest document seen (April 2021) that mentions "Hatcho miso" (spelled that way, without a hyphen–which is now the typical romanization). Hatcho is a Japanese place name meaning (approximately) "Eighth Street."

Note 3. This is the earliest document seen (April 2021) that gives illustrated details about commercial miso production.

Note 4. An advertisement on the inside back cover of the paperback edition of this book announced that the authors were preparing *The Book of Sea Vegetables.* That book was half researched and written but never published because of concern with pollutants in sea vegetables, and increased interest in soyfoods. Address: 790 Los Palos Dr., Lafayette, California 94549.

809. Shurtleff, William; Aoyagi, Akiko. 1976. The book of miso (Illustrations–line drawings) (Document part). Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. Sept. Illust. by Akiko Aoyagi. [60 ref]

• ***Summary:*** Continued: Illustrations (line drawings, both numbered and unnumbered) show: The two Japanese characters for miso. Three men "Putting Hatcho miso to bed" by piling nearly round river stones on top of a huge vat; the pyramid shape makes the pile earthquake proof. A child holding a sheaf of grain. A round *zaru* (woven split bamboo tray) with a circle of salt in the middle. A square wooden measure (*isshô-baku*) filled with soybeans. The top of rice and barley plants showing grains and leaves. A wooden vat of red miso tied with rice-straw ropes. A miso maker standing by large wooden vats of two different sizes, with braided bamboo hoops. A well stocked miso shop in Japan (at Kichijoji train station, Tokyo). A woman standing behind two deep earthenware crocks filled with miso; balls of miso are in a basket. A sunken open-hearth fireplace (*irori*) in a traditional Japanese farmhouse with a pot hanging over the coals on a hook (*jizai kagi*) and tofu dengaku being grilled around the coals, their skewers stuck into the ash.

Nine wooden kegs of different kinds of miso piled up on 3 levels. A field of soybeans planted in rows. A hand holding soybeans pods still attached to the stem. A soybean pod split open to show the beans. (1) Bar chart of protein from different sources vs. protein returned. (2) Diagram of energy flow through two different food chains, one with a steer in the middle, the other with direct consumption of soy and grains. (3) Development aid from affluent nations as a percentage of GNP (1960-1971). Stylized soybean plant growing out of a stylized Planet Earth. Miso gift pack, with poly bags of rice, barley, and Hatcho miso. A Japanese pipe *kiseru.* (6) Graph of intestinal cancer vs. meat consumption among females in selected countries; the more meat consumed, the more cancer. Miso aging (from *Miso Daigaku*). (7) The varieties of miso and their characteristics (full-page table). (8) The percentage of salt in different miso varieties.

(9a) Map of Japan showing where the different types

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of miso originate. (9b) Map of Japan showing geographical miso preferences. A head of rice. (10) Famous sub-varieties of salty rice miso. Two heads of barley. Table about two types of barley miso. Two sets of soybean leaves with pods. Table about three types of soybean miso. The Japanese characters for Hatcho Miso. (11) A wooden sign in a Hatcho miso office: "Supplier to the Imperial Household." (12) Two cross-section views of a tamari miso vat. A small pottery crock of sweet simmered miso (*Nerimiso*). Packages of different types of modern miso: Peanut miso, akadashi miso, low-salt, high protein miso, Instant miso soup with dried frozen tofu, leeks, wakame. (14) Different types of miso packaging, both traditional and modern. A sample miso label. (13) Varieties of miso available in the West, plus characteristics of each. Squeezing a bean of miso out of the cut corner of a plastic bag. Three different shoyu containers. Six different types of tofu on a cutting board. (15) Oriental kitchen tools (utensils; full page). A small crock of salt with a wooden spoon in it.

Suribachi and modern sesame seed grinder. Tofu preparatory techniques. Broiling tofu with chopsticks on a broiling screen. Four forms of kombu. Two stylized crossed sheaves of rice. A traditional farmhouse kamado (raised earthenware cooking area). Pottery crock. Black and white sesame seeds and plant. Yuzu. Sprig of kinome. Head of garlic. Two burdock roots. Two leeks (*negi*). Making broiled miso. Hoba miso. Kaiyaki miso. Yubeshi miso. Wakame plant. A bowl of miso soup. A woman drinking hot miso soup next to a vending machine. Vegetables cut for miso soup (*mi* or *gu*). Table of the most popular ingredients in miso soup. How to make miso soup at home (4 views). Miso-koshi (woven bamboo strainer). Mad monks grinding miso. (19) Full-page table of miso soup throughout the four seasons. Shiso / beefsteak leaves. Kabocha. Daikon. Irori and jizai kagi (sunken farmhouse fireplace and overhead hanging hook). Woman serving miso by a sunken / open hearth fireplace. Woman kneeling, grinding miso with a pestle (*suri kogi*) in a *suribachi* (serrated earthenware mortar / mixing bowl).

(20) Rice patties with nori (*o-musubi*, *o-nigiri*). Bamboo noodle tongs. Homemade noodles in a pot. (21) Broiled mochi wrapped with nori. (22) Steamed tofu. A Chinese cleaver, with its tip stuck into a chopping block. Cultivated shiitake mushrooms growing on a log. Kabocha. Daikon. (23) Miso oden. Doténabé [Dotenabe]. Konnyaku twists. Dengaku Hoshi. Tofu dengaku (2 pieces, skewered; 3 pieces skewered in a box). Japanese eggplant (*nasu*) scored and Shigiyaki. Deep-frying with a wok. Lotus root stuffed with miso. (24) Deep-fried sandwiches. (25) Gashouse eggs. (26) Layered omelets. Japanese bamboo steamer. Kashiwa mochi. Selling miso pickles. Two pickling containers. (27) Salt-pressing. Air-drying daikon and turnips (*kabu*). Miso pickles with tea and chopsticks. Amazaké at the Nakamura-ro restaurant.

Note: This is the earliest English-language document seen (July 2012) that uses the term "Amazaké" to refer to amazake.

How to make miso at home: Utensils, ingredients, and process (7 figures). (29) Miso fermentation crocks. Corona hand-mill. Soft mat koji.

(30) Proportions by weight of basic ingredients for various homemade misos; full-page table. (32) Utensils for homemade koji and koji starter. (33) Miso flow chart. (34) Composition of nutrients in 100 gm of basic miso ingredients. (35) Process for homemade rice koji (9 figures). (36) Graph of changes in koji temperatures. Woman leaning over miso vat.

Japanese farmhouse miso: Traditional country farmhouses (2 views). Raised farmhouse kitchen hearth, caldrons and earthenware dais (*kamado*). (38) Farmhouse floor plan. A kura (family treasury and storehouse). Two bamboo colanders. Pounding miso at Suwanose. Making miso in a traditional farmhouse (9 figures). Farmhouse soybean miso made with *miso-dama* (miso balls) (5 figures).

The traditional miso shop: (39) A 17th century workplace (2 figures). (40) Tsujita shop floor plan. Koji trays. (41) Insulated fermentation box. (42) The small tools (full-page). (43) Shop with 2 cauldrons. (44) Steamer and cauldron. (45) A fermentation vat. (46) Shop floor at vat's rim. Preparing traditional rice miso (31 figures). Making koji using natural mold spores. Stacked koji trays. Making miso in a semi-traditional shop (5 figures). Hatcho miso; company and vats (2 views).

The modern factory (2 figures).

A brief history of chiang, miso, and shoyu (incl. evolution of Chinese characters). Hideyoshi Toyotomi and a robber on the bridge (Hatcho miso history). Making miso-damari. Inside a Kikkoman shoyu factory around 1900. Traditional shoyu seller.

Chinese chiang in earthenware jars in a courtyard. Korean jang; selling it and making at home. The koji mold life cycle. Conidiophores of Aspergillus and Penicillium. (48) The interaction of basic miso components during fermentation. (49) Temperature control curves for four quick misos. Edo period shoyu production. Woman cutting tofu for Dengaku and women busy making dengaku, both from the book *Tofu Hyaku Chin.* Cartoon of a man pouring himself sake, yet thinking of miso soup. Ebisu with fishing rod and big fish under left arm. Tamari shoyu pouring out of spigot at base of miso vat. Traditional Japanese kitchen utensils. Sunken fireplace (*irori*) with huge carved wooden overhead hook hanging from braided rice straw rope. Photo (in Nerima-ku, Tokyo) with brief biography of William Shurtleff and Akiko Aoyagi. Address: 790 Los Palos Dr., Lafayette, California 94549.

810. Jung, Jai-Kie; Chung, T.-Y.; La, S.-M. 1976. [Studies on the sterols of bean sprouts]. *Korean J. of Nutrition* 9(3):238-

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42. Sept. [4 ref. Kor; eng]
• ***Summary:*** Composition of sterols in soy sprouts, measured by mass spectrometry (MS), was found (on a dry weight basis) to be 4.52 mg% campesterol, 10.35 mg% beta-sitosterol, and 7.75 mg% stigmasterol. Address: College of Engineering, Inha Univ., Incheon, South Korea.

811. Shurtleff, William; Aoyagi, Akiko. 1976. Appendix B: Varieties of Chinese chiang, Korean Jang, and Indonesian Tao-tjo [Tauco] (Document part). In: W. Shurtleff and A. Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. See p. 277-331. Sept. Illust. by Akiko Aoyagi. Revised ed. 1981. New York, NY: Ballantine Books, 620 p.
• ***Summary:*** Contents: Introduction. Note: Of the romanized Chinese names given in curly brackets below, the first is in the Wade-Giles transliteration; the second is in the more modern pinyin transliteration.

Chinese chiang: Introduction, Red or regular chiang (chunky chiang, hot chunky chiang, Szechwan red-pepper chiang, Hamanatto chiang, Cantonese red chiang, great chiang, yellow-red chiang), black chiang (sweet wheat-flour chiang, black chiang), assorted chiangs (introduction, red-pepper chiang, Canton sweet simmered chiang, dried chiang, other varieties (none of which contain soybeans or grain koji; sesame chiang, peanut chiang, umeboshi chiang, shrimp chiang, corbicula chiang, tangy chiang, semi-fermented chiang)), chiang sauces (bean sauce, hoisin sauce {*hai-hsien chiang, haixiang jiang*}, oyster sauce, barbecue sauce, other chiang sauces, none of which contain soybeans or grain koji; shrimp sauce, Chinese Worcestershire sauce, Chinese ketchup). Note 1. The Chinese (Wade-Giles) names and characters for each of these sauces are given on page 230.

Korean jang: Introduction, Korean soybean jang (*doen jang*), Korean red-pepper jang (*kochu jang*), Mild red-pepper jang (*mat jang*), Chinese sweet black jang (*cha jang* or *chungkuk jang*), Japanese red jang (*wei jang* or *ilbon jang*).

Note 2. This is the earliest English-language document seen (March 2009) that uses the word "kochu jang" (or "kochu-jang") to refer to Korean-style red pepper and soybean paste (miso).

Indonesian tao-tjo: Summary.

Note 3. This is the earliest English-language document seen (Jan. 2012) that uses the term "chungkuk jang" to refer to a fermented Korean soyfood or seasoning. Actually, the term refers to Korean-style natto which, although it is a salted paste, is fermented using bacteria (*Bacillus subtilis*) and therefore does not belong in a book about miso. Address: 790 Los Palos Dr., Lafayette, California 94549.

812. Shurtleff, William; Aoyagi, Akiko. 1976. Appendix A: A brief history of chiang [jiang], miso and shoyu (Document part). In: W. Shurtleff and A. Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. See p. 214-26. Sept. Illust. by Akiko Aoyagi. [60 ref]
• ***Summary:*** Contents: Introduction. Chinese chiang [jiang]. Early Japan. The Nara period (710-784 AD). The Heian period (794-1160 AD). The Kamakura period (1185-1333 AD). The Muromachi period (1336-1568 AD). Tamari: The forerunner of shoyu. Miso during the Edo Period. The development of shoyu. The Meiji and pre-war periods (1867-1941). Modern times. Transmission to the West.

Illustrations: Evolution of Chinese characters. Hideyoshi Toyotomi and a robber on the bridge (Hatcho miso history, p. 219). Making miso-damari (p. 220). Inside a Kikkoman shoyu factory around 1900 (p. 222-23). Traditional shoyu seller (p. 226).

Page 219: "The origins of modern shoyu can be traced more clearly to the mid 1200s when the Japanese priest Kakushin returned from China, having learned there the technique for preparing Kinzanji miso. Establishing himself at Kokoku-ji temple near the town of Yuasa..." Address: 790 Los Palos Dr., Lafayette, California 94549.

813. Shurtleff, William; Aoyagi, Akiko. 1976. Korean jang (Document part). In: W. Shurtleff and A. Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. See p. 230-31; 69, 71, 116, 118, 121, 123. Sept. Illust. by Akiko Aoyagi. Revised ed. 1981. New York, NY: Ballantine Books, 620 p. [60 ref]



*Retailing Korean jang*

• ***Summary:*** "As in China, both Korean-style miso (*daen-jang* [*doenjang*]) and Korean soy sauce (*kan jang* [*kanjang*]) are widely prepared in farmhouses and urban dwellings; each family is allotted 6 pounds of free salt per year for just this purpose. A typical downtown high-rise apartment in Seoul

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Korean Jang









will have six to eight brown earthenware crocks containing homemade *jang* and *kan jang* on 80 to 90 percent of its balconies. For this reason, *jang* is sold on only a relatively small scale at the miso-and-pickle sections of outdoor markets and food stores. *Jang* is widely used in hot spicy soups (*chigé* [*jjigae / chigae*]) which are generally thicker than Japanese miso soups. *Kan jang*, sweeter and stronger than Japanese shoyu, is made with soybeans, salt, and water, without the use of koji grain.

"Korean Soybean *Jang* (*daen jang* or *doen jang*)*:* The only traditional Korean *jang*, this variety is light grayish brown and slightly chunky from the small proportion of uncrushed soybeans it contains. Two varieties of this salty and very strong-flavored jang are found in traditional markets; neither contains grain koji and one is slightly more salty and lumpy than the other. Most of this jang is still made in private homes, even that which is sold commercially, since most Koreans prefer the homemade product.

"To prepare *daen jang*, cooked soybeans are pounded and mashed in a mortar, shaped into balls (like Japanese miso dama, p. 193), wrapped in rice straw, and hung under the rafters until each ball is covered with a white bloom

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of natural mold. The balls, called *mezu* [*meju*], are then crushed and mixed with salt and water (and sometimes with sesame seeds or sesame leaves) and placed in an earthenware container of 1 to 10 gallons capacity. The container is covered (but has no pressing lid) and placed outdoors on the balcony or rooftop, or in a courtyard. The fermentation period generally lasts for six months, from March to September. At present *mezu* is sold in marketplaces and used as the basis for some homemade *jang*. And some families have recently begun to inoculate the cooked beans with koji starter (*tané koji*) mixed with a little wheat flour; the inoculated beans are placed in a warm place (79ºF to 86ºF) for about 24 hours, or until they are covered with white mold. They are then dried, crushed, and mixed with salt and water as above.

"In the United States a commercial variety is now available in 1-pound cans at Japanese and Korean food markets. Labeled "Bean Mash" (*doen jang*), it contains soybeans, wheat, salt, and water.

"Korean Red-pepper Jang (*go-chu jang* [*gochujang*] or *kocho jang*)*:* This hot-and-spicy jang is bright brownish red, has a smooth texture, and is somewhat softer than Japanese miso; each of the three main varieties contain slightly different amounts of red peppers. Boiled soybeans are mashed, hung up in rice-straw sacks, and cured for 2 to 3 months. This material is then broken up, dried in the sun, and ground to a fine powder, usually in a hand-turned stone mill. The powder is combined with finely-ground red peppers, salt and water, mixed well, placed in crocks and allowed to ferment for 2 to 3 months. In some areas, rice flour is mixed with water to form dumplings which are dropped into boiling water and cooked. These are mashed together with *mezu* [*meju*] (see above) and powdered red peppers. One third of the salt is added each day for three days. The red-pepper jang may be served on the fourth day, but is usually fermented for 6 months. It is said that some varieties are also prepared from rice koji and wheat flour, or from glutinous rice (*mochigomé*) or *mochi* and soybeans.

"Many Korean families prepare homemade red-pepper jang. It is a favorite base of a thick soup or stew containing thinly sliced or ground meat and sweetened lightly with sugar.

"In the United States, a commercial variety is now available in 1-pound cans at Japanese and Korean food markets. Labeled "Hot Bean Mash" (*kocho jang*), it contains rice, red pepper, soybeans, salt, and water.

"Mild Red-pepper Jang (*mat jang*)*:* This variety is similar to Korean Red-pepper Jang but contains more mezu [meju], less red pepper, and less salt. Glutinous rice is often used to add natural grain sugars and a sweet flavor. The jang is wrapped in blankets and fermented in a warm place for a relatively short time (about 2 weeks). Like Japanese Finger Lickin' Miso, it is often served with fresh vegetables or tofu as a dip, topping, or garnish.

"Chinese Sweet Black Jang (*chajang* or *chungkukjang* [*Korean natto*])*:* This soft, jet black miso is a close relative of Chinese Sweet Wheat-flour Chiang (p. 228). Most of the Korean varieties are made by Chinese in Korea or imported from China. It is most popularly served with noodles in a dish called *Cha Jang Mien* (p. 126). The words *cha* and *chungkuk* both mean "Chinese."

"Japanese Red Jang (*wei jang* or *ilbon jang*)*:* This is a salty red rice miso similar to Japanese Sendai miso but with a flavor adapted to Korean tastes. It is saltier than the Japanese product. A smooth, reddish brown jang, it originated in Japan and was sold during the 36 years of Japanese occupation. It

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is now produced in large quantities in Korea. The words *wei* and *ilbon* both mean "Japanese." Address: 790 Los Palos Dr., Lafayette, California 94549.

814. Shurtleff, William; Aoyagi, Akiko. 1976. Preface (Document part). In: W. Shurtleff and A. Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. See p. 9-11. Sept. Illust. by Akiko Aoyagi. Revised ed. 1981. New York, NY: Ballantine Books, 620 p. [60 ref]
• ***Summary:*** "I received my first introduction to fine miso while working as a cook at California's Tassajara Zen Mountain Center. It was there that I first participated in the preparation of miso–we made a 50-gallon vatful once each year–and learned its many uses as a seasoning. But it was only while living in Japan and working together with Akiko on *The Book of Tofu* that we both really discovered the enormous wealth and variety contained in the world of miso and began to recognize the great value this soybean food has to offer the world. This learning experience was an adventure and not the least of its many pleasures was shopping for the different varieties of miso needed to prepare our recipes.

"Throughout Japan, thousands of small shops specialize in the sale of miso (and miso pickles), and a sampling of forty to fifty varieties will generally be available. Each is displayed in a 5-gallon cedar keg ringed with broad hoops of braided bamboo and marked in bold black characters with the miso's name, price, and province of origin. The hues and shades create a festival of autumn-maple colors, and the total atmosphere has all the warmth and rustic beauty of a Florentine cheese shop or a small wine cellar in the French countryside.

"We enjoyed learning the names of Japan's traditional favorites and their distinguished makers, and slowly developed the ability to judge quality and character. Using miso as a seasoning in our daily cookery, we found it made many of our Western-style dishes even more delicious. Its versatility seemed almost unlimited and its deep, rich flavors served to enrich and add variety to our meatless diet. In fine restaurants, we enjoyed a wide variety of different dishes featuring miso and found that it had long been important in the two main schools of Japanese haute cuisine: Zen Temple Cookery and Tea Ceremony Cuisine. I soon came to understand that, for many Japanese, miso is the very epitome of the satisfying flavors and aromas of home cooking; the mere mention of mother's or grandma's miso soup can evoke all the warm feelings that come to most Westerners at the thought of a loaf of home-baked bread, piping hot from the oven.

"As our interest deepened, we began to visit, learn from and eventually become friends with a number of the more than 2,400 master craftsmen who make Japan's miso. Working in shops which are usually located adjacent to their homes, many of these men honored the traditional spirit of fine craftsmanship in a way that transformed daily work into an art and spiritual practice. We were drawn to their handsomely crafted tools, their high-roofed shops with massive arching rafters, and their huge cedar vats–often more than 150 years old–that stand taller than a man. In the morning air, billows of steam would rise from the great iron cauldron and large cedar steamer in which half a ton of soybeans and rice were being cooked. When freshly harvested koji (mold rice) was removed from its granite-hewn incubation room, it would fill the entire shop with an incomparable lingering aroma, rich and subtly sweet, like that of freshly-roasted chestnuts or coffee.

"I was eventually given the opportunity to do an informal apprenticeship with Mr. Kiyoshi Tsujita, an exemplary miso master living quite near our home. A strong traditionalist and purist at heart, he made the most delicious miso–and the only brown-rice miso–that we had ever tasted. Studying with him and watching him at work, I began to appreciate the mysteries of the fermentation process, the complexities of its chemistry and microbiology, and the harmony of its interaction with the great movements of the four seasons. He stressed that the essence of his art could not be transmitted in words, for it was linked to one's local climate and the soil in which soybeans, rice, and barley grow; embodied in the strains of microorganisms which for generations had permeated the air, wood, and rock walls of a shop; half hidden in the muscles and bones, feeling and intuition of each craftsman. It was a total understanding, rooted in a particular place and in a man who becomes imbued with it like one who, unbeknownst to himself, becomes wet by walking through a mist. As in the ancient wine chateaux throughout Europe, it reflected a tradition and culture that took centuries to mature.

"Nevertheless, he wanted to help both Akiko and me to understand his craft and convey its fundamentals to people in the West. He therefore encouraged us to begin making our own miso and helped us get started. Under his tutelage, we prepared many small batches and, for more than a year, patiently endured the suspense of waiting, wondering how they would turn out. When we seemed pleased with the results, he teased us with the Japanese proverb saying that, naturally, every person likes his own homemade miso best!

"Over a period of some four years, Akiko and I had the opportunity to visit miso shops throughout Japan and study the preparation of most of the main traditional varieties. Though ordinarily quite protective of their traditional secrets, the shops' masters were pleased to see our sincere interest in their work and, without exception, spared no time or effort in showing us everything we wanted to see, answering all our questions, and in some cases, later carrying on a detailed correspondence.

"Early in the spring of 1973, we made our first contact with country-style miso, a tradition started hundreds of years ago by Buddhist priests in their temples and rural peasants in

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their farmhouses, and which still accounts for an estimated 17 percent of all Japanese miso production. At the Banyan Ashram, a community of young people living a simple life of meditation and farming on tiny Suwanose Island, we learned how to make barley koji (mold barley) in the ancient way by 'catching' natural wild mold spores floating in the air. Invited one sunny April morning to join in the work, we used a large wooden mortar and heavy pestles to mash koji and cooked soybeans together. In an atmosphere of down-home merriment, everyone lent rhythm to the pounding by clapping, stomping, and chanting. The women packed the mashed ingredients into tall earthenware crocks, which were then ceremoniously sealed. We were urged to return for the grand opening when the fermentation had finished, but warned not to be late, since even fifty gallons of homemade barley miso wouldn't last long in a large community of hungry, hardworking men and women.

"As our book began to take form, we traveled to Taiwan and Korea to visit local miso makers at their work, study new varieties of Chinese- and Korean-style miso in sprawling outdoor marketplaces, and sample miso cuisine at restaurants representing the full gamut of provincial cooking styles" (Continued). Address: 790 Los Palos Dr., Lafayette, California 94549.

815. **Product Name:** Soy Sprouts, Mung Bean Sprouts.
**Manufacturer's Name:** Aqua Agra.
**Manufacturer's Address:** 1521 Avalon Blvd., Castlebury, Florida. Phone: 305-339-8157.
**Date of Introduction:** 1976 October.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Don Wilson. 1993. Nov. 24. His wife is Korean. The first two products made by their business were mung bean sprouts and soy sprouts, both started at about the same time in about Oct. 1976, six months before his son was born (in June 1977). They first made them out of their garage at 1521 Avalon Blvd., Castleberry, Florida, then they moved into a large commercial location on Seminola Blvd., Castleberry, Florida. Then they introduced alfalfa sprouts. Soon they were sprouting just about everything that would sprout. In the beginning, the company was mainly a sprouting company.

He had to close the company after 6 years, in about 1983. At that time they were making about 75 products. He and his wife were each working 100 hours a week. "The doctor gave me a choice. He said, 'You can either get rid of that business and live, or you can keep it and die! But you're gonna do one of the two.'"

816. Bernard, R.L.; Hittle, C.N. 1976. United States national soybean germ plasm collections. *INTSOY Series* No. 10. p. 182-85. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** A full-page table (p. 183) gives the following information on soybean germ plasm collections worldwide: Country and curator, address, number of accessions, nature and origin of accessions. There are major collections in the following places: Toulouse, France (500 accessions). Amravati, Haharashtra (1,800), and Pantnagar, Uttar Pradesh (4,000), India. Bogor, Indonesia (400). Hiratsuka, Kanagawa prefecture (2,928), and Iwate University, Morioka (200 Glycine species), Japan. IITA, Ibadan, Nigeria (2,000). Harbin, and Kirin Province, China. Pretoria, South Africa (600). Suweon (300 Glycine species), and Cheong Kyang, Seoul (1,300), Korea. Algot Holmberg and Soner AB, Norrkoping, Sweden (1,200). AVRDC, Tainan (9,000), and Taichung (2,800), Taiwan. Urbana, Illinois (4,100), and Stoneville, Mississippi (1,700), USA. Leningrad, USSR (2,500).

There are additional collections in Australia, Bulgaria, Hungary, Philippines, [Southern] Rhodesia (Salisbury [Harare]), and Romania.

Table 1. Divisions of USDA soybean germ plasm collections (Urbana, Stoneville, Total). Table 2. Maturity grouping of the USDA soybean germ plasm collection, 1976 (In the northern region [maturity group 00 to IV] there are 237 named varieties, 51 FC [Forage Crop] strains, 2,999 P.I. [Plant Introduction] strains, and 3,287 total. In the southern region [maturity group V to IX] there are 101 named varieties, 39 FC [Forage Crop] strains, 1,514 P.I. strains, and 1,654 total).

Table 3. History of soybean introductions into the United States. The earliest period given is 1898-1907; the great surge in soybean introductions was in 1929-32 during the Dorsett-Morse expedition to East Asia; A total of 11,594 strains have been introduced. Table 4. Maturity grouping and origin of accessions through 1976 in USDA wild soybean (Glycine soja Sieb. and Zucc.) germ plasm collection (there are 361 accessions; Country of origin: Japan 180, Korea 134. China and Taiwan 32. USSR 15). Table 5. Species distribution of USDA perennial Glycine collection, 1976 (8 species [*G. canescens, G. clandestina, G. falcata, G. latrobeana, G. tabacina, G. tomentella, G. wightii*] and 161 accessions from Australia, India, Africa, Taiwan, Japan, Philippines, Ethiopia).

Note: The assignment of FC numbers began in about 1911 and was discontinued in 1957. Address: USDA.

817. Goodman, Robert M. ed. 1976. Expanding the use of soybeans. *INTSOY Series* No. 10. xv + 261 p. Proceedings of a Conference for Asia and Oceania. Held Feb. 1976 in Chiang Mai, Thailand (College of Agric., Univ. of Illinois at Urbana-Champaign). [100+ ref]
• ***Summary:*** Contents: Introduction. Opening addresses. General sessions: Production, protection, utilization and economics.

Symposia: Soybean rust. Biology and control of major insect pests of Asian soybeans. Breeding tropical soybeans.

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Small scale soybean processing: What is needed? Extension research to the village farmer.

Country reports: Current status of soybean production and research in–Australia, Bangladesh, India, Indonesia, Iran, Japan, Korea, Malaysia, Philippines, Kingdom of Saudi Arabia, Sri Lanka, Thailand.

Closing address, by R.W. Howell. List of contributed papers. Abbreviations and units of measure.

Note: Many papers presented at this conference are cited separately. Address: Dep. of Plant Pathology and INTSOY, Univ. of Illinois, Urbana, IL.

818. *INTSOY Series.* 1976. Conference delegates. No. 10. p. xii-xv. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** The following number of participants came from the following countries: Australia (3). Bangladesh (4). Hong Kong (1). India (4). Indonesia (20). Iran (6). Iraq (1). Japan (6). Malaysia (12). Pakistan (1). Philippines (9). Puerto Rico (4). Saudi Arabia (3). Singapore (2). South Korea (3). Sri Lanka (5). Switzerland (1). Taiwan (8). Thailand (120). United Kingdom (2). USA (17).

Ten patrons of the conference are also listed.

819. Kobayashi, Takashi. 1976. Pod borers and the seed pest complex in Asian soybeans. *INTSOY Series* No. 10. p. 171-73. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [7 ref]
• ***Summary:*** "The major pod borers found in Japan include the soybean pod borer, *Etiella zinckenella* (Treitschke); the Azuki pod worm, *Matsumuraeses phaseoli* Matsumura; and *M. falcana* (Walsingham)." Also discusses: Factors that influence damage by seed pests: Regional variation in damage by seed pests, prediction of damage caused by insects, control of seed pests by insecticides, cultural control of insect pests of seed. Address: Tohoku National Agric. Exp. Station, 4 Akahira, Shimokuriyagawa, Morioka, 020-01, Japan.

820. Lee, Hong Suk; Park, K.Y.; Chung, B.J.; Park, J.S.; Yohe, J.M. 1976. The status of soybean production and research in Korea. *INTSOY Series* No. 10. p. 239-42. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** Contents: Introduction. Major problems related to increased soybean production: Weather, varietal improvement, planting time, soil fertility and pH, cultural practices (cropping systems, planting patterns, seed treatment and inoculation), soybean pathology and entomology. Present and future research problems.

"Good quality soybeans with large grain size have been cultivated for thousands of years in the middle and northern part of the east coast of Korea. Because soybeans have been grown primarily for subsistence, they have not been regarded as a cash crop by Korean farmers... Soybean cultivation in 1974 and 286,188.4 hectares, thus making soybeans the third major crop of Korea in hectarage...

"Soybean production has gradually increased from 231,994 metric tons in 1970 up to 318,576 metric tons in 1974. Although total soybean production has increased, it has not kept up with demand as indicated by the fact that imports have increased from 36,291 metric tons in 1970 up to 66,370 metric tons in 1974...

"Home consumption is the major area for soybean use, about 122,000 metric tons being consumed in 1974. Soybeans are prepared by mix-boiling with rice or vegetables, or are eaten in the form of curd, sprouts, sauce, paste, milk, and flour. The government uses soybeans primarily for military needs. Soybean oil is used for industrial purposes." Address: 1. College of Agriculture, Seoul National Univ.; 2. Corps Exp. Station, Office of Rural Development; 3-4. Inst. of Agricultural Science, Office of Rural Development; 5. Crop Improvement Research Center, Office of Rural Development. All: Suweon, Korea.

821. Bookwalter, G.N. 1976. Trip report on lectures and demonstrations at Meals for Millions (MFM) Foundation, 1800 Olympic Boulevard, Santa Monica, California 90406, on November 1-4, 1976. Peoria, Illinois. 3 p. Dec. 6. Typed, without signature. [1 ref]
• ***Summary:*** This is a report for the ED [Engineering and Development Laboratory] files. Contents: Personnel contacted: Mark Sterner, Hank Sterner, and Gideon Zeidler. Student participants in training program (name and country of 7 students from India, Costa Rica, Chile, Malaysia, Nigeria, Korea, Turkey). Preparation of instantized corn meal. Preparation of mixed weaning food. Taste panel. Texturized soy protein research. Equipment development.

Bookwalter concludes: "My general impression of both the MFM and student participants was extremely high. MFM has a highly productive research program with a small staff. The student participants were all intelligent and well educated. I've never seen so much friendliness, enthusiasm, discussion, and dedication, both within MFM personnel and the student participants. I left with the feeling that a great deal of good would come from this." Address: USDA ARS Northern Regional Research Center, Peoria, Illinois 61604.

822. Development of composite flour using local resources and use of the flour to produce high nutrition low-cost food products. 1976. Seoul, South Korea: Korea Institute of Science and Technology. 177 p. *
Address: South Korea.

823. **Product Name:** Tofu. Renamed Green Cow Tofu by 1982.
**Manufacturer's Name:** Eastern Food Products Co.

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**Manufacturer's Address:** 9157-3 Whiskey Bottom Rd., Laurel, Maryland. Phone: 301-792-0440.
**Date of Introduction:** 1976.
**How Stored:** Refrigerated.
**New Product–Documentation:** Shurtleff & Aoyagi. 1977. Jan. 28. Commercial Tofu Shops and Soy Dairies.

Shurtleff & Aoyagi. 1978, Dec. *The Book of Tofu* (Ballantine pocketbook edition). "Appendix B: Tofu Shops and Soy Dairies in the West." p. 395. Owner: Unknown.

Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number (301-792-0440 or 953-3522). Owner: Mr. Kim.

Label for Green Cow Tofu. 1982. Made by Eastern Foods Products, Inc., Laurel, Maryland 20707.

824. Lee, Cherl-Ho. 1976. [The effect of Korean soysauce and soypaste making on soybean protein quality. I. Chemical changes during meju making]. *Korean J. of Food Science and Technology* 8(1):12-18. [21 ref. Eng; kor]
• ***Summary:*** "Fermented soybean Mejus were prepared in the laboratory with varying lengths of fermentation, and the changes in the chemical composition during the Meju making were determined." The moisture of the cooked soybeans gradually evaporated during the Meju fermentation, and after 2 months of fermentation the water level reached the level of raw soybeans. Address: Dep. of Food Preservation, The Royal Veterinary and Agricultural Univ., Copenhagen, Denmark; Present address: Post doctorate fellow, Dep. of Nutrition and Food Science, M.I.T, Cambridge, Massachusetts.

825. Lee, Cherl-Ho. 1976. [The effect of Korean soysauce and soypaste making on soybean protein quality. II. Chemical changes during meju-brine ripening]. *Korean J. of Food Science and Technology* 8(1):19-32. [9 ref. Eng; kor]
• ***Summary:*** "The laboratory Mejus as well as home-made Meju and improved Meju received from Korea were ripened in the brine for up to 8 months and the changes in the chemical composition during the process were determined and differences between the types of meju were compared. On the basis of the amino acid pattern, the changes in the protein quality of soybean during the process was evaluated." Address: Dep. of Food Preservation, The Royal Veterinary and Agricultural Univ., Copenhagen, Denmark; Present address: Post doctorate fellow, Dep. of Nutrition and Food Science, M.I.T, Cambridge, Massachusetts.

826. Manufacturing process of food grade soybean flour commercially produced in Korea and its quality assessment. 1976. In: Development of Composite Flour Using Local Resources and Use of the Flour to Produce High Nutrition-Low Cost Food Products. Seoul, South Korea: Korea Institute of Science and Technology. * Address: South Korea.

827. **Product Name:** Soybean sprouts.
**Manufacturer's Name:** Pyung Hwa Food Co. Inc.
**Manufacturer's Address:** 2139 Dundas St., Toronto, ONT, M6R 1X1, Canada. Phone: 416-534-0237.
**Date of Introduction:** 1976.
**Ingredients:** Soya beans (Feves de soya), water, magnesium chloride (chlorure de magnesium), calcium sulfate (sulfate de calcium).
**Wt/Vol., Packaging, Price:** 600 gm.
**How Stored:** Refrigerated.
**New Product–Documentation:** R. Leviton. 1980. Soyfoods magazine. Summer. p. 16-17. The company is at 2139 Dundas St. "located underneath a garage and service station. Mr. Jhasun Koo's traditional-style shop, which began operation in 1976,... also makes 4,000 pounds of soybean sprouts weekly and sells them in 50-pound sacks to Oriental restaurants and groceries." He has 7 workers.

Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Mr. Jhasun Koo.

Talk with Jhasun Koo, owner and founder. 1989. May 4. He started making soy sprouts in his home basement in 1976. At that time, his company had no name. It was first named Pyung Hwa Food Co. in 1978. In 1986 he moved from Dundas St. to his current address: 115 McCormack St., Toronto, ONT, M6N 1X8. Phone: 416-767-7604. Mr. Koo is Korean.

828. Bayramian, Mary. 1976. Around the world vegetarian cookbook. San Francisco, California: Troubador Press. 120 p. Illust. by Patricia Kinley. Recipe index. 21 cm.
• ***Summary:*** Soy-related recipes include: Japanese [mung] bean sprouts and cucumbers with sesame dressing (*Moyashi no goma su ae*) uses 1 teaspoon of soy sauce (p. 74). Korean watercress salad-relish (*Namul*) uses 2 tablespoons of soy sauce (p. 74). Soy is not used in any other recipes. The author was born 1921.

829. Bernard, R.L. 1976. United States national germplasm collections. In: L.D. Hill, ed. 1976. World Soybean Research [Conference I: Proceedings]. Danville, Illinois: Interstate Printers and Publishers, Inc. xvii + 1073 p. See p. 286-89.
• ***Summary:*** "The U.S. Department of Agriculture has attempted to acquire and maintain all available soybean germplasm since about 1949. In that year two collections were established, one of early varieties (Group IV and earlier) at Urbana, Illinois and one of the later ones (Group V and later) at Stoneville, Mississippi. The USDA was able to gather from various experiment stations many of the old varieties introduced from eastern Asia during the previous 50 or 60 years, about 1500 strains altogether. In addition to the foreign varieties, all of the old United States and Canadian varieties that still could be found were preserved.

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The Collection has grown steadily since that time until today there are over 5000 strains being maintained. Seeds of these are made available to researchers throughout the world.

"The collection now consists of several divisions. The Named Variety Collection (Table 1) consists of commercial varieties, past and present, of the United States and Canada. The older varieties in this division are simply introductions, brought from eastern Asia in the 1910's, 1920's, and 1930's and grown commercially here. The more recent ones are mostly pure-line selections following controlled hybridizations. Currently there are many privately developed varieties, blends, etc., being sold to the farmer, but, because of the confusion involved, we are not now putting any varieties of secret origin in the germplasm collection.

"The largest division in the collection is that of the foreign varieties, several thousand in number identified by FC and PI numbers. Table 2 shows the history of their collection. The active collection periods of the 1920's and of the past two years contrast with the slow accession rate for most of the past 40 years. The northern collection is predominately from eastern Asia with about 30 percent from China, 30 percent from Korea, 20 percent from Japan, and 20 percent from Europe. The southern collection is predominantly from eastern and southern Asia with major collections from Korea, Japan, India, Indonesia, the Philippines, and other countries of southeast Asia with some recent additions from South America and Africa. These accessions range from primitive native varieties to recently developed experiment station varieties. Many of them have come in from commercial or other non-agricultural sources and we have no information at all about the nature of their origin. Altogether, there are over 4000 accessions in this division.

"The Genetic Collection was established to aid in the preservation of material of use in qualitative genetic study. In one part, called The Genetic Type Collection, we try to preserve each known gene (not in a named variety) preferably in the original strain used by the author who described the trait. There are about 100 strains including a number of mutants not yet studied genetically. In addition to the Type Collection there is an isoline collection (Table 3) developed by backcrossing and involving about 60 genes and 5 recurrent parents, resulting in over 300 isolines including combinations of two or more genes. A third subsection of the Genetic Collection is the recently established Cytogenetic Collection which will be developed and maintained by Dr. Reid Palmer, Cytogeneticist at Iowa State University." (Table 3).

"In the Species Collection we have represented all or almost all of the known species of *Glycine* including *G. soja* (Table 4) and seven perennial species (Table 5). We are actively collecting for the annual wild soybean (*G. soja*), which appears to have the most potential value to the breeder since it will cross with the cultivated soybean while the perennial species will not.

"Collections lists or evaluation reports are available by writing to the Soybean Laboratory in Urbana, Illinois or for the late-maturing material (Group V and later) write to Dr. E.E. Hartwig in Stoneville, Mississippi." Address: U.S. Regional Soybean Laboratory, Agricultural Research Service, USDA; and Dep. of Agronomy, Univ. of Illinois, Urbana-Champaign.

830. Iwadare, Shoji. 1976. Miso, nattô, tôfu kenkô-hô [Miso, natto, tofu: The way to health. Shiokara natto, kara natto, and tera natto] (Document part). Tokyo: Yomiuri Shinbun-sha. 238 p. Illust. 18 cm. [Jap]

• ***Summary:*** Page 141: The word "natto" first appeared in 1286 in the *Shinsaru Gakki*, by Fujiwara Myoe, whose epicurean sister was said to love *shiokara natto* or salty natto [fermented black soybeans]. The ingredients used to make this salty product are 100 kg soybeans, 100 kg barley flour, and 30 kg salt. It is also called T'ang natto (*kara-natto*) and was used as an hors d'oeuvre with saké or in place of tea cakes (*chauke*) with tea.

Tera-natto used as gifts at O-bon and New Years: At Nara's temples Kofukuji and Todaiji, the monks made salty natto and gave them to the parishioners at O-bon and New Years. Later the tradition was transmitted to Kyoto and became the now famous Daitokuji natto and Tenryuji Natto (?), each varieties of "T'ang natto" (*kara-natto*) or "shiokara-natto."

Note: This is the earliest (and only) document seen (Nov. 2011) which states that salty natto [fermented black soybeans] were made at Kofukuji temple in Nara.

All these types contain salt, are inoculated with a mold, have a dark color (and no strings), and have a long shelf life. Today at Daitokuji one can still see the splendid *Nassho* (offering place or natto place) which, according to the book *Honcho Shokkan*, was given this name since that was where natto were (originally?) made [and used as an offering]. Natto were an important protein source for the vegetarian monks.

Differences between tera-natto [salty natto] and itohiki-natto [stringy, unsalted natto]: Tera-natto first came to be made by monks in temples. These savory fermented black soybeans and chunks were close relatives of miso and shoyu. Japanese Buddhist monks who went to China to practice during the T'ang dynasty (618-906) learned how to make these condiments and brought the knowledge back to Japan, where they made them in temples. They are made with molds (mainly *Aspergillus oryzae*) rather than bacteria (which are used to make itohiki natto). Cooked soybeans are dusted with roasted wheat or barley flour which is mixed with mold spores, incubated until a mycelium forms, sun-dried, pickled in brine with seasonings, then sun-dried again. Daitokuji natto is crushed then reshaped into lumps, while Hamanatto, made at Daifukuji is sold as is. When Tokugawa Ieyasu

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(military ruler / shogun of Japan, 1600-1603) conducted his military campaign in Korea [1592] he had large quantities of Hamanatto produced as food for his soldiers; later it became a commercial product, today's Hamanatto. The "natto" that appear in ancient documents are mostly these fermented black soybeans [salty, fermented soybeans]. Address: Tokyo, Japan. President of Manyu Eiyo KK. Teaching at Nihon Daigaku Daigaku-in and Meiji Daigaku Nôgaku-bu. Prof. at Shobirin Joshi Tanki Daigaku.

831. Kwon, S.H. 1976. Korean germplasm collection. In: L.D. Hill, ed. 1976. World Soybean Research [Conference I: Proceedings]. Danville, Illinois: Interstate Printers and Publishers, Inc. xvii + 1073 p. See p. 290-97. [9 ref]
• ***Summary:*** Contents: Introduction. Materials and methods. Variation of plant characters. Conclusion. References.

"Introduction: "The Korean peninsula lies between 33º 06' and 43º north latitude and it measures about 1,000 km in total north-south length. The typical topography of the land includes numerous valleys. The total land area of the peninsula is 220,848 km2 and the Republic of Korea comprises 98,758 km2 but only 23 percent of the land is arable [9].

"The yearly precipitation varies from about 1,500 mm along the coastal region of the southern part to 600 mm in the northern interior. During the period of the rainy season (June to August), an average of 60 percent of the total yearly precipitation is recorded. The summers are hot with an average August temperature above 240 C. The mean temperature during the crop season (May to October), ranges from 160 to 21º C, and the number of frostless days varies from 169 to 228 [1]. The soil of Korea is mostly of granitic origin and is acidic and low in fertility. In general, environmental conditions of the Korean peninsula are suitable for soybean production.

"The exact history of soybean culture in Korea is not known, but it is clear that the soybean has played an important role in diversifying agriculture and providing human foods for many centuries. Based on numerous reports and historical evidences [2, 6], it is assumed that the Korean soybean culture started in the fourth to fifth century B.C. or earlier [3].

"Acreage, production, and yield per hectare for the 10-year period, 1964-1974, in Korea are presented in Table 1 [9]. Although the acreage of the soybean did not increase in that 10-year period, the total production of soybean seed increased from 163,000 tons in 1964 to 319,000 tons in 1974 simply due to increased yield per unit area–from 580 kg per hectare in 1964 to 1,110 kg per hectare in 1974. The sharp increase of seed yield per unit area may be the result of the favorable weather of the year and improvement of cultural management. The acreage and production are exceeded by 666,000 tons of barley harvested from 375,000 hectares and 4.417 million tons of rice from 1.189 million hectares of paddy field in 1974. In spite of the increase in total production, it is not sufficient to meet the local consumption, and therefore Korea imports soybeans from other countries.

"In Korea, soybean yield per hectare is low as compared with other major soybean producing countries in the world. This low productivity may be attributed to the use of low yielding varieties, low soil fertility, and delayed plantings after barley and wheat harvest. To meet the national soybean consumption, yield potential must be increased instead of expanding limited farm land." Address: Applied Genetics Lab., Korean Atomic Energy Research Inst., Seoul, South Korea.

832. Simoons, F.J. 1976. Geographic perspectives on man's food quest. In: Dwain N. Walcher, N. Kretchmer, and H.L. Barnett, eds. 1976. Food, Man, and Society. New York and London: Plenum Press. xv + 288 p. See p. 31-53. [46 ref]
• ***Summary:*** Discusses: (1) Pakka and kachcha [kaccha] foods, which relate to Hindu dietary laws. Pakka food contains ghee (clarified butter), a very costly fat believed to promote health and virility. Hindus regard raw foods as possessing the greatest purity; they will accept them even from untouchables.

(2) Dairying: It seems to have been first practiced in about 4000 B.C. in the Near East and North Africa (Simoons 1971). The nonmilking zone embraces all of Southeast Asia from Burma eastwards as well as most of East Asia including China, Korea, and Japan. Much of Africa is also non-dairying; in Africa dairying spread southward from Kenya after the start of the Christian era. People generally did not consume dairy milk if it caused gas intestinal and/or cramps, diarrhea, or even vomiting. Nearby dairying peoples were the Mongols and Tibetans.

The failure of dairying to spread throughout Asia and Africa does not involve a single cause but rather a series of factors from culture, environment, and ecology. Also, most people (70-100%) above age 3 in the nonmilking zone have low levels of the intestinal enzyme lactase that hydrolyzes lactose (milk sugar) into glucose and galactose, which can be readily absorbed by the body. This, it should be emphasized, is the same condition that prevails in other land mammals, and it is believed to be the normal pattern found among primitive men. Address: Dep. of Geography, Univ. of California, Davis, Davis, California 94616.

833. Solomon, Charmaine. 1976. The complete Asian cookbook. New York, NY: Summit Books. 511 p. Illust. Color plates. Index. 29 cm.
• ***Summary:*** This artistic cookbook is loaded with full-page color plates plus a good glossary. Soy-related recipes include: Bean curd omelettes (Tahu telur, from Indonesia, p. 188). Fried bean curd with peanuts (Tahu goreng kacang, from Indonesia, p. 204). Fried bean curd with soy sauce (Tahu goreng kecap, from Indonesia, p. 204). Fried fish

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with salted soya beans [miso] (Ikan goreng tauceo, from Malaysia, p. 224). Bean curd in salted soya bean paste [tofu in miso] (Taukwa tauceo, from Malaysia, p. 233). Bean curd and bean sprouts [probably mung bean sprouts] (Taukwa dan taugeh, from Malaysia, p. 233). Stuffed soy bean cake [with fried tofu] (Tauhu sod sai, from Thailand, p. 316). Glutinous rice and soybean sauce (Nuoc leo, from Vietnam, p. 341). Soup with bean curd (Canh dau hu, from Vietnam, p. 342). Misu tomato sauce (with red misu = red miso, from the Philippines, p. 351). Bean curd in barbecue sauce (Chu hau jeung mun dau fu, from China, p. 414). Bean curd with crab sauce (Hai yook par dau fu, from China, p. 414). Ginger soy sauce (See yau ghung jeung), Chilli soy sauce (See yau laht jiu jeung), Black bean sherry sauce (Dau see sheung jing jeung, with canned salted black beans = fermented black soybeans), Black bean garlic sauce (Suen tau dau see, with fermented black soybeans) (from China, p. 431). Sesame seed sauce (Cho kanjang, from Korea, p. 451, with "4 tablespoons light soy sauce"). Dumpling soup (Mandoo, from Korea, p. 453, with "1 square fresh bean curd" and "2 tablespoons light soy sauce"). Soup of soybean sprouts (Kong namul kuk, from Korea, p. 453, with 500 gm soy bean sprouts and 1 tablespoon soy sauce). Rice with fried bean curd (Kitsune domburi, from Japan, p. 460). Steamed egg custard with tofu (Kuya mushi, from Japan, p. 471). Bean paste soup (Miso shiru, from Japan, p. 477). Sushi in fried bean curd (Inari-Zushi, from Japan, p. 480).

Soy-related glossary entries (p. 485-502) include: Aburage. Akamiso. Black beans, salted (Chinese: dow see = salted black beans). Bean curd (Chinese: dow foo; incl. yellow bean curd, dried bean curd, red bean curd). Chinese bean sauce (ground = *mor sze jeung* or chunky = *min sze jeung* similar to Malaysian *taucheo* or *tauceo*). Dow foo pok (Chinese-style fried bean curd). Miso. Mushroom soy (Soy sauce flavored with mushrooms during the last stage of processing). Soy sauce (light or dark, shoyu, kecap manis). Yellow beans, salted (=salted yellow beans). Yellow bean paste.

Note 1. It is also the earliest document seen (April 2012) that uses the term *kecap manis* to refer to sweet Indonesian soy sauce.

Interesting glossary entries (p. 485-502): Aburage, bean curd (fresh, yellow, dried, red), black beans, salted (Chinese: *dow see;* made from soy beans, heavily salted and sold in cans and jars), Chinese bean sauce (ground or chunky, like Malaysian taucheo or tauceo), fish sauce (Vietnamese: *nuoc mam.* Burmese: *ngan-pya-ye.* Thai: *nam pla.* Tagalog: *patis*). Miso. Mushroom soy (Soy sauce flavored with mushrooms during the last stage of processing). Red misu (See miso). sesame seed (Hindi: *till.* Sinhalese: *thala.* Malay: *bijan.* Chinese: *chih mah.* Japanese: *goma.* Indonesian: *wijen*). Sesame oil ("The sesame oil used in Chinese cooking is extracted from toasted sesame seeds..."). Sesame paste ("Sesame seeds, when ground, yield a thick paste similar to peanut butter. Stores specialising in Middle Eastern foods sell a sesame paste known as *tahini,* but this is made from raw sesame seeds, is white and slightly bitter, and cannot be substituted for the Chinese version–which is made from toasted sesame seeds, and is brown and nutty"). Wakame. Wasabi or wasabe. Yellow beans, salted (Very similar to canned salted black beans, but lighter in color). Yellow bean paste (It is not really yellow, but brown. Sold in cans).

Note 2. This is the earliest English-language document seen (March 2009) that uses the word "tauceo" to refer to Indonesian-style miso.

834. U.S. Department of Agriculture. 1976. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period July 1, 1974 through June 30, 1975. Washington, DC: U.S. Government Printing Office. See table 17.

• ***Summary:*** Table 17 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1975." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: Soy fortified sorghum grits (SFSG), CSM (Corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: British Solomon Islands, India, Indonesia, Khmer Republic [Cambodia], Korea, Laos, Nepal, Philippines, Singapore, Sri Lanka, Vietnam.

Afghanistan, Egypt, Gaza, Jordan–East Bank, Jordan–West Bank, Morocco, Tunisia, Yemen.

Benin, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Ethiopia, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Malagasy Republic, Mali, Mauritania, Mauritius, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia Republic, Sudan, Tanzania, Togo, Upper Volta, Zaire.

Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Peru.

Concerning "veg oil" (soybean oil) shipped under P.L. 480 Title II in fiscal year 1975: India received 14.189 million lb [6,436 metric tons] (p. 116). Address: Washington, DC. Phone: 703-875-4901 (1991).

835. Wang, H.L.; Mustakas, G.C.; Wolf, W.J.; Wang, L.C.; Hesseltine, C.W.; Bagley, E.B. 1976. An inventory of

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information on the utilization of unprocessed and simply processed soybeans as human food. Peoria, Illinois: USDA Northern Regional Research Center, Interdepartmental Report. AID AG/TAB-225-12-76. 197 p. On contract AID AG/TAB-225-12-76. Undated. No index. 27 cm. Comb bound. [65 ref]

• ***Summary:*** This was submitted to The Agency for International Development.

Contents: Introduction. Home and village traditional soybean foods by country. 1. Soybean food uses and production in Asia. Soaking dry soybeans. In China: Tou chiang (soybean milk; preparation, ways of serving), tou fu (soybean curd; yen-lu is the Chinese name for nigari), tou fu nao (soft curd), tou fu kan (dry / firm bean curd), chien chang (pressed tofu sheets), yu tou fu (fried tou fu), tung tou fu (frozen tou fu), tou fu pi (protein-lipid film; yuba), huang tou ya (yellow bean sprout or soybean sprout), mao tou (hairy bean, green soybean, or immature soybean), dry soybeans (roasting and frying, stewing and boiling), roasted soybean flour. Fermented soybean foods. Production and consumption of soybeans (China and Taiwan).

Japan: Tofu (soybean curd), kinugoshi tofu, processed tofu products (aburage or age, nama-age and ganmo), kori tofu (dried-frozen tofu), yaki tofu (grill tofu), yuba (protein-lipid film), soybean milk, gô (ground soybean mash), daizu no moyashi (soybean sprouts), edamame (green vegetable soybeans), whole soybeans, kinako. Fermented soybean foods: Production and consumption.

Korea: Tubu (soybean curd), soybean sprouts, whole soybeans (green soybeans, parched or roasted soybeans, boiled soybeans), soybean flour ("Soybeans are first roasted and then ground to a flour. The flour is extensively used as an ingredient in various food preparations." Note: This is the earliest document seen (Nov. 2012) that mentions roasted whole soy flour in Korea–however no Korean name of this roasted soybean flour is given), soysauce, bean paste [Korean soybean miso], natto (no Korean name is given), production and consumption of soybeans.

Indonesia: Tahu or tahoo (soybean curd), bubuk kedele (soybean powder), tempe kedele, tempe gembus [the name in Central and East Java for okara tempeh], oncom tahu [the name in West Java for okara onchom], other soybean products (soybean sprouts, green soybeans, roasted and boiled soybeans, kecap or soysauce, tauco or bean paste [miso]), food mixtures (Saridele, Tempe-fish-rice or TFR, Soy-rice baby food, soybean residue [okara]-fish-rice), production and consumption of soybeans.

To make bubuk kedele (p. 58): "Soybeans of the white variety are roasted until no beany flavor can be detected. They are ground into a powder and mixed with such spices as garlic and chili. Bubuk kedele is kept in a jar and served on special occasions with a rice product, longtong (rice wrapped in banana leaves and boiled for 3 to 4 hours). Bubuk kedele is always homemade and is eaten by everyone" (Source: I. Gandjar 1976, personal communication).

Note 1. This is the earliest English-language document seen (Nov. 2012) that uses the word *bubuk* or the term *bubuk kedele* to refer to Indonesian roasted soy flour.

Thailand. Philippines: Soybean sprouts, soybean coffee, soybean cake (made from equal amounts of soybean flour and wheat flour), soybean milk, tou fu and processed tou fu products, production and consumption. Burma. India. Malaysia. Nepal. Singapore. Sri Lanka (Ceylon). Vietnam. West Asia [Middle East; Iran and Turkey]. References–Soybean food uses in Asia.

2. Soybean food uses and production in Africa. Ethiopia: Injera, wots and allichas, kitta, dabbo, dabokolo, porridge. Kenya. Morocco. Nigeria: Whole soybeans, soybean paste, corn-soy mixtures (soy-ogi). Tanzania. Uganda. Production. References–Soybean food uses in Africa.

3. Soybean food uses and production in Europe [both Eastern and Western]. 4. Soybean food uses and production in Latin America. Argentina. Bolivia. Brazil. Chile. Colombia. Ecuador. Guyana. Paraguay. Peru. Uruguay. Venezuela (fried arepas with textured soy). Mexico: New village process, commercial developments of soy-based food products, Gilford Harrison, Ruth Orellana, Seguras Social. Honduras. Costa Rica. Panama. Dominican Republic. Jamaica. Haiti. Trinidad. References–Soybean food uses in Latin America.

5. Soybean food uses and production in North America. United States: Oriental populations, vegetarian communes, The Farm in Tennessee. Canada. References–Soybean food uses in North America. 6. Soybean food uses in Oceania. Australia. New Zealand. 7. Summary of soybean food uses. Traditional soybean foods: Soybean milk, soybean curd and processed soybean curd products, protein-lipid film, soybean sprouts, tempe (tempeh), green soybeans, boiled soybeans, roasted soybeans, soybean flour, soysauce, fermented soybean paste, fermented whole soybeans [Toushih, hamanatto], natto, fermented soybean curd. Experimental soybean foods: Whole soybean foods, soybean paste, soy flour, soy beverage. Production and consumption.

8. Recent simple soybean processes, other than traditional. Simple village process for processing whole soybeans: Equipment, process, sanitation requirements, quality of product, evaluation of product in formulas and procedures for family and institutional use in developing countries. NRRC village process. Foods from whole soybeans developed at the University of Illinois (drum dried flakes, canned and homecooked soybeans, soy beverages and beverage products, spreads, snacks).

Ways of cooking and serving soybeans in the American diet. 9. Industrial processes. Industrial production and selling prices of edible soybean protein products. 10. Barriers to acceptability and utilization of soybeans in food and research recommendations: Availability. Cultural and social factors. Texture. Flavor. Nutrition and food safety.

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Technology development. Technology transfer. Research recommendations [concerning each of the above barriers].

Concerning Morocco: Cereal-soy blends have been used extensively in Morocco; in fiscal year 1974 some 14.7 million lb were shipped to Morocco. Mmbaga (1975) reported that soy flour is being used in making porridge, with 1 part soy flour to 3 parts maize / corn flour.

Tables show: (1) Soybean production and imports in Taiwan, 1962-1975 (tonnes = metric tons, p. 33). Production rose from a 53,000 tonnes in 1962 to a peak of 75,200 tonnes in 1967, then fell to 61,900 tonnes in 1975. Imports skyrocketed from 62,400 tonnes in 1962 to a record 827,300 tonnes in 1975. (2) Consumption of soybean foods in Taiwan, 1964-1974 (kg/capita/year, p. 34). Total soybean foods not including tofu rose from 1.08 kg in 1964 to a peak of 2.61 kg in 1972 then fell to 1.99 kg in 1974. Consumption of tofu (80% water) rose from 18.75 kg in 1964 to a peak of 33.89 kg in 1972, then fell to 32.04 kg in 1974. (3) Supply and disposition of soybeans in Japan, 1971-1974 (p. 49). Total supply is beginning stocks, plus domestic production, and imports. Total disposition is crushing, plus traditional foods and feed. In 1974 imports accounted for 87.5% of the supply, and crushing accounted for 71.0% of the disposition. (4) Whole soybeans used in the production of traditional foods in Japan, 1970-74 (tonnes / metric tons, p. 50). Tofu and others rose from 508,000 in 1970 to 539,000 in 1974. Miso rose from 177,000 in 1970 to 192,000 in 1974. Shoyu rose from 13,000 in 1970 to 14,000 in 1974. (5) Defatted soybean meal used in the production of traditional foods in Japan, 1970-74 (tonnes / metric tons, p. 51). Shoyu rose from 163,000 in 1970 to 176,000 in 1974. Tofu and others was constant at 130,000 from 1971 to 1973. Miso decreased from 4,000 in 1970 to 2,000 in 1974. (6) Production of traditional soybean foods in Japan, 1970-74 (tonnes / metric tons, p. 52). Tofu and others rose from 1,867,800 in 1970 to 2,264,900 in 1973. Shoyu rose from 1,334,1000 in 1970 to 1,455,800 in 1974. Miso rose from 552,200 in 1970 to 587,200 in 1974. (7) Production and food use of beans [various types] and consumption of some soybean products in Korea, 1964-1967 (p. 56-57). In 1967 consumption (in tonnes / metric tons) was: Bean curd 290,000. Bean sprouts 270,000. Bean sauce 69,700. Bean paste 27,700. Total: 11.6 kg per capita per year. (8) Soybean production in Indonesia, 1960-1974 (p. 65). It rose from 442,862 tons in 1960 to 550,000 tons in 1974. (9) Consumption of soybeans in various parts of Indonesia in 1970 (p. 66). (10) Production of soybean foods in the province of Central Java, 1968-1972 (tons, p. 67). Kecap rose from 914,695 in 1968 to 1,524,000 in 1972. Tahu decreased from 18,570 in 1978 to 17,000 in 1972. Tempe rose from 506 in 1968 to 39,000 in 1972. (11) Area planted to soybeans and total soybean production in Thailand, 1964-1974 (p. 70). Area rose from 213,000 rais (6.25 rais = 1 ha) in 1964 to 1,016,000 rais in 1974. Production (in metric tons) rose from 31,300 in 1964 to 252,400 in 1974. (12) Utilization of soybeans by soybean-consuming countries, 1964-66 (based on FAO 1971 Food Balance Sheets, 1964-66 average, p. 150). The countries leading in per capita consumption (kg/person/year) are: China (PRC) 6.7. Japan 5.1. Korea(s) 5.0. Singapore 4.3. Indonesia 2.8. Malaysia 2.6. Taiwan (ROC) 1.1. (13) Amounts of cereal-soy blends distributed under Title II, Public Law 480 in fiscal year 1974 (p. 152-155). (14) U.S. exports of full-fat soy flour, 1974-75 (p. 156). Address: Northern Regional Research Center, Agricultural Research Service, Department of Agriculture, Peoria, Illinois 61604.

836. Takai, Wataru. 1976? History of Takai Seisakusho Co., Ltd., 1917-1975. Ishikawa-ken, Japan. 3 p. Undated. Unpublished manuscript. [Eng]

• ***Summary:*** "Date of establishment: July, 1917.

"Capital: 31 million yen.

Major executives:

"The President: Motoo Takai.

"Vice-president: Akio Takai.

"Executive director: Akira Takai

Size of this factory:

The head office: Site 8,156 sq. meters. Building: 4,808 sq meters.

"Matsuto factory: Site 1,875 sq. meters. Building: 1,047 sq meters.

History of our company:

1917 July–Takai brotherly company was established, and production of bean curd machine and its selling were begin.

1931 April–The old name was replaced by Takai Co., Ltd.

1946 Jan.–The name was replaced by Takai Mfg. Co., Ltd.

1957 Jan.–A bean curd automatic manufacturing machine was developed

1958 Aug.–This company was commended as a superior enterprise by the Smaller Enterprises Agency.

1958 Dec.–The ex-president Kamejiro Takai was conferred *Shiju-hosho* (Violet Ribbon Medal)

1959 Nov.–Our company was given a governor's special prize at the ceremony of awarding an honor of a corporation of a society of invention.

1960 April–The 7th anniversary of the operation of the patent system, our company was given a prize of invention at the nationwide ceremony of a corporation of invention.

1960 Sept.–Our company received a subsidy for the experiment of invention from the Scientific Technique Agency.

1960 Oct.–The ex-president was decorated with the Fifth Order of Merit with the *Zuihosho.*

1961 April–An organization of agency "A nation wide Takai society" was formed.

1962 July–A new factory was built at Inari, Nonoichi-machi Ishikawa-gun, Ishikawa-prefecture.

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1962 July–Our company was given a governor's special prize at the local ceremony of a corporation of a society of invention.

1963 April–Our company was given a prize of invention at the nationwide ceremony of a corporation of a society of invention.

1965 Nov.–Our company was commended officially as a superior factory in labor management by a Labor Standard Office in Ishikawa-prefecture.

1966 Jan. Our company was named "a model factory of rationalization of the smaller enterprises" by the Smaller Enterprises Agency.

1966 Aug.–Our company was telecasted nation wide by NHK educational television titled "Industrial operation–establishment of a long-range plan".

1969 Jan.–Our company was given a citation as a superior corporation by a Taxation Office in Natsuto-city.

1969 April–A large-sized bean curd plant was built at Nada-Kobe co-operative association.

1969 Nov.–Our company was telecasted nationwidely by NHK educational television titled "A new age of operation–A plan of mechanization for making 10 million cakes of bean curd".

1970 July–Our company was commended officially as a superior factory in safe management of factories by a Labor Standard Office in Ishikawa-prefecture.

1971 Oct.–A large bean curd plant was built in the Republic of Korea.

1972 May–A smaller bean curd plant was developed.

1974 Feb.–Matsuto branch factory was built at Miyamaru-machi Matsuto-city.

1974 March–Our company was commended as a superior factory in rationalization of the use of electricity by Hokuriku Electric Society.

1974 June–IBM computers introduced.

1974 Oct.–Our company was commended on account of co-operation of traffic transportation.

837. Meals for Millions Foundation. 1977. Annual report 1976: A commitment to self-help for a hungry world. Santa Monica, California: MFM Foundation. 9 panels. Each 9 x 23 cm. Complex folding.

• ***Summary:*** Peter J. Davies is now President and Chief Executive Officer; he resides at the New York office. On the black and white cover is a photo of two pairs of cupped hands overflowing with soybean seeds. MFM's former logo is absent.

Contents: Message from the president (Davies). Highlights of 1976: New president (Davies) appointed in April 1976 after a two-year search, additional grants from US AID and PACT, financial summary. The commitment. MFM meets its commitment through self-help programs: Technical and material assistance (Ecuador, Korea, Bootheel, Missouri, Africa {Ghana, Kenya}, the Caribbean {Jamaica, Haiti}). Technical and professional training (India, International Training Institute in Santa Monica; two 8-week training sessions were held during 1976). Transfer of technology (Research & Development, MFM extruder and village texturizer). Nutrition education.

Income for 1976 by source: $756,028 (total). Statement of functional expenses for the year ended Dec. 31, 1976 ($353,202). Board of Trustees. A portrait photo shows Peter Davies. Address: 1. Western office–IIPFT, 1800 Olympic Boulevard (P.O. Box 680), Santa Monica, California 90406; 2. Eastern office, 815 Second Ave., Suite 501, New York City, NY 10017. Phone: (213) 829-5337 or (212) 986-4170.

838. **Product Name:** Island Spring Delicious Steamed Tofu in Sauce.
**Manufacturer's Name:** Island Spring, Inc.
**Manufacturer's Address:** P.O. Box 747, Vashon, WA 98070.
**Date of Introduction:** 1977 March.
**Ingredients:** Tofu, soy sauce, soy oil, sesame seeds, honey, ginger powder, garlic powder, cayenne pepper, black pepper.
**Wt/Vol., Packaging, Price:** 12 oz.
**How Stored:** Refrigerated.
**Nutrition:** Per 3 oz.: Calories 88, protein 10.3 gm, carbohydrate 2.9 gm, fat 7 gm.
**New Product–Documentation:** Label. 1979. 2 by 1 inch oval. Self adhesive. Black on gold. "Serve Hot Or Cold." Leviton. 1981. Soyfoods. Winter. p. 43. "One thousand pounds of tofu a week are converted into Delicious Steamed Tofu, fresh griddled slabs of tofu packed in soy sauce."

Label. 1982. 6 by 5 inches. Plastic film. Brown and yellow on clear. "Delicious steamed tofu is good served hot or cold for snacks, sandwiches, hors d'oeuvres, or as a main course." Talk with Luke Lukoskie. 1987. Oct. 19. "Suni [his wife, and a Korean-American] joined Island Spring in March 1977, and we started our flavored tofu at that time." Form filled out by Yvonne Kuperberg. 1988. Oct. 1. Lists original ingredients. Label. 1986. 5 by 4 inches. Pink, green, blue, and black. Shows moon rising over mountains and water with sprig of plum blossoms in left foreground. "A fitness food from the Pacific Northwest, USA."

839. Kolb, H. 1977. Herkoemmliche Verfahren zur Nutzung von Soja im asiatischen Raum [Traditional processes for using soya in Asia]. *Alimenta* 17(2):41-45. March/April. [35 ref. Ger]

• ***Summary:*** Discusses each of the following foods briefly and gives sources of further information: Kinako (roasted soy flour), soymilk, yuba, tofu, kori tofu (dried-frozen tofu), aburaage, namaage, kinugoshi tofu, sufu, soy cheese (Western style), soy yogurt, ganmodoki, natto, Hamanatto, koji, tempeh, miso, tao-tjo [Indonesian-style miso], kochu-jang, shoyu, and ketjap.

Note 1 This is the earliest German-language document

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seen (Oct. 2011) that uses the word "sufu" to refer to fermented tofu.

Note. This is the earliest German-language document seen (April 2013) that mentions silken tofu, which it calls *kinugoshi*. Address: Institut fuer Lebensmitteltechnologie, Frucht- und Gemuesetechnologie, Technische Universitaet Berlin, Koenigin-Luise-Strasse 27, D-1000 Berlin 33, West Germany.

840. Park, Jae Hong; Nam, Hyun Keun. 1977. [Studies on the harmful heavy metals in foodstuffs. I. Contents of mercury in edible bean sprouts]. *Korean J. of Nutrition* 10(3):137-39. Sept. [10 ref. Kor; eng]
• ***Summary:*** 36 samples of soy sprouts collected from the Gwangju city area contained mercury in amounts ranging from 0.010 to 0.553 parts per million (ppm); average 0.240 (ppm). About half the samples were contaminated with mercury. Address: Gwangju Seowon Junior College, Gwangju, South Korea.

841. *Evening Sun* (*The*) (*Baltimore, Maryland*). 1977. First Korean Festival. Oct. 5. p. 91.
• ***Summary:*** "Baltimore's first Korean Festival will be held from Noon to 6 P.M., Saturday, October 8, at Center Plaza...

A recipe is given for "Bulgogi (Barbecued Beef)." Variations: "Use pork or chicken instead of beef. To give pork more flavor, add cayenne pepper or gochujan... (gochujan is a mixture of 2 tablespoons each of soybean paste, cayenne pepper and soy sauce.)" Address: Sun staff writer.

842. Chang, C.H.; Lee, S.R.; Lee, K.H.; Mheen, T.I.; Kwon, T.W.; Park, K.I. 1977. Fermented soybean foods. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 465-66, 482-87.
• ***Summary:*** Contents: Korean soy sauce: Kanjang (is made by primitive methods in the home), steps in preparation, microbiology, biochemical changes (p. 465-66). Korean doenjang and kochujang: Description (Soy sauce and miso were introduced to Japan, from Korea, during the Nara period {645-793 AD}), patterns of consumption (Daily per capita consumption of doenjang and kochujang are estimated to be about 15 gm and 10 gm, respectively), steps in preparation (utensils, substrates, essential microorganisms), control of process, biochemical changes, economics of production and distribution.

Note: This is the earliest English-language document seen (April 2021) that uses the word "kochujang" to refer to Korean-style red pepper and soybean paste (miso).

Illustrations show: (17) Flow sheet: Production of Korean doenjang (soybean paste). Soak soybeans, boil, mash, form into balls, wrap in rice straw, and incubate under rafters until covered with mold (*meju*). Crush, mix with salt brine, and ferment for 6 months to obtain doenjang. (18) Flow sheet: Production of Korean kochujang (soybean paste). Soak soybeans, boil, mash, suspend in rice straw sacks until overgrown with mold (*meju*). Crush, sun-dry, and pulverize to obtain 10 liters of crushed meju. Add cooked gelatinous rice flour (2 liters), hot pepper flour (0.5 to 0.7 liters), kanjang (Korean soy sauce), dried beef, jujube flour, honey, and salt brine. Mix. Ferment for 2 months to obtain kochujang.

A table (p. 487) shows the amino acid composition of doenjang. Address: 1. Food & Nutrition Dep., Sacred Heart Women's Univ., Bucheon, Kyungki-do, South Korea.

843. Ford, R.E.; Sinclair, J.B. eds. 1977. Rust of soybean: The problem and research needs. *INTSOY Series* No. 12. x + 110 p. Nov. Report of a workshop held Feb. 28 to March 4, 1977 in Manila, the Philippines (College of Agric., Univ. of Illinois at Urbana-Champaign). [167 ref]
• ***Summary:*** Contents:

Foreword
Workshop Participants
Opening Remarks
Introductory Address, by R. E. Ford
Welcoming Addresses
INTSOY by William N. Thompson AVRDC, by James J. Riley PCARR, by Ramon V. Valmayor
The International Working Group on Soybean Rust and Its Proposed Soybean Rust Rating System, by S. Shanmugasundaram
Soybean Rust, by An Overview
Studies on the Biology of the Soybean Rust Fungus in the Philippines, by Lina L. Ilag
Soybean Rust in the Western Hemisphere, by James B. Sinclair
Soybean Rust in the Eastern Hemisphere, by Charles Y. Yang
Soybean Rust and the Pathogen–Some Needed Research, by K.R. Bromfield
Current Research Efforts
U.S. Research Effort, by K.R. Bromfield
Soybean Rust in Australia, by K.K. Kochman
Soybean Rust in Korea, by B.J. Chung and C.S. Park
Soybean Rust in Taiwan, by Kuo-lien Chan
Breeding for Resistance: Observations and Theories on Cultivar
Resistance of Soybeans to Rust, by R.M. Lantican
Resistance of Soybean to Rust in Australia, by R. McLean and D.E. Byth
Breeding for Resistance to Soybean Rust in India, by B.B. Singh and P.N. Thapliyal
Breeding for Soybean Rust Resistance in Indonesia, by R.S. Sumarno and M.S. Sudjadi
International Rust Nursery, by S. Shanmugasundaram

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Reaction of Soybean Cultivars and Chemical Control of Soybean Rust in Indonesia, by M.S. Sudjadi, M. Amir, and R.S. Sumarno

Control of Soybean Rust

Chemical Control of Soybean Rust in the Philippines, by F.C. Quebral

Control of Soybean Rust by Means Other Than Breeding for Resistance, by James B. Sinclair

Closing Remarks, by R.E. Ford

Literature Cited and Bibliography

Index.

Workshop sponsored by the Government of the Philippines, INTSOY, AVRDC, and PCARR (Philippine Council for Resources and Agriculture Research). Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

844. Hymowitz, T.; Newell, C.A.; Carmer, S.G. 1977. Pedigrees of soybean cultivars released in the United States and Canada. *INTSOY Series* No. 13. 23 p. Nov. (College of Agric., Univ. of Illinois at Urbana-Champaign). [17 ref]

• ***Summary:*** Contents. Introduction. Abbreviations. Pedigrees of soybean cultivars released in the United States and Canada (Five-column table, p. 4-15). Strain identification. Parentage of strains. Registration of soybean cultivars. References.

The 337 soybean varieties listed in this publication, named or released from 1889 to 1976, are currently (1977) in the USDA germplasm collection, and were released in the USA and Canada. "Cultivars having an experimental strain pedigree and preceded by an asterisk, and the strain is underlined" (e.g., Beeson, Bonus, Bragg). This information was compiled from many sources, including USDA Bureau of Plant Industry Bulletins.

In the information on early soybean varieties below (adapted from the 12-page "Pedigrees" table), column 1 is the year introduced to the USA, column 2 (separated by a comma) is the cultivar name, 3 is the Maturity Group, 4 is the pedigree (P.I. is the "Plant Introduction" number and F.C. is the "Forage Crop" number, both from the USDA, Beltsville, Maryland), and column 5 is the year named or released. Only the early (pre-1915) introductions are listed here, in chronological order:

1889, Medium Green or Guelph, III, 1903 and 1907.

1889, Kingston, IV, P.I. 17255 (From Japan), by 1907.

1894, Easycook, VI, P.I. 34702 (From Shantung Prov., China), by 1923.

1900 or before, Mammoth Yellow, VII, Unknown, Unknown.

1900, Wisconsin Black, I, P.I. 5039 (From Paris, France), by 1910.

1901, Austin, V, P.I. 17263 (From Pingyang [Pyongyang / P'yongyang], Korea), by 1910.

1901, Ebony, IV, P.I. 6386 (From Pingyang, Korea), by 1907.

1901, Haberlandt, VI, P.I. 6396 (From Pingyang, Korea), by 1910 [sic, 1905].

1901, Midwest, IV, P.I. 6556 (From Central China), by 1922.

1901, Tokyo, VII, P.I. 8424 (From Yokohama, Japan), by 1910.

1902, Hollybrook, V, Rogue in Mammoth Yellow, by 1910.

1905, Cloud, III, P.I. 16790 (From Hangchow, China), by 1910.

1905, Tarheel Black, VIII, P.I. 14952 (From Shanghai, China), by 1923.

1906, Elton, I, P.I. 20406 (From Khabarovsk, USSR), by 1910.

1906, Habaro, I, P.I. 20405 (From Khabarovsk, USSR), by 1913.

1906, Morse, IV, P.I. 19186 (From Newchang, or Yingkow [Newchwang or Ying-k'ou / Yingkou], Manchuria), by 1910.

1906, Peking, IV, P.I. 17852B (From Peking, China), by 1910.

1906, Wilson, IV, P.I. 19183 (From Newchwang, Manchuria), by 1910.

1907, Chestnut, III, Selection from Habaro, by 1910.

1907, Shingto, III, P.I. 21079 (From Teiling, Manchuria), 1910.

1907, Virginia-N, IV, P.I. 19186D (Selection from Morse), by 1920.

1907, Virginia-S, V, P.I. 19186D (Selection from Morse), -.

1908 [sic, ca. 1943], Acadian, VIII, P.I. 60406 x F.C. 04910, 1943.

1908, Arisoy, VIII, P.I. 86736 (From Konosu, Japan), 1930.

1908, Arlington, V, P.I. 22899 (From Paotingfu [later Baoding, Hebei], China), by 1910.

1908, Barchet, VIII, P.I. 23232 (From Shanghai, China), 1923.

1908, Biloxi, VIII, P.I. 23211 (From Tangsi, China), by 1917.

1908, Columbia, III, P.I. 22897 (From Paotingfu, China), by 1910.

1908, Hong Kong, IV, P.I. 22406 (From Hong Kong), by 1910.

1910, Manchuria, I, P.I. 28050 (From Harbin, Manchuria), by 1912.

1910, Minsoy, 0, P.I. 27890 (From Paris, France), ca. 1926.

1910, Soysota, I, P.I. 28019 (From Naples, Italy), by 1923.

1911, Black Eyebrow, II, P.I. 30744 (From Wulukai, Manchuria), by 1917.

1911, Hoosier, I, P.I. 30746 (From Wulukai, Manchuria), by 1927

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1911, Manchu, III, P.I. 30593 (From Ninguta, Manchuria), by 1917

1911, Mandarin, I, P.I. 36653 (From Pehtuanlintza, Manchuria), by 1920.

1911, Otootan, VIII, (From Taiwan via Hawaii), by 1923.

1911, Wea, II, P.I. 30600 (From Shuangchengpu, Manchuria), ca. 1926.

1912, A.K. (F.C. 30761), IV, Selection from A.K., by 1940.

1913, Dunfield, III, P.I. 36846 (From Fanchiatum Sta., Manchuria), by 1923.

1914, Arksoy, VI, P.I. 37335 (From Pingyang, Korea), -.

1915, Hahto, VI, P.I. 40118 (From Wakamatsu, Japan), by 1921.

Talk with Ted Hymowitz. 1998. July 5. Ted and his colleagues created a computerized database, with the data entered on 80-column paper punch cards, using software that Sam G. Carmer borrowed from Washington State University. In hindsight, Ted wishes he had divided the column titled "Year named or released" into two. The first would be "Year named" and the second would be "Public release." This database no longer exists. The many thousands of punch cards were discarded after Sam Carmer died. Address: Dep. of Agronomy, Univ. of Illinois.

845. Kim, Chul-Jin.; Byun, S.M. 1977. [Effects of soy protein isolate on quality and acceptability of soy protein isolate substituted beef patties and ice cream]. *Korean J. of Food Science and Technology* 9(3):190-93. [15 ref. Kor; eng]
• ***Summary:*** Beef patties were made with 0, 15, 30, 45, 60, 75, and 100% replacement of beef with soy protein isolate (SPI). Ice cream was made with 0, 25, and 50% replacement of milk solids-not-fat with SPI. Sensory analysis by a taste panel showed that beef patties containing 30% or less SPI were not significantly different that 100% beef patties. The ice cream with 25% and 50% SPI had the same textural quality as dairy ice cream but had a significant "beany" off-flavor. Address: Dep. of Biological Science and Technology, Korea Advanced Inst. of Science, South Korea.

846. George, Susan. 1977. How the other half dies: The real reasons for world hunger. Montclair, New Jersey: Allanheld, Osmun & Co. xxix + 308 p. Index. 21 cm. [500+* ref]
• ***Summary:*** Soybeans are discussed in several places: Between 1972 and 1973 U.S. soybean production increased by 25% (p. 9).

Chapter 4, titled "Technology: Now who pays to do what to whom?" shows that no new technology, not even a new crop is neutral in the effects it has on different classes of people. A report on soybeans in Brazil commissioned by the French Government Center for External Trade showed that they are becoming an increasingly important crop there. Since Brazil can produce and sell its crop between the two U.S. soybean harvests, the government's official agricultural policy encourages Brazilian farmers to grow more soybeans since they are a profitable export crop. The price of soybeans is attractive, so farmers have abandoned corn, a traditional crop, as well as wheat (to a lesser extent) because soybeans demand less fertilizer. Since soybean production is easily mechanized, fewer Brazilians need be employed. Soybeans are usually crushed to make oil and meal. This complex processing technology is being taken over by the world's most competent processors–large multinational agribusiness firms, such as Cargill and Bunge. Small Brazilian processors are going bankrupt. Since Brazil's infrastructure for transporting and loading the soybeans is substandard, the World Bank has been kind enough to contribute half the price of new private export corridors to the seaports, which the Brazilian government has kindly declared necessary for the multinationals. No doubt the Brazilian soybean industry will be profitable for multinational agribusiness, but what will be the consequences for ordinary Brazilians. From 1970 to 1972, the price of corn, a traditional staple food and feed, has risen 60%, while the price of chicken has gone up 33%. Soybeans have drastically decreased the amount of land previously used for growing the *feijao* or black bean–another staple crop and key human protein source; during this period its price jumped by 275%. Rice production also suffered from the soybean competition. All of these developments hurt average Brazilians, and especially the poor.

In addition, real estate prices in areas best suited to soybean production have risen dramatically; one hectare in Rio Grande do Sul, which sold for 1,500 cruzeiros in 1972, sold for less than 10,000 cruzeiros less than a year later. Thus, smaller farmers with less mechanization are losing out to those who can afford to buy more than and agricultural equipment. Soybean production in Brazil directly counteracts the efforts of the Brazilian government to limit inflation (p. 67-69).

Chapter 6, titled "Planned scarcity," notes that in the USA, one acre in 6.5 is now planted to soybeans. Europe is only 2% self-sufficient in plant protein production. After World War II, Europe introduced American hybrid corn to replace local varieties; though the yield was higher, the protein content was lower. Thus a new protein source had to be found for feeding livestock, and U.S. soybean meal seemed to be the most rational and inexpensive solution. Export of soybean meal from the U.S. to Europe jumped from only 47,000 tons in 1949 to nearly 5 million tons in 1972-73. Major U.S. processors set up crushing mills in Europe. In short, the entire post-war European livestock industry has been developed on the basis of extensive use of low-price soybean meal. The U.S. established a "near-monopoly position for supply not only of Europe but of Japan and other nations."

Discusses the 1973 U.S. soybean export embargo, which began in June and sent prices soaring to $12 a bushel,

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from $2. The embargo was removed 3 months later and at year's end it became clear that the scare over shortages was unwarranted. The Food for Peace program introduced soya oil into countries like Spain and Tunisia that had never before tasted anything but their own olive oil. Even the butter-rich Netherlands now consumes more imported soy margarine than butter. "Far be it from me to suggest collusion I can't prove, but it is at least evident who profits from higher prices and who suffers. A futures market in soya meal was opened in London in April 1975 as a measure that might check price fluctuations." Yet the key fact is that European countries do not produce soybeans, nor any alternative protein crop.

Discusses the new effort to extend the use of soya beyond feeding animals by promoting TVP, and the international conference held at Munich, Germany, in Nov. 1973. Earl Butz (U.S. Secretary of Agriculture) led the American delegation; Hubert Humphrey stated: "Food is a new form of power. Food is wealth. Food is an extra dimension in our [U.S.] diplomacy." "Americans presented 24 out of the 38 papers (including 13 by agribusiness representatives and 10 by USDA people). Only one was by a nutritionist. "One sees absolutely no alternative to continued US MNC (multinational corporation) control of the world plant-protein production and prices." "The only rational way to offset price and foodstock manipulation by the giant traders would be to have grain stocks held in government hands, to be released or held back as the market situation demanded." The grain traders are "frantically opposed to any reserve system..." (p. 122-25).

Chapter 8, titled "Food aid?... Or weapon," discusses: Importance of feedgrains exports, Soybean Council of America, American Soybean Association, PL 480, promotion of soybean exports to Spain, Iran, and Korea, Ralston Purina and Cargill, Food for Peace counterpart funds used to finance research in recipient countries, "common defense" military expenditures (p. 172, 176).

Chapter 11, titled "What can 'they' do?" discusses alternative food sources, single-cell protein (SCP), America's energy-devouring food-production system which could exhaust U.S. fossil fuel reserves within 25 years, research by DuPont showing that when soybeans are experimentally flooded by carbon dioxide, they quadruple yields and fix more nitrogen (p. 239-40). Address: A Smith College graduate now studying at the Sorbonne. Fellow of the Transnational Inst.

847. Igata, Sadaaki. 1977. Nihon kodai kokumotsu-shi no kenkyû [Research on the ancient history of cereal crops in Japan]. Tokyo: Yoshikawa Kobunkan (Koshikawa Bunkan). p. 130-49, 170. [3 ref. Jap; eng+]

• ***Summary:*** Introduction: Soybeans seem to have originated in East- or Southeast Asia. Origin of cultivation: (1) Literature" Soybeans are mentioned in the *Kojiki*. Norinaga Motoari accepted the myth of the Five Grains and thought that soybeans and the other four grains had been cultivated since the age of the Gods. Soybeans and adzuki beans are grouped together and mentioned as "beans" in the *Nihonshoki*.

(2) Archaeological study: According to a report in the journal *Toro* (Japan Archaeology Society, p. 358), wild soybeans (*tsurumame*) were excavated from the ruins of Toro.

On pages 148-49 is a section on *Edamame* (Green vegetable soybeans), which notes that the *Engishiki* (A.D. 927) describes the offering of fresh, podded soybeans at Buddhist temples. According to Taichi Fukazawa's report, soybeans were found in a pit in Komoriyama, Senya Village, Senhoku-gun, Akita prefecture, Japan. See "The pit from which grains were excavated," by R. Moriomoto (1933).

According to Dr. Nobuo Ito of Tohoku University, the naturally carbonized layer of soybeans dates back to the 1st or second century.

According to *Nara-cho shokuseikatsu no kenkyu* [Research on the eating habits of the Nara period (A.D. 710-784) in Japan], by S. Sekine (1969, p. 30), soybeans were excavated not only from the Komoriyama ruins, but also from the Yasuda Okayama ruins in Mioka Village, Kumage-gun, Yamaguchi prefecture, Japan, and from the Iba ruins in Hamamatsu city, Shizuoka prefecture, Japan.

Mr. Yoshinori Segawa mentioned that soybeans were found in the ruins of Taguchiyama, Maikata city, Osaka (*Sankei Shinbun Morning News*, 29 Sept. 1974). In summary, archaeological evidence from the Komoriyama ruins suggests that soybeans were grown in Japan by the 1st or second century A.D.

Comparison of Korea and Japan: Soybeans were cultivated in the southern Korean peninsula along with several kinds of grains, and these were found in the ruins of an army storage house in [illegible place name], Korea. These grains and beans date back to the middle of the 7th century A.D., but the earliest known mention of soybeans in Korean literature dates from the middle of the third century A.D. The author concludes that soybean cultivation seems to have started in Japan before it began in Korea, indicating that soybeans were not imported but were probably domesticated from wild soybeans.

Soybeans also appear in the *Sankoku-shiki* (Vol. 1, No. 1; Vol. 2, No. 2., Vol. 4, No. 4, and Vol. 23, No. 1).

Mr. Matsumoto wrote *Shina ni okeru Giso oyobi Shaso, Shimin seikatsu, kochi seido, kokumotsu no meisho no kenkyu* (A study of the Giso and Shaso storage houses, and the life of the Shimin people, the cultivated field system, and the names of grains). Page 148 states that "shu" includes both soybeans and azuki beans, and page 166 states that before the 6th century, both soybeans and azuki beans were cultivated. The "Five Grains" always includes "shu."

Process of cultivation: Soybeans and azuki beans are

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mentioned as emergency foods used to relieve shortages in A.D. 840. (See the *Zoku Nihon Koki*, vol. 9, and the *Reishûkai*, vol. 13). Therefore soybeans must have been grown widely, since they were offered to the government in place of millet when farmers could not afford millet in difficult situations.

According to the *Nihon Sandai Jitsuroku*, vol. 14, in March of A.D. 867 Japanese farmers burned the holly mountain to grow soybeans. This seems to indicate these farmers' active attitude toward growing soybeans.

In the 8th and 9th centuries, soybeans were grown in the Omi, Tanba (or Tamba), [two areas whose characters are not recognized], Bizen, Bitchu, Bingo, Kii, Awa, Sanuki, and Iyo areas. These are mainly centered around the Inland Sea area (*Seto-naikai*) of southern Honshu (Japan's main island).

The *Engishiki* (vol. 24) states that a certain island [characters not recognized] offered 24 *to* (1 *to* = 18 liters or 4.76 gallons) of soybeans.

Note: Concerning areas mentioned above in Japan in the 8th and 9th centuries: According to a map titled "The provinces of Japan" in *A history of Japan to 1334*, by George Sansome (1958, p. 2). Omi was located by today's Lake Biwa (Japan's largest lake), northeast of Kyoto. Tanba is located in the Kyoto area. Bizen, Bitchu, and Bingo are located adjacent to and directly north of the Inland Sea. Kii occupied what is today Wakayama prefecture and part of Mie prefecture. Awa, Sanuki, and Iyo were provinces on the northern side of Shikoku island.

848. Korean Society of Food Science and Technology. 1977. Comprehensive review of the literature on Korean foods. II. (1969-76). Seoul, South Korea: 235 p. *
Address: Korea.

849. Moomaw, J.C.; Park, H.G.; Shanmugasundaram, S. 1977. The role of legumes in South and Southeast Asia. *College of Tropical Agriculture* (*Univ. of Hawaii*), *Miscellaneous Publication* No. 145. p. 155-69. J.M. Vincent, A.S. Whitney, and J. Bose, eds. Exploiting the Legume-Rhizobium Symbiosis in Tropical Agriculture. [39 ref]
• ***Summary:*** Contents: Introduction: Role of legumes in agricultural production, role of legumes in human nutrition, future role of legumes.

"People in South and Southeast Asia rely heavily on cereals and legumes for their major nutrients. FAO statistics (FAO, 1975) clearly show that protein needs are inadequately met and that vulnerable groups are suffering from both calorie and protein deficiency. At least 90 million people, mostly children, are suffering from moderate to severe malnutrition. Greater legume production is necessary to provide even the generally inadequate protein and vitamins to the 2,200 million people living in the region." Legumes are usually presented in four broad categories: food legumes, oil seeds, forage and cover crops, and miscellaneous" (p. 155).

"The role of legumes in agricultural production is small relative to that of cereals, but the role of legumes in human nutrition is more important than their relative acreage or production volume (harvested crop) indicate" (p. 158).

"Among the 13,00 species of legumes, about 20 are eaten in significant quantities by man directly as food. Soybean is easily the most important of these, especially in China, Japan, Korea, Taiwan, and Indonesia. Mungbean (*Vigna radiata*), black gram (*V. mungo*), chickpea (*Cicer arietinum*), pigeon pea (*Cajanus cajan*), lentil (*Lens esculenta*), dry beans (*Phaseolus vulgaris*), lathyrus pea (*Lathyrus sativus*), broad bean (*Vicia faba*), cowpea (*Vigna sinensis*), groundnut (*Arachis hypogaea*), and dry pea (*Pisum sativum*)."

Soybean research in Asia (AVRDC 1976) has five major priorities (see p. 165).

Tables show: (1) Area, yield and production of pulses in Asia, North America, and the world, 1961-65 and 1974. Source: FAO Production Yearbook, 1974. In Asia, area harvested and production have decreased. In North America, area harvested is unchanged but production has increased. Worldwide, area harvested and production have both decreased. (4) Soybean production cost and returns in Thailand, Philippines, and Taiwan. Source: ARDC 1976. There is a very small net return (profit) on soybeans in Thailand and Philippines, and a small loss in the Philippines. (5) Protein productivity of certain tropical food crops. Soybeans produce 9.1 kg of protein per ha per day, more than twice as much as any other crop shown in this table. No. 2 are lima beans (4.5), followed by cowpea (3.3), winged bean (3.0), peanut (2.7), and chick pea. (6) Nutritional contribution of AVRDC's six crops toward balancing a rice diet. Soybean is the best source of protein (36.8 gm per 100 gm), followed by mungbean (22.9).

Figures show: (1) Food grain yields (for cereal grains) have increased dramatically since about 1966 in developing countries as a result of the introduction of "Green Revolution" technology. Source: After Chancellor and Goss 1976. Address: AVRDC, Shanhua, Taiwan.

850. U.S. Department of Agriculture. 1977. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period July 1, 1975 through September 30, 1976. Washington, DC: U.S. Government Printing Office. See table 17.
• ***Summary:*** Table 18 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1976." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and

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Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: Soy fortified sorghum grits (SFSG), CSB (corn soya blend), CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: Near East: Bhutan, Egypt, Gaza, Jordan, Jordan West Bank, Morocco, Tunisia, Yemen.

Latin America: Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru.

Africa: Benin, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Liberia, Malagasy, Malawi, Mauritania, Mauritius, Niger, Rwanda, Senegal, Seychelles, Sierra Leone, Sudan, Tanzania, Togo, Zambia.

Asia: Bangladesh, India, Indonesia, Korea, Nepal, Pakistan, Philippines, Singapore, Sri Lanka.

Concerning "peanut oil" shipped under P.L. 480 Title II in fiscal year 1970: India received 37,776 million lb (Table 18). Address: Washington, DC. Phone: 703-875-4901 (1991).

851. Yokotsuka, Tamotsu. 1977. Shokuhin Kagaku Daijiten: Shôyu [McGraw-Hill encyclopedia of food, agriculture & nutrition: Soy sauce]. Tokyo: McGraw-Hill Kodansha. See p. 309-310. [Jap]

• ***Summary:*** History: Hishio and Kuki production techniques came to Japan from China and Korea. According to the Taiho Ritsuryo (702 A.D.), various types of Hishio and Kuki and Miso (this is the Misho character–NOT the present Miso one) were made from soybeans in the Hishio Tsukasa of the Kunaisho. It is in later times that they started to use the liquid which was separated from the above three as seasonings. In the Kamakura (1185-1333 A.D.) period in the Wakayama prefecture they collected the liquid accumulated in the bottom of Miso Oke. In the Muromachi period (1338-1573 A.D.) they added water to miso and squeezed it to extract the liquid (called Usudare or Taremiso). Shoyu (which is different from miso) was first mentioned in Ekirinbon Setsuyoshu (1597 A.D.). Address: Kikkoman Corporation, Noda, Japan.

852. **Product Name:** Tofu.
**Manufacturer's Name:** Boo Han Oriental Food Manufacturing.
**Manufacturer's Address:** South Tacoma Way, Lakewood, Washington.
**Date of Introduction:** 1977?
**New Product–Documentation:** Talk with Ed Elkin. 1991. Feb. 8. About 12-15 months ago Boo Han changed hands; it is now named Hang Yang, owned by Mr. Choy, a Korean-American, who does not speak English–although his brother does. Hang Yang is very aggressive and doing well; he just upgraded to a new tofu system. The company is at the same location it was when he purchased it from Boo Han.

Talk with Peter Lesser, founder of Pacific Soyfoods. 1991. Feb. 8. Starting in Feb. 1982 he began to buy okara from Mr. Boo Han, a Korean-American tofu maker located at something like 100 South Tacoma Way, Lakewood, Washington. Originally Mr. Han's shop was located in the back of his retail Asian food store. Then he moved it around the corner. He used a big old boiler. Peter has no idea when Mr. Boo Han started his tofu company. He still owns his retail store; he sold his tofu company. He speaks pretty good English.

In Feb. 1991, the phone directory has a listing for Boo Han Oriental Food Manufacturing, 9122 S. Tacoma Way, Tacoma, Washington. Phone: 206-588-7300. The owner's name is Mr. Boo-Nam Han.

853. Meals for Millions Foundation. 1978. Annual report 1977: A commitment to self-help for a hungry world. Santa Monica, California: MFM Foundation. 9 panels. Each 9 x 23 cm. Complex folding.

• ***Summary:*** Peter J. Davies is President and Chief Executive Officer; he resides at the New York office. On the orange, black and white cover is a photo of a little girl. MFM's former logo of the plant growing in the upturned bowl is now at the bottom of the cover.

Contents: Message from the president (The "trickle-down" theory of investing in infrastructure does not work). Highlights of 1977: The Borsook Fund was established, the National Committee of Sponsors was formed, with Mrs. John Steinbeck as chairperson, generous grants were received from a long list of organizations, starting with US AID and PACT. Since 1974 MFM has emphasized self-help programs, moving away from distribution of MPF. Technical and material assistance (Ecuador, Honduras, Egypt, Korea, Jamaica, Kenya). Transfer of technology (Village texturizer, India–Robert and Jeanne Nave). Multi-Purpose Food (sent to Syracuse, New York). Technical and professional training (IIPFT, Bolivia). Nutrition education (Tucson, Arizona. In June 1977 MFM held its first Nutrition Education Workshop for 28 field nutritionists).

Income for 1977 by source: $893,765 (total). Statement of functional expenses for the year ended Dec. 31, 1976 ($529,028). Board of Trustees. National Committee of Sponsors. MFM officers. A small portrait photo shows Peter Davies. Address: 1. 1800 Olympic Boulevard (P.O. Box 680), Santa Monica, California 90406; 2. 815 Second Ave., Suite 501, New York City, NY 10017. Phone: (213) 829-5337 or (212) 986-4170.

854. Wang, Jun Ryun (Mrs.); Lee, Yang Hee. 1978.

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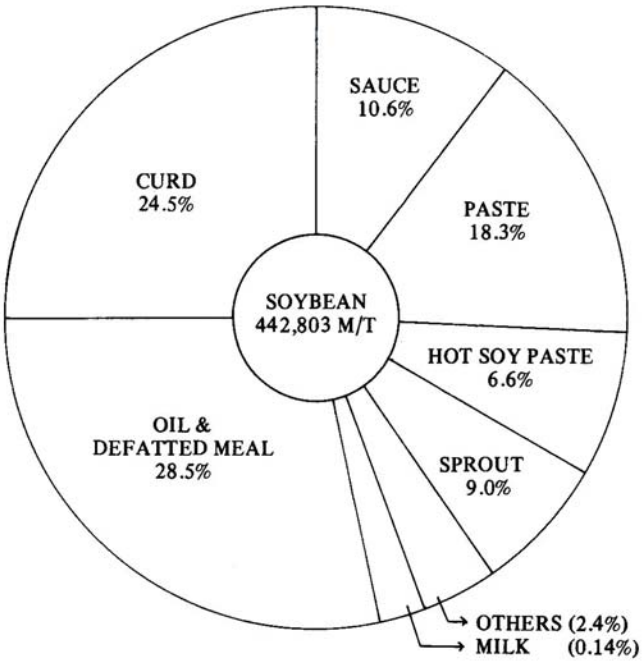
Traditional soybean foods in Korea. In: American Soybean Assoc., ed. 1978. International Soya Protein Food Conference, Proceedings. Hudson, Iowa: ASA. 136 p. See p. 43-47. [13 ref]

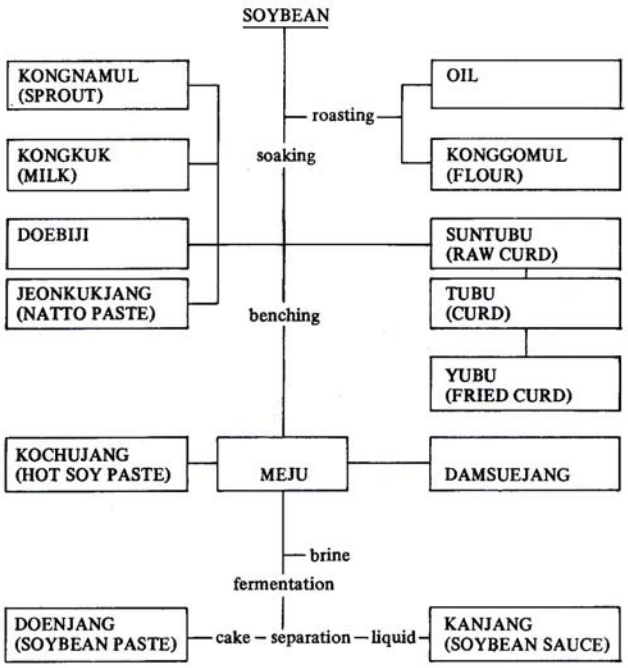
Annual Production and Import of Soybean

| Year | Production (M/T) | Import (M/T) | Total (M/T) |
|---|---|---|---|
| 1970 | 231,994 | 36,291 | 268,285 |
| 1971 | 222,302 | 60,573 | 282,875 |
| 1972 | 223,939 | 31,468 | 255,407 |
| 1973 | 245,822 | 72,964 | 318,786 |
| 1974 | 318,576 | 66,370 | 384,946 |
| 1975 | 310,555 | 61,000 | 371,555 |
| 1976 | 294,949 | 147,854 | 442,803 |

• ***Summary:*** "The origin of soy sauce and paste in Korean literature dates back to 683 A.D. (Shinmu King 3rd year of the United Silla period). Since an old Japanese literature [document], *Hwameyruitsuroku* [*Wamyô Ruijusho;* Collections of Japanese Names, by Subject], of Heyan [Heian] records that 'Maljang (Meju) is a Korean soy sauce and paste' and a record on Maljang was also observed in the ruins of Nara, it is evident that soy sauce and paste were introduced from Korea to Japan during the Nara period (645-793 A.D.). Therefore, it is believed that the beginning of their consumption in Korea should be in the third century of Kokuryo period."

"Soybean has been a major protein source in the Korean diet." Figure 1 shows: Consumption pattern of soybean foods (1976). Some 442,803 tonnes (metric tons) of soybeans were used in Korea as follows: oil and defatted meal 28.5%, curd




(*tubu*, or tofu [*suntubu* is raw curd/fresh curds]) 24.5%, paste (*doenjang*) 18.3%, soy sauce (*kanjang*) 10.6%, soy sprouts (*kongnamul*) 9.0%, hot soy paste (*kochujang*, made from meju, hot pepper flour, and cooked glutinous rice) 6.6%, soymilk (*kongkuk*) 0.14%, and other 2.4%. Other includes roasted soy flour (*konggomul*, used for coating rice cakes [mochi]), fried tofu (*yubu*), salted natto paste (*jeonkukjang / cheonggukjang / cheonkukjang*). *Doebiji* is fresh soybean puree, made by grinding soaked soybeans. When used as a food, it is usually cooked with vegetables, kimchi, and meat. Meju is balls of soybean koji like Japan's miso-dama. All fermented Korean soybean foods except Joenkukjang are prepared from meju. Its characteristic flavor results from *Aspergillus*, *Penicillium*, and *Mucor* species of molds on the surface of the balls and *Bacillus subtilis* on the inside. *Damsuejang* (*Makjang*) is a quick fermented soy paste made by crushing meju to a powder, adding a warm brine solution, then allowing it to ferment and ripen.

Note: This is the earliest English-language document seen (March 2009) that uses the word "Damsuejang" to refer to Korean-style soybean paste (miso).

The above usage is the equivalent of 12 kg per capita per year. The daily per capita consumption of soy sauce (kanjang) is 20 ml, of soybean paste (doenjang) is 15 gm, and of hot soybean paste is 10 gm. Most of the soy sauce (64%), doenjang (82%), and kochujang (76%) and all of the salted natto paste (joenkukjang) and quick fermented soy paste (damsuejang) are produced at a household level and consumed directly.

Tables show: (1) Annual production and import of soybeans.

Both soybean production and imports have grown in

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recent years. In 1970 production was 231,994 tonnes, and imports were 36,291 tonnes for a total of 268,285 tonnes. In 1976 production was 294,949 tonnes (up 27% over 1970), and imports were 147,854 tonnes (4 times as much as in 1970) for a total of 442,803 tonnes (up 65% over 1970).

(3) Chemical composition of meju. (4) Chemical composition of kanjang. (5) Chemical composition of doenjang. (6) Chemical composition of kochujang.

Other figures show: (2) Outline of traditional soybean foods in Korea: Gives the Korean name of 13 such foods; all names have already been given above. Foods at the top half of the diagram are unfermented; those at the bottom half are fermented.

(3) Preparation of tubu [tofu].

(4) Preparation of kongkuk (soy milk).

(5) Changes in chemical composition of soybean sprout.

(6) Changes in vitamin content of soybean sprout.

(7) Preparation of meju [soybean koji].

(8) Preparation of kanjang and doenjang [soy sauce and Korean soybean paste].

(9) Preparation of kochujang [with glutinous rice, hot pepper flour, and meju].

(10) Preparation of damsuejang (Korean-style soybean paste). Address: Korea Food Development Centre, Seoul, South Korea.

855. Chung, Sung-Soo; Chang, H.N.; Park, M.Y. 1978. [Dehydration of soybean residue by hot-air in conjunction with filter pressing]. *Korean J. of Food Science and Technology* 10(1):1-7. March. Food Sci. Technol. Abstr. 79-01-G0072. [8 ref. Kor; eng]

• ***Summary:*** "The wet soybean residue [okara], a byproduct of soymilk industry having potential food value has been tried to dehydrate for the purpose of storage. The total solid of the byproduct was composed of 28.9% protein, 13.6% fat, 4.4% ash and 53.0% carbohydrates.

"The original water content of 593% (dry-weight basis) was reduced to 378% by pressing mechanically. The sufficient pressure and time for the pressing were found to be 0.5M/T and 5 minutes, respectively.

"The partially dehydrated soybean residue was formed into pellets of 3mm in diameter and 10mm in length. By applying hot air on the thin layer of pellets the moisture could be further reduced to the level of 10% which is equivalent to that of the commercial wheat flour. No significant color deterioration in the product was observed if the hot air dehydration procedure was within the limits of 95 minutes at 120ºC under the air flow velocity of 160 feet per minute." Address: Korea Advanced Inst. of Science, Chung's Foods Co., Ltd., Seoul [Korea].

856. Martin, Bradley K. 1978. Seoul food is more than just C-rations. *Baltimore Sun* (*The*) (*Baltimore, Maryland*). April 6. p. 31 (p. C1, C8).

• ***Summary:*** The highly rated Jang Won restaurant in Seoul served traditional Korean dishes such as "raw vegetables with *toenjang* (a fiery dip made of soybean paste and peppers). Then there were raw sea cucumber with hot bean sauce, *kochu-jang;* raw abalone,..." Address: Sun staff writer.

857. Mori, Masao. 1978. Moyashi kôgengaku to sono bunka [Thoughts on bean sprouts and their culture]. *Ajinomoto-sha Ajiko News* No. 61. 9 p. April 30. [Jap; eng+]

• ***Summary:*** In 1974, consumption of all kinds of sprouts in Japan reached 260,000 tonnes/year. Per capita consumption is one of the highest among vegetables. The main seed sprouted is black mappe (*kokuryoku-tô*). In the old days, soybeans and mung beans (*ryoku-tô*) were the two most widely sprouted seeds. In Japan, sprout production as an industry started in the first decade of the 20th century, and after the Great Kanto Earthquake of 1923 it grew rapidly. During the period from about 1910 to 1915 the popularity of Chinese cooking grew rapidly in Japan. Because sprouts are widely used in Chinese cookery, they became firmly settled in the food tastes of regular Japanese. During the period from 1945 to 1965, the number of sprout products increased significantly. Producers were located mostly in the large cities of Yokohama, Tokyo, Osaka, and Kobe. Among the producers who joined the Japanese Bean Sprout Industry Association (*Mame Moyashi Kogyô Kumiai*) were 34 small producers and 667 individuals (insiders). The outsiders who didn't join the Association increased too.

The new seed for sprouting, black mappe [*Vigna mungo*], was originally imported from Burma only, but later Thailand entered the market, and became the main source of the beans starting in about 1965. In 1975 this seed cost less than 100,000 yen/tonne, but by 1977 the price had doubled, making it difficult for small producers to buy black mappe. So they started to mix mung beans with black mappe, but this made it difficult to produce sprouts of uniform quality.

The reason the Japanese switched from using soybeans and mung beans to using black mappe had to do with an incident in Nagasaki between China and Japan. The Chinese said the Japanese had treated their flag with disrespect. They got mad and for a while stopped trading with Japan–although the two countries are now becoming friendly again. Yet only a very small amount of soybeans and mung beans are imported from China.

It is believed that humans discovered the fact that seeds sprout in about 10,000 to 5,000 B.C. In the early Han dynasty, before the Christian era, the emperor of China wrote that "sprouts give health," and recorded their health effects. In Japan, the earliest record of bean sprout production dates from the Northern and Southern dynasties period (*Nanboku-cho*) (1336-1392). There is a legend that before that time the Chinese who landed by boat (accidentally) in Kyushu or Shikoku introduced sprouts to Japan. It is known that soy sprouts were made in Korea at an early date. There was

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a theory among the people in the sprout industry that soy sprouts were introduced to Japan when KATO Kiyomasa brought at least one Korean soy sprout maker to Japan at the time of Toyotomi Hideyoshi's war there (during the 1590s). Kato is said to have ordered the Korean to make soy sprouts using spring water from Suizenji park in Kyushu, and these sprouts are said to be Japan's first commercial sprouts–but there is so solid evidence or documents to prove that this really happened.

Japan's sprout industry consists almost entirely of small producers. In Kagoshima there are 75 producers–the largest number in any one part of Japan. Tokyo, Chiba, and Saitama together have 85 producers. Also Ashikaga in Tochigi prefecture (north of Tokyo) produces large amounts of sprouts. There are about 1,282 sprout producers in Japan. Of these 611 companies (with a 49% market share) have 1-5 workers, 553 companies (43%) have 6-20 workers, 95 companies (7%) have 21-50 workers, 13 companies (0.1%) have 51-100 workers, and 10 companies (40.1%) have 101-200 workers.

Professor Tadayoshi TAZAKI of Tokyo Agricultural and Industrial University (*Tôkyô Nôgyô Kôgyô Daigaku*), Agricultural Dept., proved that ethylene (*echiren*) gas can be used to produce fat sprouts–it prevents them from growing long and thin. Address: Shokuryo Gakuin Kyoju Kyoritsu Joshidai Koshi, Japan.

858. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). 1978. Despite big harvests, Korea's corn, soybean imports remain high. June 12. p. 6-8.
• ***Summary:*** Korea was the sixth largest export customer for U.S. farm products in 1977. The country imported record volumes of corn, soybeans, and tobacco. 70% of the total came from the U.S. All of the soybeans in the shipments came from the U.S.

In 1977, Korea's 318,735-ton soybean crop was 8% higher than the 1976 level, largely because of greater use of improved varieties, favorable weather, and a 1% expansion in area to 250,620 hectares. Soybean yields reached a new peak–1,270 kg/ha. Korea's imported soybeans–150,600 tons included 109,385 tons for crushing, 15,814 tons for food-industry use, 5,401 tons for military use, and 20,000 tons for price-control purposes. Address: U.S. Agricultural Attaché, Seoul.

859. Birnbaum, Alfred. 1978. Re: Natto, the word *kara* and the history of early Japanese-Korean relations, and sea vegetables. Letter to William Shurtleff at New-Age Foods Study Center, Lafayette, California, July 12. 1 p. Handwritten (in pencil) and signed.
• ***Summary:*** Alfred will try to finish translating the chapter on Nattô from *Daizu Shokuhin* before he leaves Japan for southern California on about Aug. 10; he has found certain scientific terms hard to translate.

He has been reading a somewhat controversial Japanese-language publication titled *Nihon no naka no Kankoku bunka* (*Korean culture inside Japan*). It states that the Japanese word *kara* (as in *kara-natto*), meaning simply "from the continent" was first applied to Korea, from Korea's Sam-Han & Three Kingdoms periods and Japan's Kofun (A.D. 250-552), Asuka (552-645), and Nara (646-794) periods–before Japan had any relations with China. The first usage was the Chinese character (1 Cc = 1 Chinese character given) which, although it appears to refer to Han dynasty China, was adapted by the early Korean Japanese "Kara" clan (which Alfred believes later became the *Higashi-no-Aya* clan). The next usage was (1 Cc, pronounced "kara"), as in Sam-Nan clans of Korea and the Karakuni Jinja (4 Cc) in Nara (still extant). Then the character changed to (1 Cc), still meaning "Korea" (not salty), and finally (1 Cc)–all pronounced *kara*.

Note: This is the earliest English-language document seen (Nov. 2011) that contains the term "kara-natto."

Alfred was introduced to these studies in early Japanese-Korean relations and the falsifications in the *Kojiki* etc. by a Korean linguist in Los Angeles. It became obvious how twisted the stories on the Japanese side became and how anxious the ancient ruling class Japanese (who were largely Korean) was to prove it was separate and unrelated to Korea.

Concerning Hama-natto [from Yamaya]: It is a special product of Hamamatsu, used as an accompaniment to rice, tea, or fried egg yolks. Two sources give two processes.

He still hopes to find time for a trip to Kyoto, and he is still interested in working together on a book about sea vegetables. During Aug. he will stay with his parents in Rancho Palos Verdes, California. From Sept. he will be visiting a friend in Columbia, Maryland. Address: Tama-sô No. 1, Inokashira 1-28-30, Mitaka-shi, Tokyo 181, Japan. Phone: 0422-47-7130.

860. Whigham, D.K.; Judy, W.H. 1978. International soybean variety experiment: Third report of results, 1975. *INTSOY Series* No. 15. x + 369 p. Aug. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: Africa: Algeria, Burundi, Cameroon, Congo, Dahomey, Egypt, Ethiopia, Gambia, Ghana, Ivory Coast, Lesotho, Mali, Mauritius, Niger, Reunion, Rhodesia (Salisbury), Rwanda, Senegal, Sierra Leone, Swaziland, Tanzania, Togo, Upper Volta, Zambia.

Asia: Afghanistan, Bangladesh, India, Indonesia, Korea, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand.

Europe: Hungary, Italy, Spain, Yugoslavia.

Mesoamerica: Bahamas, Belize, Costa Rica, Honduras, Jamaica, Martinique, Nicaragua, Panama, Trinidad & Tobago.

Middle East: Iran, Israel, Jordan, Lebanon, Saudi Arabia.

North America: United States.

Oceania: Fiji, Tahiti.

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South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Peru, Venezuela.

Note 1. This is the earliest document seen (March 2021) concerning soybeans in Niger, or the cultivation of soybeans in Niger. On 3 July 1975 fifteen soybean varieties were planted at Maradi, Niger; two days later the same 15 varieties were planted at Gaya, Niger. The research was conducted under the auspices of the Director, Institut de Recherches Agronomiques Tropicales (IRAT), Station de Tarna, B.P. 6, Maradi, Niger. At Maradi, Forrest gave the highest yield, 3,501 kg/ha and nine varieties gave yields of over 3,000 kg/ha. At Gaya, Jupiter gave the highest yield, 1,925 kg/ha.

Note 2. This is the second earliest document seen (Jan. 2002) for the cultivation of soybeans in French Guiana (12 Dec. 1975). On 12 Dec. 1975, cooperators Mr. J. Larcher and Mr. P. Midras (Institut de Recherches Agronomiques Tropicales, Station de Cabassou, B.P. 60, 97301 Cayenne, French Guiana), planted fifteen varieties of soybeans at Cayenne. Jupiter gave the highest yield, 3,445 kg/ha.

Note 3. This is the 2nd earliest document seen (April 2005) concerning soybeans in French Polynesia (or Tahiti), or the cultivation of soybeans in French Polynesia. This document contains the 2nd earliest date seen for soybeans on French Polynesia, or the cultivation of soybeans on French Polynesia (3 Dec. 1975). Thirteen varieties were tested at Papeete (capital of French Polynesia on the island of Tahiti), under the direction of Mr. Jean-Louis Reboul and Mr. Robert Yau-Akui, *Service de l'Economie Rurale*, B.P. 100, Papeete, Tahiti, French Polynesia. Davis gave the highest yield, 4,902 kg/ha.

This is the earliest document seen (Jan. 2005) concerning soybeans in Niger, or the cultivation of soybeans in Niger. This document contains the earliest date seen for soybeans in Niger, or the cultivation of soybeans in Niger (3 July 1975). Fifteen varieties were tested at Maradi under the direction of IRAT, Station de Tarna, B.P. 6, Maradi, Niger. Forrest gave the highest yield, 3,501 kg/ha. On 5 July 1975, fifteen varieties were tested at Gaya; Jupiter gave the highest yield, 1,925 kg/ha.

This document also contains an early clear date seen for soybeans in Senegal, and the cultivation of soybeans in Senegal (9 July 1975; one of two documents). Fifteen varieties were tested at Sefa under the direction of Mr. Jean Durovray, C.N.R.A., Sefa, Senegal. Jupiter gave the highest yield, 2,025 kg/ha.

This is the earliest document seen (Jan. 2005) concerning soybeans in Martinique, or the cultivation of soybeans in Martinique. This document contains the earliest date seen for soybeans on Martinique, or the cultivation of soybeans on Martinique (10 April 1975). Fifteen varieties were tested at Fort de France, under the direction of Mr. Daly, IRAT, Le Lamentin, B.P. 427, Fort de France, Martinique. Improved Pelican gave the highest yield, 2,154 kg/ha.

This is the earliest reliable document seen (March 2006) concerning soybeans in Togo, or the cultivation of soybeans in Togo. This document contains the earliest solid date seen for soybeans in Togo or the cultivation of soybeans in Togo (2 May 1975). On May 2 fifteen varieties of soybeans were planted at Davié in southern Togo under the direction of Mr. J. Marquette, Le Chef de la Mission, IRAT au Togo, B.P. 1163, Lome, Togo. Davis gave the best yield, 3,563 kg/ha. On May 7 fifteen varieties were grown at Amoutchou; Jupiter gave the best yield, 3,667 kg/ha. On July 8 eleven varieties were grown at Kitangbao; Jupiter gave the best yield, 3,292 kg/ha. The source of the soybeans in each country was INTSOY for ISVEX trials. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

861. Robin, Mike. 1978. The reign in the U.S. lies mainly in the grain. *Lincoln Gazette* (*Nebraska*). Sept. 20. [7 ref]
• ***Summary:*** Contents: Introduction. The Soviet wheat deal. Cargill and the state. Tradax. And back home. Food for Peace in Korea. Soybeans in Brazil.

This 4-page report shows how Cargill has grown through efficiency, predicting the future, taking advantage of every opportunity, and–whenever possible–using public monies and subsidies to finance its operation

The Soviet wheat deal: "Because farmers had no advance knowledge of the Russian sales, they sold their grains at prices ranging from $1.25 to $1.50 a bushel. The grain companies scurried about trying to buy these cheap grains from farmers, co-ops, and government-held reserves all through the early part of the summer of 1972. Several months later, when the Soviet sales were announced and the price of wheat rose as much as 50 percent, farmers realized the extent of the beating they had taken on what came to be known as the 'Great American Grain Robbery'. Agriculture Department officials claimed that even they had no knowledge of how much wheat had been sold to the Russians. Then Agriculture Secretary Earl Butz stated at a press conference, 'Farmers knew precisely as much as the grain companies. Some money has been made in the deal. Some trading companies made it. But it's the name of the game.'"

Although Cargill is adamant about the merits of free trade and looks askance at government regulation of the grain trade, the company nevertheless has many friends and employees in high government positions.

"Tradax: In order to market and export its grain, Cargill set up a new corporate entity, Tradax International, in Panama. Vice President Walter Saunders explained: 'Organizing the new company in Panama enabled us to conduct our trading activities in the international grain market on the same tax footing available to our major competitors.'"

"Finding that Panama was less than ideal for doing

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business, Cargill then set up a Swiss Company called Tradax Geneva. Tradax is so large that by itself it ranks as one of the world's largest grain traders. Cargill Chairman Erwin Kelm told the U.S. Senate subcommittee on multinationals that Cargill sells as much as 50 percent of its grain yearly to its own subsidiaries abroad. Now, when the Soviets buy U.S. grain, they no longer go to Cargill in the U.S. as they did in 1972. Instead, they buy from Tradax Geneva, which makes it difficult to monitor Soviet purchases–U.S. law doesn't require Tradax to report its sales,–and, additionally, Cargill does not pay U.S. taxes on its sales through Tradax."

"Soybeans in Brazil: Again in Brazil, Cargill was successful in using public monies to finance its operations. In 1972 Cargill received a loan of $25 million from OPIC, a semi-public agency, to build a soy-bean crushing plant in Brazil. The Export-Import Bank also helped by underwriting loans of more than $1 million. Soybean prices were skyrocketing in the early 1970s, and Brazil had already emerged as one of the world's largest soybean producers, second only to the U.S. Cargill jumped at the opportunity to get a foothold in the Brazilian market and its potential large profits.

"What both of these lending agencies and Cargill chose to overlook is the fact that much of Brazilian soybean production is for export and would be competing with United States-grown soybeans in world markets, thus undercutting the position of U.S. soybean farmers in the international market.

"As Verl Loyland of the Finley Farmer Grain and Elevator Company of North Dakota told the Senate Committee on Multinationals in 1976, 'I think the big problem, the way we look at it, is that these few [grain] companies are multinational companies. They are really not our salesmen. The multinational companies can pick up grain in any country they so desire, at whatever price advantage, or what have you. Just because a big sale is made to Russia doesn't necessarily mean they are going to buy from the U.S.'

"To underline this point, in 1976 Cargill's European subsidiary, Tradax, sold 37 million bushels of soybeans to the Soviets. Terms of the sale allowed the beans to originate anywhere.

"Dennis Blankenship, director of market development for the American Soybean Association, claims that the soy processing boom in Brazil accounts in part for the recent drop in volume of American meal shipped to Western Europe. The Brazilian government heavily subsidizes its soybean exports and ships abroad as much as 70 percent of its soy production, most of which is processed by subsidiaries of the grain giants, such as Cargill Agricola, Dreyfus, Bunge, and Archer-Daniels-Midland.

"While there appears to be little question that American agribusiness promotion of soybeans in Brazil has had harmful effects for U.S. producers, the expansion of soybeans has been far more deleterious to Brazil farmers and consumers alike. *How The Other Half Dies,* by Susan George [1977], summarizes a French government report on the introduction of soybeans to Brazil. Much of what follows is drawn from that study.

"The authors of the report are certain that soybeans have drastically reduced the amount of land previously devoted to staple crops, particularly the feijao or black bean... [see Susan George]

"In this article I have tried to break the veil of secrecy that has shrouded Cargill and its activities from public view. Cargill's influence on our lives is profound, and demands much more study..."

862. **Product Name:** Tofu Tahini Spread.
**Manufacturer's Name:** Michele's Beautiful Spreads and Dressings.
**Manufacturer's Address:** 1214 Manor Rd., Havertown, PA 19083. Later Philadelphia, PA. Phone: 215-474-8638 (9/92).
**Date of Introduction:** 1978 September.
**Ingredients:** Incl. soft tofu, sweet carrots, sesame tahini, fresh herbs (10/87).
**How Stored:** Frozen.
**New Product–Documentation:** Spot in Natural Foods Merchandiser. 1987. Oct. p. 23. "Tofu Dressing." The product seems to be named "Michele's Original Tofu Tahini Spread." The company is now named Michele's Original Gourmet Tofu Products, located at 6441 Haverford Rd., Philadelphia, Pennsylvania 19151. 9 oz. Retails for $2.55.

Manufacturer's catalog. 1987. Richard Rose review. 1987. Oct. 28. "Bland, uninspiring."

Talk with Robert Ashton of Natural Alternatives in Washington, DC. 1992. Sept. 14. Michele's Tofu Spread (which is still on the market) is very similar to the one he has long made. Note: This product is not made by Michele's Bakery in Philadelphia. Talk with John Liss of Michael's Bakery. This product is still on the market. Talk with Howard Waxman of Essene in Philadelphia (Phone: 215-922-1146). 1992. Sept. 21. He carries Michele's tofu spreads and dressings. The small business, which operates out of a store front (but does not sell retail), is run by a woman named Michele. Gives phone number of Michele's.

Talk with Michele D'Ambrosio, founder and owner of Michele's Original. 1992. Sept. 21. She became a vegetarian in 1974 in college and started making this product that year for herself and for one restaurant (named The Sunflower; she worked there while she went to St. Joseph's University in Pennsylvania. "We used to make it for a Pita Pocket, a Yogi Hoagie"). After the restaurant closed, she started in Nov. 1978 to sell it to a few health food stores (since that's all there were) in Havertown. She now made this, her first tofu product, out of the pantry of her home in Haverford. It was her original idea and it is still her best-seller. Other people have copied the idea since. Her company made only

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this one product for a number of years. In 1980 she changed the company name to Michele's Original and moved to her present address, a commercial deli kitchen at 6441-43 Haverford Ave., Philadelphia PA 19151. Phone: 215-474-8638. But she still lives in Havertown.

Talk with Michele D'Ambrosio. 1998. June 29. Her company produces vegetarian sandwiches made with soy meats (such as tofu and baked tofu), plus tofu spreads, tofu dressings, tofu salads, and tofu in the pasta. It's a whole vegetarian menu. She is age 48. The Tofu Tahini, a spread, is still her best-seller. It is prepared with carrots and other vegetables, which are pureed, then tahini is added; its like an orange whipped cream. She buys her tofu from a Korean company located in Chinatown in Philadelphia, Tung Yu [which is actually a wholesale distributor for tofu made by Sun Yee]. Her distributors are Cornucopia, Stow Mills, and Neshaminy Valley. In 1979 her community published a little cookbook titled *The what to do with tofu cookbooklet: Recipes for soybean curd.* It contained cute illustrations. It used to be distributed by her co-op, the Grow-cery, later renamed the Philadelphia Co-op. Her community practiced meditation from Guru Maraji; she is still his disciple.

863. *Soyanews* (*Sri Lanka*). 1978. Boneless meat [tofu]. 1(3):1, 8. Nov.
• ***Summary:*** About tofu. "A curd formed from soya milk that's as delicious as meat is dietary staple in a great part of Asia, said Mrs. Gai Kim, President of the United Nations Women's Guild, at the Hotel School in Colombo on October 17th. Over 50 representatives from the leading women's associations in Sri Lanka were present to hear Mrs. Kim explain why soya curd [tofu] is receiving such praises from both gourmets and nutritionists.

"The curd making demonstration was organized by the Sri Lanka Women's Conference..." Two photos show Mrs. Kim demonstrating how to make "soya curd," and how it can be cubed or "sliced for currying, frying, grilling and salads."

She said it is available at the "Modern Chinese Cafe on Havelock Road [in Colombo] where it is available at Rs. 4/- a pound. If it made at home, the cost is less than Rs. 1.50, she said, and will provide a little more than half the daily protein needs of an adult."

"Unlike high protein foods like meat, bean curd is not acidic but has an alkaline composition."

Mrs. Kim said that she would like to see curd called "'Boncheese' because it sounded like 'bonchi' the word for bean in Sinhala. 'Bon' means 'good' in French which would give the name 'boncheese,' derived from 'this god-sent grain,' a truly international character."

864. **Product Name:** Tofu.
**Manufacturer's Name:** Korean Farms.
**Manufacturer's Address:** 3456 N. Clark, Chicago, Illinois 60613. Phone: 312-525-3823.
**Date of Introduction:** 1978 December.
**How Stored:** Refrigerated.
**New Product–Documentation:** Shurtleff & Aoyagi. 1978, Dec. *The Book of Tofu* (Ballantine pocketbook edition). "Appendix B: Tofu Shops and Soy Dairies in the West." p. 395. Street mistakenly written as 3456 N. Cloud. Owner: Unknown.

Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name as Korea Farm at 3456 (or 3707) N. Clark. Owner: Mr. Young Sun Yo.

865. **Product Name:** Tofu.
**Manufacturer's Name:** Tofu, Inc.
**Manufacturer's Address:** 1900 Oak Crest, Roseville, MN 55113. Phone: 612-633-1098.
**Date of Introduction:** 1978 December.
**How Stored:** Refrigerated.
**New Product–Documentation:** Shurtleff & Aoyagi. 1978, Dec. *The Book of Tofu* (Ballantine pocketbook edition). "Appendix B: Tofu Shops and Soy Dairies in the West." p. 396. Owner: Unknown.

Letter/Order for the book *The Book of Tempeh* (profession edition) from Sonja Rank of Tofu, Inc. 1979. Nov. 16. The company is located at 1900 Oakcrest, Roseville, Minnesota 55108.

Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Tofu, Inc., 1900 Oak Crest, Roseville, MN 55113. Owners: Mr. Dam Choi and Mr. Lee R. Lee, Korean.

FIND/SVP. 1981, May. "The tofu market: Overview of a high-potential industry." p. 80. The company now makes about 12,000 to 13,000 lb/week of tofu in the soft and firm styles. Address is 1900 Oak Crest, Roseville, MN 55113. Phone: 612-633-1098.

Note: This is the earliest record seen (May 2019) concerning Tofu, Inc., which was later renamed Eastern Foods Corp., then Mainland Express.

866. **Product Name:** Tofu.
**Manufacturer's Name:** Aqua Agra.
**Manufacturer's Address:** 100 Highline Dr., Longwood, FL 32750. Phone: 305-339-8157.
**Date of Introduction:** 1978.
**How Stored:** Refrigerated.
**New Product–Documentation:** Shurtleff & Aoyagi. 1979. July. New Tofu Shops & Soy Dairies in the West. Don Wilson, owner. Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. Owner: Don Wilson.

Talk with Don Wilson. 1993. Nov. 24. His wife is Korean. He started making tofu in 1978, after he was sprouting soybeans and growing several other types of

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sprouts. The *Sentinel Star* did a story on his company in 1980.

867. **Product Name:** Eastern Flavor Tofu.
**Manufacturer's Name:** Eastern Foods, Inc.
**Manufacturer's Address:** Minneapolis, Minnesota.
**Date of Introduction:** 1978.
**New Product–Documentation:** Shurtleff & Aoyagi. 1983. Soyfoods Industry and Market; Soyfoods Center Computerized Mailing List. 1983. June 20. Owners: Lee R. Lee & Calvin Lutzke. Ostman. 1985. Morning Pioneer News Dispatch (St. Paul, Minnesota). Sept. 15. p. 1G, 3G. He first made tofu in a small plant in Roseville.

868. Fukui, J.; Sunaga, S.; Kaizuma, Norihiko. 1978. [Comparative investigation on inter-strain variation in the growing periods of Siberian, USSR, northeastern Chinese, South Korean, and Japanese strains of wild soybean (*Glycine soja*)]. *Iwate Daigaku Nogakubu Hokoku* (*J. of the Faculty of Agriculture, Iwate University* (*Japan*)) 14(2):71-80. [Jap]*

869. **Product Name:** [Tofu: Soybean Cake].
**Foreign Name:** Tofu: Gâteau aux Feves de Soya.
**Manufacturer's Name:** Pyung Hwa Food Co. Inc.
**Manufacturer's Address:** 2139 Dundas St., Toronto, ONT, M6R 1X1, Canada. Phone: 416-534-0237.
**Date of Introduction:** 1978.
**Ingredients:** Soya beans (Feves de soya), water, magnesium chloride (chlorure de magnesium), calcium sulfate (sulfate de calcium).
**Wt/Vol., Packaging, Price:** 600 gm.
**How Stored:** Refrigerated.
**New Product–Documentation:** R. Leviton. 1980. Soyfoods magazine. Summer. p. 16-17. "Mr. Jhasun Koo's Korean tofu shop (2139 Dundas St.) is located underneath a garage and service station. The traditional-style shop, which began operation in 1976, produces about 5,000 pounds of tofu weekly, in the form of 2000, 40-ounce containers of nigari-made tofu." He has 7 workers. Two-thirds of Pyung Hwa's market is Oriental stores, the rest going to natural foods stores. With Vital Eat handling his tofu distribution now, and Mr. Koo's recent conversion to nigari and organic soybeans, he expects to increase sales to the natural foods trade.

Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. Owner: Mr. Jhasun Koo.

Label. 1983, undated. 5 by 4.25 inches. Plastic film. Blue and light blue on clear film. "Soybean cake. Gateau aux feves de soya. Keep refrigerated."

Talk with Martha Gifford Thompson of Rochester Zen Center. 1989. April 11. She once visited a small tofu shop on Dundas in Toronto. She is not sure what nationality of people ran it. Talk with Jon Cloud of Soy City Foods. 1989. May 3. Pyung Wa was an early tofu company on Dundas St.

Talk with Jhasun Koo, owner and founder. 1989. May 4. He started making tofu in 1978 (not 1976) on Dundas St. Before that he had made soy sprouts in his home basement. In 1978 the only other tofu companies in Toronto were Yet Sing (probably the first) and Hwa Chang. Both were run by Chinese-Canadians and both are still in business. In 1986 he moved from Dundas St. to his current address: 115 McCormack St., Toronto, ONT, M6N 1X8. Phone: 416-767-7604.

870. Passmore, Jacki. 1978. All Asian cookbook: Japan, China, Korea, India, Malaysia, Singapore, Indonesia, Laos, Thailand, Burma, Cambodia, Vietnam, Philippines, Sri Lanka. Secaucus, New Jersey: Chartwell Books. 224 p. Illust. (color photos). Index. 29 cm.
• ***Summary:*** Soy-related recipes: Vietnam: Soya sauce pork (Thit bho to, p. 71, with light soya sauce). Malaysia and Singapore: Mixed vegetables with salted black beans [fermented black soybeans] (the black beans are crushed, p. 103). Stuffed beancurd, peppers and black mushrooms (with 6 pieces hard beancurd, each 5 cm {2 inches} square, p. 103). Fried beancurd squares (Taukwa goreng, with 6 squares hard beancurd and dark soya sauce, p. 103). Chinese soup with pickled vegetables, beancurd and mixed meat (with 2 squares soft beancurd, p. 106).

Indonesia: Sweet pork (Babi kecap, with sweet soya sauce {kecap manis}, p. 118). Soya sauce sambal (with dark soya sauce, p. 124). Mixed vegetable soup (Sayur campur, with 2 cakes soft beancurd, p. 126).

Philippines: Lumpia (with dark soy sauce in the sauce, p. 136).

China: Fish with hot bean sauce (with hot bean paste or hoisin sauce, p. 146). Lobster with salted black beans and chili (p. 11). Stewed spare ribs with salted black beans (p. 159). Mixed green vegetables with salted black beans (p. 163). Hotpot of vegetables and beancurd (with 8 squares soft beancurd, p. 164). Ma po beancurd (with 6 squares soft beancurd, p. 166). Cold beancurd salad (with 6 squares soft beancurd, p. 166). Fried beancurd (with 8 squares soft beancurd, p. 166). Sharks fin soup (with dark soya sauce, p. 167). Wonton soup (with light soya sauce, p. 168).

Japan: Soya bean paste (miso, homemade from canned chick peas + soya sauce!, p. 178). Tuna glazed with miso (Gyoden, with dark miso paste, p. 180). Sukiyaki (with 3 squares soft bean curd, p. 187). Braised pork and leek rolls (Teriyaki, with light soya sauce, p. 188). Fried eggplant in miso sauce (with white miso paste, 194). Miso soup (miso shiru, with diced bean curd and white miso paste, p. 195).

The Glossary includes: Bean paste, hot (made from chilies and soya beans, La do ban jiang, Chinese). Bean paste, salted (also known as yellow bean paste, made from soya beans, Taucheo, Chinese). Bean paste, sweet (either tien mien jiang or do ban jiang, made from soya beans, Chinese. See also hoisin sauce). Beancurd. Beancurd

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'cheese,' fermented (in brine with chilies, wine, and spices, Dofu ru, Chinese). Beancurd skin [yuba] (yellowish, almost transparent sheets). Beans, salted, black: See Salted black beans. Kecap manis (Sweet, slightly thick soya sauce, Indonesian, Malaysian). Miso (Japanese). Soya sauce (light, dark, and sweet). Tahu (Malaysian): See beancurd. Taucheo (Chinese): See Bean Paste, salted. Taukwa (Chinese, hard beancurd). Tien mien jiang (Chinese): See Bean paste, sweet. Tofu (Japanese): See beancurd. Vinegar and soya sauce dip: "A sharp-flavoured Korean accompaniment made by blending 3/4 cup light soya sauce, 3 tablespoons white wine vinegar, 3 tablespoons ground sesame seeds and 2 teaspoons finely chopped spring onions. Serve in individual sauce bowls." Yellow bean paste: See Bean paste, salted.

Note: This is the earliest document seen (Feb. 2011) that contains Vietnamese recipes that use soy as an ingredient. Address: Australian-born food writer.

871. Suh, Sang-Chul. 1978. Growth and structural changes in the Korean economy, 1910-1940. Harvard University, Cambridge, Massachusetts: Council on East Asian Studies. 222 p. Distributed by Harvard Univ. Press.
• ***Summary:*** Chapter 1, "The historical background," gives a very interesting and useful history of Korea from 1876 to about 1976.

Table 72 (p. 140) shows that the percentage of bean cultivation area in Korea was 53% in the North and 47% in the South in 1910 and in 1922, but 58% to 42% in 1936.

872. *FAO Monthly Bulletin of Statistics.* 1978--. Serial/periodical. Rome, Italy: Food and Agricultural Organization of the United Nations. Yearly. ca. 350 p. *
• ***Summary:*** Succeeds: Monthly bulletin of agricultural economics and statistics. Rome: Food and Agriculture Organization of the United Nations, 1952-1977.

873. *Detroit Free Press* (*Detroit, Michigan*). 1979. Arcade: I'll have some doenjang jpeeggae, and some bamboo shoots for my panda. Jan. 21. p. 97.
• ***Summary:*** "How can you not love a restaurant that has hanging in its entry way two big color photographs of Hsing-Hsing and Ling-Ling, the pandas at the National Zoo? You can't. Not when the place alls itself Panda and specializes in an Asian cuisine difficult to find elsewhere in Michigan: Korean.

"Try the savory tofu and beef stew ($3.25) served in a crock pot with rice, kimchi (pickled hot [napa] cabbage) and tea, or the fish stew ($4.25). or Doenjang Jpeegae ($3.50), a stew of vegetables, pork and soybean sauce" [paste; Doenjang].

874. Bray, Walter J. 1979. The Wonseong County, Korea Project. *LEC Report* No. 7. p. 107-09. D.E. Wilson, ed. Low-Cost Extrusion Cookers: Second International Workshop Proceedings (Fort Collins, CO: Dept. of Agric. and Chemical Engineering, Colorado State Univ.). Held in Dar es Salaam, Tanzania.
• ***Summary:*** In the early 1970s existing extruders presented a number of problems. So "by 1974 Meals for Millions had initiated work on an extruder of its own.

"A grant from U.S. AID in the following year made possible comprehensive design and development work, and a prototype unit was ready by 1976. This machine and its later developments are described in the paper by H. Sterner.

"At this time the Foundation was active in Korea and Ecuador and was planning to use extrusion cooking in projects in both countries. The potential for this type of cooking seemed particularly high in Ecuador, since the use of soy to enrich foods was a logical extension of an existing project to teach farmers to raise soybeans.

"An extruded mixture of soy and rice was developed as the base for a strawberry flavored drink." Unfortunately the project was terminated in mid-1977."

"Meanwhile, plans were developing for a project in Korea. It was now decided to make and market highly-nutritious low-cost extruded foods, starting with snack foods and progressing to weaning foods and powdered food bases. These activities were to be focused on Wonseong County, a rural area about 100 km east of the capital [Seoul], with a specific target of nutritionally at-risk groups, such as infants, young children, pregnant and lactating women–about 10,000 people in all.

"The main objective of the project was to find ways to induce the poorer at-risk members of the community to purchase and consume highly nutritious foods." Three secondary objectives are listed.

"The Wonseong County was from the very beginning a joint effort involving Meals for Millions, the Korean Institute of Science and Technology (KIST), ASI" (a leading market and research firm), and nutritionists from the Korea University and the Korean Government. "I will explain this project and its status by reviewing the work done by each of these groups.

Tables show: (1) Composition of snack food products (18% protein; containing 68% corn and 20% defatted soy flour). (2) Product raw material cost ($0.90 per kg). (3) Product selling cost: $2.31 per kg or $0.09 per 40-gm bag–incl. 39% raw materials, 22% manufacturing expenses, 15% administrative expenses, 15% sales expenses (incl. packaging), 10% Value Added Tax (VAT) 9%.

Figures show: (1) Flow chart for the production of HN/LC foods. (2) Organizational chart. Address: PhD, Meals for Millions Foundation, Santa Monica, California.

875. Hong, Sik Cheigh. 1979. The LEC program in Korea. *LEC Report* No. 7. p. 115-20. D.E. Wilson, ed. Low-Cost Extrusion Cookers: Second International Workshop Proceedings (Fort Collins, CO: Dept. of Agric. and Chemical

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Engineering, Colorado State Univ.). Held in Dar es Salaam, Tanzania. [4 ref]

• ***Summary:*** Contents: Introduction. The Wonseong County Comprehensive Nutrition Program in Korea. The MFM-KIST extruder. Development of high-nutrition low-cost (HNLC) food with a LEC system for the Wonseong Country program. Partial cooking of rice and corn for a pasta program with the MFM-Kist extruder. Experiments for rice bran stabilization by the extrusion process. Future program.

"Extrusion cooking is now practiced widely in the production of snack foods, blended foods, textured vegetable protein and inactivation of enzymes (Crowley, 1976). The Korean Institute of Science and Technology (KIST) has had several years of experience in the development of a high-nutrition low-cost (HNLC) food utilizing barley, soybean and sesame (BSS) and corn, soybean sesame (CSS) compositions through the extrusion process."

The MFM-KIST extruder is 1½ [2½] inch diameter single-screw unit, and the screw has constant pitch. It is driven by a 30-Hp [horsepower] motor whose speed can be changed with a 3-speed gear box. The barrel is divided into three sections without any cooling or heating jacket." It "is capable of producing 100 kg of product per hour.

Tables show: (1) Specification of MFM-KIST Extruder. (2) Trials for test production of proposed formulas with MFM-KIST extruder. (3) Chemical composition of proposed products. (4) Amino acid composition of proposed formulas. (5) Protein Efficiency Ratio (PER) and adjusted PER of proposed products. The PER ranges from 3.37 to 3.64. The adjusted PER (relative to casein, which has a PER of 2.5) ranges from 2.33 to 2.53. (6) Results of sensory evaluation of products (based on flavor, taste, texture, and color). (7) Effect of extrusion temperature and retention time on moisture content and residual peroxidase [enzyme] activity in extruded rice bran.

Figures show: (1) Graph of effect of extrusion temperature on free fatty acid development in rice bran during storage at 30ºC and 87% humidity. (2) Photo of dryer, enrober and packaging machine at KIST. Address: Korea Inst. of Science and Technology, Seoul, South Korea.

876. Shurtleff, William; Aoyagi, Akiko. 1979. Appendix C: Varieties of tofu in East Asia (Document part). In: W. Shurtleff and A. Aoyagi. 1979. The Book of Tofu. New York: Ballantine Books. 433 p. See p. 402-05.

• ***Summary:*** Gives the local, vernacular name for and a description of many varieties of tofu found in China and Taiwan, Indonesia, South Korea, Philippines, Thailand, and Vietnam.

China and Taiwan:

Taiwan, with a population of 15 million people, has about 2,500 tofu shops. There are no statistics yet available on the number of shops in mainland China, but if the proportion of shops to people is the same as in Taiwan, we can expect there to be 158,000 shops serving China's 950 million people. Unless otherwise stated, all Chinese terms are standard Mandarin. The "t" in toufu is pronounced like the "d" in "doe."

Chinese-style Firm Tofu (*toufu; dowfu* or *daufu* in Cantonese). The most popular type. Coagulated with calcium sulfate (gypsum) and sold in 3-inch squares weighing about 4½ ounces each. Contains 10 percent protein. One special type made in Shantung province is called *t'aian toufu;* another made in Anhui province, Chunnan, is called *pa-kung-shan toufu.*

Pressed Tofu (*tofu-kan*)*:* Similar to firm tofu but pressed until as firm as ham. Contains 22 percent protein. Often simmered in mixtures of water and burnt millet sugar, molasses, turmeric, or tea to create a variety of colors and flavors and increase shelf life.

Five-Spice Pressed Tofu (*wu-hsiang toufukan* or *hsiang toufukan*)*:* Made by simmering pressed tofu squares in a mixture of soy sauce, oil, and "five spice powder" (ground anise, cinnamon, cloves, plus fennel and Szechuan chili powder or ginger and nutmeg). Now prepared in San Francisco, it has a flavor and texture resembling smoked ham.

Soy-sauce Pressed Tofu (*chiang-yu toufu-kan*)*:* Made by simmering small squares of pressed tofu in a mixture of soy sauce and water.

Pressed Tofu Sheets (*pai-yeh* or *ch'ien-chang*)*:* Tofu pressed into very thin sheets that look like a 6-to-12- inch-square of canvas.

Pressed Tofu Noodles (*toufu-ssu* or *kan-ssu*)*:* Made by cutting pressed tofu sheets into noodlelike strips.

Pressed Tofu Loops (*pai-yeh chieh*). Made by cutting pressed tofu sheets into ½-inch-wide strips. Each is then tied into a simple overhand knot.

Salt-dried Tofu (*toufu-kan*)*:* Made from squares of pressed tofu that are rubbed with salt, tied together with strands of rice straw, and hung in the sunlight to dry.

Hard tofu (*lao-toufu*)*:* A general term for all tofu that is not soft.

Chinese Silken Tofu (*shui-toufu, nan-toufu, nen-toufu,* or *shih-kao toufu*)*:* One popular type is like a soft Japanese silken tofu; another is so soft it cannot be cut into cakes.

Smooth Soymilk Curds (*toufu-nao*)*:* Literally "tofu brains." Sold in the West as Tofu Pudding. Sold by street vendors in China topped with a brown sugar & peanut sauce.

Curds-in-Whey (*toufu-hua* or *rou-hua*)*:* Literally "tofu flowers." Available at some Chinese restaurants in the West.

Deep-fried Tofu (*yu-toufu* or *cha-toufu*)*:* A general term for deep-fried tofu cutlets, cubes, triangles, or netlike cutlets.

Hollow Deep-fried Tofu Cubes (*toufu-kuo* or *cha-toufu*)*:* Made by deep-frying 1-inch cubes of firm tofu.

Sautéed Tofu (*kuo-lao toufu*)*:* Made by thinly slicing firm tofu and frying it over low heat in a skillet until it turns a rich brownish yellow.

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Frozen Tofu (*tung-toufu* or *ping-toufu*)*:* Made by setting firm tofu out overnight in the snow.

Fermented Tofu (toufu-ru): See Chapter 14. Varieties include *nan-ru, nan-chiang toufu, ru-fu, mei-kui ru-fu,* and *chiang-toufu.*

Soymilk (*toufu-chiang tou-chiang,* or *tou-ru*)*:* See Chapter 10.

Chinese-style Yuba (*toufu-p'i* or *doufu-i*)*:* See Chapter 14.

Bamboo Yuba (*fu-chu* [*dried yuba sticks*])*:* U-shaped, dried rolls.

Okara (*tou-cha*)*:* See Chapter 6.

Indonesia:

Over 11,000 tofu shops make tofu for this country's 130 million people.

Indonesian tofu (*tahu*)*:* Similar to Chinese firm tofu (*toufu*). In many shops, the whey, allowed to stand overnight until it ferments, is used as the coagulant. Pressed tofu simmered in turmeric (also called simply *tahu*) is popular.

Deep-fried Tofu Cubes (*tahu goreng*)*:* 1¼-inch cubes deep-fried fresh by market vendors. Served crisp and hot, often with a fiery chili perched on top.

Tofu Chips (*krupuk tahu*)*:* Salted tofu sliced into long, thin strips and sun-dried. Broiled until crisp, then eaten as a snack or topping for Gado-gado (cooked vegetables with peanut sauce).

Fermented Tofu (*taokoan* or *takoa*)*:* Steamed and pressed into thin slices before being fermented.

Okara (*ampas tahu*)*:* Usually made into delicious okara tempeh or okara onchom.

South Korea:

There are more than 1,000 tofu shops scattered throughout this country of 32 million population. If there were a proportional number in North Korea, there would be 470 shops for 15 million people.

Korean Tofu (*tubu*)*:* Slightly firmer than its Japanese counterpart; not as firm as Chinese toufu.

Deep-fried Tofu Strips (*yubu*)*:* Each strip is about 7 by 1 by 3/4 inch. Unique.

Soymilk Curds (*sun tubu*)*:* Widely used.

Okara (*piji*)*:* Also popular.

Philippines:

Philippine Tofu (*tokwa*)*:* Identical to Chinese firm tofu (toufu).

Soymilk curds (*tajo* [*tajo*])*:* Pronounced ta-HO; made by Chinese. Sold topped with a little brown sugar.

Brine-fermented Tofu (*tahuri*)*:* Made like Chinese brine-fermented tofu but with an *Aspergillus elegans* mold and a little soy sauce in the brining liquor.

Thailand:

Thai Tofu (*tao-hu*)*:* Identical to Chinese firm tofu (*toufu*). Made mostly by Chinese.

Deep-fried Tofu (*tao-hu tod*)*:* Small (l¼-inch) cubes of deep-fried tofu. Often sold strung on split bamboo and tied in a loop.

Soymilk (*nom rua-liung*)*:* Sold hot each morning by Chinese. A thin soymilk is called *nam tao-hu.*

Soymilk Curds (*tao-huey*)*:* Sold by street vendors, topped with grated gingerroot and brown sugar syrup.

Red Fermented Tofu (*tao-hu yee*)*:* A Chinese product. Sold in 2-inch squares wrapped in either banana leaves or paper.

Lactone Silken Tofu (*tau-hu lord* or *tau-hu lawd*)*:* A modern product.

Vietnam:

Vietnamese Tofu (*dau hu* or *dau phu;* these and all of the following terms are spelled with many diacritical marks): Similar to Chinese firm tofu.

Smooth Soymilk Curds (*dau hu*)*:* Similar to the Chinese product of the same name. Served warm in a sauce of brown sugar and ginger.

Fermented Tofu (*chao*)*:* Similar to Chinese fermented Tofu.

Soymilk (*sua dau nanh*)*:* Identical to Chinese soymilk.

Pressed Tofu Sheets (*mi cang*)*:* Identical to the Chinese product.

Yuba (*dau phu truc*)*:* Identical to Chinese yuba.

Note 1. This is the earliest English-language document seen (April 2013) that uses the word "daufu" to refer to Chinese-style tofu.

Note 2. This is the earliest English-language document seen (Oct. 2010) that uses the word "nan-ru" to refer to fermented tofu. Address: P.O. Box 234, Lafayette, California 94549.

877. Sterner, Hank. 1979. Panel presentation: Characteristics of LEC's and manufacturing experiences. *LEC Report* No. 7. p. 163-64. D.E. Wilson, ed. Low-Cost Extrusion Cookers: Second International Workshop Proceedings (Fort Collins, CO: Dept. of Agric. and Chemical Engineering, Colorado State Univ.). Held in Dar es Salaam, Tanzania.

• ***Summary:*** "During 1975, while on the staff of Meals for Millions Foundation (MFM), I was assigned to develop a low-cost extruder cooker for the production of structured vegetable protein (SVP). Other imposed design objectives were that the machine could be manufactured and repaired in developing countries. The first was built in MFM's machine shop which was equipped with a Bridgeport milling machine, an engine lathe and a welder. Automobile parts, available the world over, were used in the power train. The first attempt at dissemination of this technology took place in Korea at the Korean Institute of Science and Technology (KIST). Performance of this machine is reported in other papers."

An illustration (line drawing) shows AEMC's Model 303 extrusion cooker with feeder and cut-off. Address: Appropriate Engineering and Manufacturing Co., Corona, California.

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878. Wang, H.L.; Mustakas, G.C.; Wolf, W.J.; Wang, L.C.; Hesseltine, C.W.; Bagley, E.B. 1979. Soybeans as human food: Unprocessed and simply processed. *USDA Utilization Research Report* No. 5. iv + 54 p. Jan. Slightly revised, July 1979. Jan. No index. 28 cm. Compiled for USAID. [50+ ref]

• ***Summary:*** Contents: Introduction. 1. Soybean food uses in Asia. China: Soaking dry soybeans, tou chiang (soybean milk), tou fu (soybean curd), processed tou fu products, tou fu pi (protein-lipid films), huang tou ya (soybean sprouts), whole soybeans, fermented soybean foods, production and consumption.

Japan: Tofu (soybean curd), kinugoshi tofu, processed tofu products, yuba (protein-lipid film), soybean milk, gô (ground soybean mash), daizu no moyashi (soybean sprouts), whole soybeans (edamame {fresh green soybeans}, whole dry soybeans, kinako), fermented soybean foods: Production and consumption.

Korea: Tubu (soybean curd), processed tubu product, soybean sprouts, whole soybeans (green soybeans, parched or roasted soybeans, boiled soybeans), soybean flour ("Soybeans are first roasted and then ground into flour. The flour is used extensively as an ingredient in food preparations." Note: The name of the roasted soy flour is not given), fermented soybean foods (Soy sauce and [soy] bean paste are commonly used in Korea as flavoring agents. Natto is also enjoyed), production and consumption [of soybeans in Korea].

Indonesia: Tahu or tahoo (soybean curd), bubuk kedele (soybean powder. "Soybeans of the white variety are roasted until no beany flavor can be detected. They are ground into a powder and mixed with such spices as garlic and chili"), tempe kedele, tempe gembus [the name in Central and East Java for okara tempeh], oncom tahu [the name in West Java for okara onchom], other soybean products (soybean sprouts, green soybeans, roasted and boiled soybeans, kecap {soy sauce}, tauco {soybean paste}), food mixtures, production and consumption.

Thailand: Tofu (*tauhu*), soy sauce, green soybeans in the pods (*tourae*).

Philippines: Soybean sprouts, soybean coffee, soybean cake, soybean milk, tou fu and processed tou fu products, production and consumption.

Burma. India. Malaysia. Nepal. Singapore. Sri Lanka (Ceylon). Vietnam. Middle East. References–Soybean food uses in Asia.

2. Soybean food uses in Africa. Ethiopia: Injera, wots and allichas, kitta, dabbo, dabokolo, porridge. Kenya. Morocco. Nigeria: Whole soybeans, soybean paste, corn-soy mixtures (soy-ogi). Tanzania. Uganda. Production. References–Soybean food uses in Africa.

3. Soybean food uses in Europe and U.S.S.R.

4. Soybean food uses in Latin America. Argentina. Bolivia. Brazil. Chile. Colombia. Ecuador. Guyana. Paraguay. Peru. Uruguay. Venezuela. Mexico: New village process, commercial developments. Honduras. Costa Rica. Panama. Dominican Republic. Jamaica. Haiti. Trinidad. References–Soybean food uses in Latin America.

5. Soybean food uses in North America. United States. Canada. References–Soybean food uses in North America.

6. Soybean food uses in Australia. 7. Summary of soybean food uses. Traditional soybean foods: Soybean milk, soybean curd and processed soybean curd products, protein-lipid film, soybean sprouts, tempe (tempeh), green soybeans, boiled soybeans, roasted soybeans, soybean flour, soy sauce, fermented soybean paste, fermented whole soybeans, natto, fermented soybean curd. Experimental soybean foods: Whole soybean foods, soybean paste, soy flour, soy beverage. Production and consumption.

8. Simple village process for processing whole soybeans: Equipment, process, sanitation requirements, quality of product, evaluation of product in formulas and procedures for family and institutional use in developing countries. NRRC village process. 9. Industrial production and selling prices of edible soybean protein products.

10. Barriers to accepting and using soybeans in food: Availability. Cultural and social factors. Texture. Flavor. Nutrition and food safety. Technology development. Technology transfer.

Tables: (1) Soybean production, imports, and total supply in Taiwan, 1962-1975. (2) Consumption of soybean foods in Taiwan, 1964-1974 (incl. tofu, which increased from 18.75 kg per person per year in 1964 to 32.04 kg per person per year in 1974). (3) Supply and disposition of soybeans in Japan, 1971-1974. (4) Whole soybeans (metric tons) used in the production of traditional foods (miso, shoyu, tofu and others) in Japan, 1970-1974. (5) Defatted soybeans meal (metric tons) used in the production of traditional foods (miso, shoyu, tofu and others) in Japan, 1970-1974.

(6) Production (metric tons) of traditional soybean foods in Japan (miso, shoyu, tofu and others). (7) Production and food use of beans and consumption of some soybean products in Korea, 1964-67. Note: The beans consisted of 85% soybeans, 8.5% red beans [azuki], 1.6% green beans, 1.3% peanuts, and 3.4% other beans. (8) Soybean production (metric tons) in Indonesia, 1960-74 (Winarno 1976). (9) Consumption in kilograms per capita per year of soybeans in various parts of Indonesia in 1970 (Winarno 1976). (10) Production (metric tons) of 3 soybean foods in Central Java, 1968-1972 (Winarno 1976).

(11) Area planted to soybeans and total soybean production (metric tons) in Thailand, 1964-1974. Page 27: Sales (metric tons) of faffa and soy-wheat-flour in Ethiopia, 1973-75. Page 29: Soybean area and production in 6 leading African countries, 1976. Page 30: Soybean area and production in 6 leading European countries, 1976. Page 36: Consumption of soy as human food in Mexico (in metric tons per capita per day).

(12) Supply and disposition of soybeans in the United

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States, 1967-76 (in million bushels). (13) Soybean supply and distribution in Canada, 1964-74 (in 1,000 bushels). (14) Soybeans: area and production in specified countries of the world, annual 1970-76. (15) Use of soybeans by soybean-consuming countries, 1964-66 (metric tons) (FAO 1971). (16) Amounts of cereal-soy blends distributed under Title II, Public Law 480 in fiscal year 1974 to various countries worldwide. (15) Use of soybeans by soybean-consuming countries, 1964-66 (Production, imports, domestic use, per capita consumption as food per year–of which the leaders are: China 6.7 kg. Japan 5.1 kg. Korea 5.0 kg).

(17) U.S. exports of full-fat soy flour, 1974-75 (in 1,000 lb). Mostly to Canada and Mexico. (18) Equipment and cost information on making soy flour by hand process (Mustakas' process). (19) Nutritional analysis of full-fat soy flour. (21) U.S. production and price estimates for soy proteins, 1976 (in million kg; soy flours, concentrates, isolates, textured soy flours, textured soy protein concentrates). (20) Yield and analysis of basic products (milk, atole, pasta; from 1 kg soybeans, adding about 9 liters water in the boiling process) (NRRC village method). (21) U.S. production estimates for soy proteins, 1976 (flours, concentrates, isolates, textured flours, textured isolates) (Personal communication, N.R. Lockmiller, 1976). Address: Northern Regional Research Center, Peoria, Illinois.

879. Wilson, David E. ed. 1979. Low-cost extrusion cookers: Second International Workshop Proceedings. *LEC Report* No. 7. vii + 288 p. Jan. Illust. 28 cm. Held 15-18 Jan. 1979 at Hotel Kilimanjaro, Dar es Salaam, Tanzania (Available from: Department of Agricultural and Chemical Engineering, Colorado State Univ., Ft. Collins, CO 80523). [100 ref]
• ***Summary:*** Contains about 34 papers by various authors; at least 19 of these are cited separately. Also contains four sets of opening remarks, numerous discussions, and a directory of workshop participants (45 representatives of 18 countries).

The workshop was co-hosted by: (1) the Dept. of Food Science and Nutrition, Colorado State Univ., Fort Collins, Colorado; (2) National Milling Corporation, Dar es Salaam, Tanzania. It was sponsored by: (1) U.S. Agency for International Development, Development Support Bureau, Office of Nutrition; (2) USDA Office of International Cooperation and Development, Nutrition and Agribusiness Group. The Preface is by G. Richard Jansen and R.E. Tribelhorn of Colorado State Univ. R.E. Tribelhorn is technical editor. Address: Research Associate, Dep. of Agricultural and Chemical Engineering, Colorado State Univ., Fort Collins, Colorado 80523.

880. Meals for Millions Foundation. 1979. Annual report 1978: A commitment to self-help for a hungry world. Santa Monica, California: MFM Foundation. 12 panels. Back to back. Each panel 22 x 9.5 cm.
• ***Summary:*** Submitted by Peter J. Davies, President; he works at the New York office. Hugh J. Roberts, Ph.D., is vice president for program. Alfred C. Bartholomew, D.D., Ph.D., is chairperson, board of trustees. On the cover, printed with red and black ink on white paper, is a photo of a Latin American man standing behind his wife against a black background. Contents: Message from the president. Highlights of 1978. Financial highlights of 1978 ("To fund its expanding programs, MFM's income broke the $1 million barrier in 1978. General support from the public continued to be the backbone. Generous grants were received from the U.S. Agency for International Development (A.I.D.),...").

"As we went to press [March 1979] the MFM Board of Trustees approved our becoming successor to the American Freedom from Hunger Foundation and changing our name to Meals for Millions / Freedom from Hunger Foundation."

Contributions made to Meals for Millions are tax deductible. It is a 501(c)(3) corporation. Los Angeles Social Service Permit #2108.

Statement of income and expenses. Where the money comes from. Where the money goes (Programs and services 77.3%). Board of trustees. National committee of sponsors. Meals for Millions / Freedom from Hunger Foundation (officers and addresses).

Technical and material assistance: Ecuador, Honduras, the Caribbean (Jamaica), Korea, Philippines. Transfer of technology. Village Texturizers are being field tested in Colombia, Ghana, India, Jamaica, the Philippines, Samoa, and Trinidad. India: SPRA in Bareilly, Uttar Pradesh. Multi-Purpose Food (sent to Brazil and Haiti; no statistics are given). Nutrition education: U.S. Southwest, Papago Indians, Child and Youth Nutrition Education, Urban Community Gardens & Self-Care Health Program, Healthy Lifestyle for Seniors. Food and Nutrition Institute. Research and Development. Contains 10 photos without captions, one showing a Village Texturizer at work. Address: 1800 Olympic Boulevard (P.O. Box 680), Santa Monica, California 90406. Phone: (213) 829-5337.

881. Nordquist, Ted. 1979. Re: Planning a natural soy products industry in Sweden. Letter to William Shurtleff and Akiko Aoyagi at New-Age Foods Study Center, undated. 1 p. Typed, with signature. [Eng]
• ***Summary:*** "Thank you again for the lovely evening [19 May 1979, in Lafayette] and all the helpful materials. A great deal has transpired here since we last met. I am now in the process of planning a 'natural soy products' industry in Sweden, along with a long time friend and Engineer, Ki Yong Kim. Towards this end, Kim will be visiting Japan in August." He would like to visit medium- and large-scale companies that make tofu equipment.

"Ray Nagai of Traditional Tofu mentioned the ideas of soy-milk yogurt and tofu salad dressings as good starters on the Swedish market (Swedes have a taste for 'sour' milk products)."

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"We are in the process of researching all available Swedish machinery suitable for soy products. We are aiming at December [1979] as the month when we put together our findings concerning machinery, marketing, distribution, initial products, aims, etc. and can present a convincing deal to probable financiers, hopefully by February of 1980... It took me a great deal of deep thinking to make the final jump from academics to soy products. Now that I have turned down a two-year grant and both Anne-Marie and I have decided to 'make or break' our lives on soy products I have a good gut sensation that I am headed in the right direction.

"My love to you both. Om Tat Sat. Ted A. Nordquist, FD."

Note: This is the earliest English-language document seen (Sept. 2012) that contains the term "soy-milk yogurt." Address: Blodstensvägen 16, 752 44 Uppsala, Sweden.

882. Shurtleff, William. 1979. The tofu and soymilk industry in the United States (News release). Lafayette, California: New-Age Foods Study Center. 1 p. June.

• ***Summary:*** The first statistics compiled on the U.S. soyfoods industry. "There are presently 150 tofu shops and soy dairies in the U.S. Ninety of these, mostly run by Caucasian Americans, have opened within the past 3 years since publication of *The Book of Tofu;* they now have about 35% of the industry sales. The remaining 60 are Japanese and Chinese run; they have an estimated 65% of the market. The industry has a brisk sales growth rate of 25% per year.

"The largest tofu factory in the U.S. is the Matsuda-Hinode company in Los Angeles; they produce about 16,000 pounds of tofu a day under fourteen different labels. The largest of the new breed of Caucasian-run plants is the New England Soy Dairy in Greenfield, Massachusetts. Founded in 1977, it now produces some 4,500 pounds of tofu a day and expects revenues of $750,000 in 1979. In its April 12 front page story on the tofu industry, *The Wall Street Journal* focused on The New England Soy Dairy.

"The U.S. tofu and soymilk industry presently uses approximately 7000 tons of dry soybeans per year.

"In July of 1978, tofu and soymilk producers founded the Soycrafters Association of North America (SANA), an educational and trade association. Its quarterly publication *Soycraft* is the primary source of information on soy protein foods in the Western World. For details contact:

"Ira Leviton, president
"Soycrafters Association of North America
"305 Wells St.
"Greenfield, MA 01301

"Worldwide, the tofu and soymilk industry is rapidly expanding. There are presently a total of 211,000 producers, including 38,000 in Japan, 158,000 in mainland China, 11,000 in Indonesia, 2500 in Taiwan, and 1470 in Korea. The largest tofu factories, located in Japan, produce over 100,000 pounds of tofu a day (15,000 tons a year) and the largest soy dairy [Vitasoy], located in Hong Kong, produces 500,000 bottles of soymilk a day (150 million bottles a year).

"Most of the new tofu shops and soy dairies in the U.S. have gotten into production using the technical manual *Tofu & Soymilk Production* by William Shurtleff & Akiko Aoyagi (who also wrote *The Book of Tofu,* which now has over a quarter million copies in print). This technical manual is available for $17.50 from:

"New-Age Foods Study Center
"P.O. Box 234
"Lafayette, California 94549. Tel: 415-283-2991." Address: 790 Los Palos Manor, Lafayette, California 94549.

883. *Soyworld* (*American Soybean Association, St. Louis, Missouri*). 1979. Korea office. 1(2):2. June.

• ***Summary:*** "The bustling Korean economy is one of the fastest growing new markets for American soybeans. In the last three years Koreans have nearly doubled their purchases of U.S. soybeans from 155,000 metric tons in 1976 to over 300,000 metric tons in 1978. Growth is expected to continue, climbing to over a million metric tons by the late 1980's.

"For several years the American Soybean Association has served the Korean market through offices in Tokyo. However, because of the recent jump in soybean imports, and the need to provide a closer working relationship with Korean importers and end users of soybeans, it has been determined that ASA market development activities on behalf of American farmers can best be served by establishing an office in Seoul. The office, which will open in July of 1979, will be headed by Dr. Kyung Lee, a native Korean and graduate of University of Illinois. Now a U.S. citizen, Dr. Lee has been an ASA employee for nearly six years.

"The remarkable growth of the Korean economy is bringing the nation's population up from subsistence incomes to levels of income that allow more flexibility in spending.

"One beneficiary of Korea's new affluence has been agriculture, as Korean's seek to improve their diets with more protein. Demand for meat and livestock products has increased dramatically in the last three years. In order to fulfill the demand animal numbers have risen significantly with an equally significant increase in demand for feed grains and protein meal."

A portrait photo shows Dr. Kyung Lee.

884. Horan, F.E. 1979. Corporations and the world food problem. Paper presented at World Game '79, New York University, Loeb Student Center, New York City, NY. July 18. 20 p.

• ***Summary:*** Focuses on ADM, vegetable proteins, TVP, cereal-soy blends, and the Food for Peace Title II program. Figure 1 shows percentage of after-tax income spent on food: Canada 14.8, France 16.5, UK 16.6, Netherlands 16.9, USA 17.0, West Germany 21.2, Korea 46.8, Philippines 50.8.

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In the period 1963-65, the percentage of total protein obtained from vegetable and from animal sources was: Developing regions: 81/19. Developed regions 46/54. World 68/32. Address: Vice President, R&D Div., Archer Daniels Midland Co., Decatur, Illinois.

885. **Product Name:** Tofu.
**Manufacturer's Name:** Korea Farm.
**Manufacturer's Address:** 3456 (or 3707) N. Clark, Chicago, IL 60613. Phone: 312-348-1625.
**Date of Introduction:** 1979 July.
**How Stored:** Refrigerated.
**New Product–Documentation:** Shurtleff & Aoyagi. 1979. July. New Tofu Shops & Soy Dairies in the West. Mr. Young Sun Yo. Soyfoods Center Computerized Mailing List. 1981. Jan. 22.

886. Bernard, Richard L. 1979. [Soybean] germplasm resource development. In: R.W. Judd, ed. 1979. 50 Years with Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 8-16.
• ***Summary:*** "The soybean crop was established in the Midwest using Chinese varieties introduced from northeast China (the area called "Manchuria" at that time), an area with soils and climate similar to those of our Midwest and one where soybeans were already being grown on a large commercial scale. In contrast to most of the rest of eastern Asia where soybeans were grown in gardens or small plots for local food use, in Manchuria soybeans were grown on a large commercial scale (as much as 50% of the total crop area) and were used for oil extraction with the meal used for animal feed or fertilizer. Large shipments of soybeans were made to Japan and to oil extraction mills in western Europe.

"During the early part of this century many hundreds of soybean varieties were introduced from eastern Asia and tested by U.S. agronomists for performance here. Virtually all of the successful ones were from central and southern Manchuria, where large scale commercial production had already been underway for several decades. Thus, the success of the Midwest soybean industry was based to a large extent on the earlier successful development of a similar industry of soybean production and oil extraction in northeast China. We owe a debt of gratitude to the unknown Chinese plant breeders or farmer-selectors who developed these basic commercial-type soybean varieties.

"Beginning in the late 1930's and 1940's soybean breeders in the USDA-state experiment station breeding programs, through hybridization and selection, were developing improved varieties with higher yielding ability and more resistance to lodging and shattering and to the prevalent diseases. By the 1950's virtually all acreage was planted to these products of the scientific breeders' art, yet even down to the present day these American varieties trace the bulk of their ancestry to a small group of successful introductions, largely from northeast China. This is specified in Table 1 for major northern and southern US varieties. The introduced parental varieties and their place of origin is listed across the top of the table. Most of these have American names because they were grown here commercially after being introduced. The eleven northern varieties listed occupied 2/3 of the northern US acreage in 1978 and trace to eleven introduced varieties, all but two from northeast China. The nine southern varieties occupied over 80% of the south-central acreage and trace to twelve introduced varieties with five of them in common with the northern varieties. The remaining acreage is planted to various varieties, each with less than 2% of the regional acreage. Almost without exception these are from the same parentage as those listed, and so, if all US commercial varieties had been included, there would be very few ancestral varieties added to the table. Thus, only fifteen introduced varieties have provided the germplasm on which our soybean industry is based. Much research, testing, evaluation, and hybridization has been done with some of the thousands of other soybeans introduced to the U.S., but much more work remains to be done in the effort to broaden and improve our germplasm base. One of the first and most basic steps is to obtain, maintain, and make available to researchers soybean germplasm from all over the world.

"The history of soybean introduction in the United States can be divided into seven periods from 1898 to the present (Table 2). Prior to 1898 "... there were not more than eight varieties of soybeans grown in the United States" according to C.V. Piper and W.J. Morse writing in "The Soybean" (1923). Prior to 1925 soybean introductions were obtained through consuls, missionaries, and seedsmen, as well as local agronomists and a few agricultural explorers such as Frank Meyer who traveled extensively in China. A major contributor was USDA plant explorer P.H. Dorsett, who collected nearly 1,500 soybean types in Manchuria in 1925 to 1927. An agricultural exploration trip in northern China, Korea, and Japan in 1929 to 1931 by Dorsett and W.J. Morse brought in 4,578 varieties.

"As the soybean grew in importance in this country and access to its homeland was restricted because of war and political problems, it was realized that a permanent system of maintaining soybean germplasm must be established. Relatively few varieties were grown in this country, and these, being closely interrelated, provided only a very limited range of germplasm. Until just 30 years ago no formal preservation system for soybean germplasm existed. Most of the introduced varieties had been discarded if not of immediate usefulness. Of the 8526 soybeans introduced, only 1580, or less than 20%, were still around in 1949 when the present germplasm collection system was begun. Under the direction of Dr. Martin Weiss of the USDA's Soybean Investigations a soybean germplasm collection was established with the late varieties (Group V and later) to be

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maintained at Stoneville, Mississippi, and the early ones at Urbana, Illinois. Dr. E.E. Hartwig has been curator of the southern collection from the beginning, and I have looked after the northern collection since 1954. Table 2 indicates how this collection has grown to its present size of over 8000 and Table 3 gives the breakdown by maturity group as of last January. After a long period of passive additions (1933 to 1968) we have renewed our efforts to actively collect the world's soybean germplasm. Large collections have been obtained from colleagues in Japan, South Korea, and the Soviet Union. Of course, China is a most important source of soybean germplasm. Most of the older introductions including those of Dorsett and Morse are from northern China, leaving large areas of southern and western China virtually untapped. In recent years we have begun to obtain a large number of soybeans from China, many of them via the Soviet Union. With the present favorable relations we are hoping to greatly increase the number of accessions from China in the near future.

"In addition to the major collections of U.S. and foreign varieties, we maintain a heavily used Genetic Collection of over 400 strains of special interest to geneticists. This includes a large collection of genetic isolines which we have developed and which are widely used by researchers in genetic studies and in assaying the effects of individual traits, such as pest resistance, time of maturity, growth type, leaf shape, pubescence type, etc.

"We have a very extensive collection of species related to soybeans. The wild soybean (*Glycine soja*) is the closest relative, and since it can be easily crossed with soybeans; offers a potential source of pest resistance or other traits not present in soybeans. Just 10 years ago there were 8 entries of this species in the collection. Now, by virtue of some collection trips that I have made and through the help of colleagues in eastern Asia the number has grown to 558 (Table 4). The other species of the genus *Glycine* are all perennials from Australia, southeast Asia, and South Pacific islands, and although they cannot be cross-pollinated with soybeans, they provide interesting material for research into the botanical origin of soybeans. We now have a collection of over 100 accessions of these species (Table 5). All of these are made available on request to research workers throughout the world.

"The soybean collection is heavily used, with over 10,000 packets sent out each year. Some of the traits for which soybean germplasm has been evaluated are listed in Table 6. Success stories can be told about finding resistance to cyst nematode, new races of phytophthora root rot, soybean mosaic virus, etc. Future progress in yield, pest resistance, plant growth type, and seed composition will depend heavily on this germplasm collection as a source of new desirable genes for the varieties of the future." Address: AR-SEA-USDA, Univ. of Illinois.

887. *Soybean Digest.* 1979. Korean demand spurs soybean imports: Escalating economy opens new market for protein, oil. July/Aug. p. SID-1-2.

• ***Summary:*** "Korea's thriving economy presents the fastest growing new market for American soybeans. Between 1966 and 1970 annual Korean imports of soybeans and soybean products totalled 40,000 metric tons (MT). In the next 5 years imports increased to 58,000 MT. Then, in 1976, purchases leaped to 300,000 MT. Market growth is expected to continue, climbing to over a million MT in the 1980's.

"With affluency has come a sharp consumer demand for animal protein and edible oil."

888. Hymowitz, T.; Kaizuma, Norihiko. 1979. Dissemination of soybeans (*Glycine max*)*:* Seed protein electrophoresis profiles among Japanese cultivars. *Economic Botany* 33(3):311-19. Sept. [22 ref]

• ***Summary:*** Seed protein electrophoresis is shown to be a powerful tool for resolving problems of taxonomy, evolution, and paths of dissemination of domesticated plants. By the use of these seed protein banding patterns, which act like silent fingerprints, the movement of germplasm and the paths of dissemination of soybeans to and within Japan may be clarified.

Seed protein extracts from 477 cultivated Japanese soybean varieties were analyzed by polyacrylamide gel electrophoresis to determine the distribution of the alleles of three trypsin inhibitor loci (Ti-a, Ti-b, Ti-3c) and two special protein loci (Sp1-a, Sp1-b) with respect to the maturity group and area of adaptation of each variety. A map (Fig. 2) shows Japan divided into 5 geographical areas. About 60% of the soybean varieties had the Ti-a allele. The frequency of the Ti-b allele was found to be highest in southeastern Japan and lowest in northeastern Japan. The Ti-c allele, discovered in 6 varieties, was traced to two possible sources adapted to the Tohoku area.

In conclusion, the writers conclude that the present population of cultivated Japanese soybean varieties was developed from two distinct sources of introductions: (1) A short-season crop cline or summer-season type having almost exclusively the Ti-a Sp1-b genotype. (2) The full-season crop cline having either the Ti-a Sp1-b or T1-a Sp1-b genotype. The full-season crop cline probably came from north-central China through to Japan. The short-season crop cline appears to have evolved in either Korea or on Kyushu, Japan's southernmost main island.

The problem of determining the origin of the short-season crop cline "is complicated by the fact that the movement of soybeans from Korea to Japan and vice versa across the Korea Strait has been going on since at least the third century A.D. and perhaps earlier."

Contains 3 figures and four tables. Address: 1. Crop Evolution Lab., Univ. of Illinois; 2. Iwate Univ., Morioka, Iwate, Japan.

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889. **Product Name:** Tofu (Vacuum Packed).
**Manufacturer's Name:** Summercorn Foods Inc.
**Manufacturer's Address:** Community Cannery, 1508 W. 6th St., Fayetteville, AR 72701. From spring 1981: 401 Watson, Fayetteville, AR 72701. Phone: 501-521-9338.
**Date of Introduction:** 1979 September.
**Ingredients:** 1988: Certified organic soybeans, purified water, natural calcium sulphate.
**Wt/Vol., Packaging, Price:** 16 oz vacuum packed.
**How Stored:** Refrigerated.
**Nutrition:** Per 100 gm: Calories 72, protein 9 gm, carbohydrates 2.4 gm, calcium 828 mg, sodium 14 mg, fat 4 gm.
**New Product–Documentation:** Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address (401 Watson St.) and phone number. The owners are Steve Kectner and David Druding.

Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owners are now Steve Keltner, David Druding, and Annee Littell. 1981. Spring. Swallows. Summercorn Soyfoods is now producing tofu, soymilk, and soysage.

Talk with David Druding. 1987. Oct. The company started in 1974 as a bakery. Rodale Press published their Uprisings Cookbook. Label. 1988. 3 by 4 inches. Blue and brown on tan.

Talk with David Druding. 1988. May 18. They started making tofu in September 1979 in a place they rented in the Community Cannery, which was about 8 blocks from the main bakery, and located at 1508 West 6th St. in Fayetteville. Steve Keltner learned the process from a Korean man who had worked with Thom Leonard in Lawrence, Kansas. He also learned from *The Book of Tofu.* They would cut up the tofu as soon as it was chilled, transport it to the main building, package it and make carob pudding, tofu onion dip, and creamy tofu dressing. They sold the products locally (Fayetteville and Little Rock) and in Missouri, not to the 11-state region that was part of New Destiny Federation. The formal trade name of the company/co-op from the beginning was Summercorn Foods Inc. The name on the incorporation paper is Summercorn Collective Co, Inc. but at time the trade name Summercorn Bakery and Soyfoods was used, informally. The latter never appeared on labels.

Talk with David Druding. 1994. Nov. 2. He moved in about Dec. 1992 from 401 West Watson St. to 1410 Cato Springs Rd., Fayetteville, Arkansas. Same phone. At that time he changed the business name from Summercorn Bakery and Soyfoods to Summercorn Foods. His business is doing well. He just started selling his tofu to Walmart, which is selling it at their new natural and gourmet foods department in several of their division 1 stores. A health inspector said that he must establish another barrier to botulism and other food poisoning bacteria in his vacuum packed tofu.

890. Ohlund, Tim. 1979. Re: Ted Nordquist and Aros Soymilk Products in Sweden. Letter to William Shurtleff at New-Age Foods Study Center, P.O. Box 234, Lafayette, California, Nov. 26. 1 p. Handwritten.
• ***Summary:*** "Ted [Nordquist], a business man named Gunnar, a Korean–Professor Kim, and myself are now deeply involved in setting up the Aros Soymilk Products company. We've found a suitable factory location in Örsundsbro (my village) at a reasonable price. Now the architect is busy working out the floor plan [500 square meters] which will have to be approved by the health authorities. An estimate of the factory remodeling plus all other prospected costs will be the basis for a loan from the State development agency. We hope to get a loan for the whole shebang. The interest rate and other conditions will be very favorable. If all goes well we hope to start production of tofu, soymilk, salad dressing and later a few other products next fall. We'll let you know more later as it develops. Love–Tim, Annalena & Finn."

Note: The date of this letter is not clear. It was probably 26 Nov. 1979 but could be 20 April 1979, with a follow-up card from Tim on 5 Dec. 1979 (or 12 May 1979). The books were finally sent on 10 Dec. 1979.

Note: This is the earliest document seen concerning the work of Ted Nordquist with soyfoods in Sweden. Address: Box 559A, 19063 Örsundsbro, Sweden.

891. Shurtleff, William. 1979. Rapid growth of tofu shops and soy dairies in North America (News release). Lafayette, California: New-Age Foods Study Center. 1 p. Nov.
• ***Summary:*** "There are presently 164 tofu shops and soy dairies in North America and, as shown in the accompanying graph, the increase in numbers is rapidly accelerating. Ninety-six of these run by Caucasian Americans have opened in the past 3 years since publication of *The Book of Tofu*, by Shurtleff & Aoyagi, which has sold over a quarter of a million copies. The industry has a brisk sales growth rate of 25 to 30% a year, and uses an estimated 35% of the industry sales; the 68 Oriental shops have 65%.

"The largest tofu factory in the U.S. is the Matsuda-Hinode company in Los Angeles; they produce about 16,000 pounds of tofu a day under 14 different labels. The largest of the new breed of Caucasian-run plants is the New England Soy Dairy in Greenfield, Massachusetts. Founded in 1977, it now produces some 4,500 pounds of tofu a day and expects revenues of $750,000 in 1979. In its April 12 front page story on the tofu industry, *The Wall Street Journal* focused on The New England Soy Dairy...

"Worldwide, the tofu and soymilk industry is rapidly expanding. There are presently a total of 211,000 producers, including 38,000 in Japan, 158,000 in mainland China, 11,000 in Indonesia, 2,500 in Taiwan, and 1,470 in Korea.

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The largest tofu factories, located in Japan, produce over 100,000 pounds of tofu a day (15,000 tons a year) and the largest soy dairy, located in Hong Kong, produces 500,000 bottles of soymilk a day (150 million bottles a year).

"Most of the new tofu shops and soy dairies in the U.S. have gotten into production using the technical manual *Tofu & Soymilk Production* by William Shurtleff & Akiko Aoyagi, which has just been published in both paperback and hardback editions." Address: P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

892. *SoyaScan Notes.* 1979. Chronology of soybeans, soyfoods and natural foods in the United States 1970s (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** Overview of the 1970s:

The Soyfoods Movement Begins. This industry focused on traditional, low-tech soyfoods such as tofu, soymilk, tempeh, and miso. Many of the pioneer Caucasian-American (non-Asian) soyfoods companies started during this decade, often for philosophical and ideological reasons. The founding of the Soycrafters Association of North America in July 1978 marks the beginning of this movement.

By Dec. 1979 there are 159 tofu manufacturers in the United States. Ninety of these are run by Caucasian Americans and are less than 3 years old. There are also 18 tempeh companies and 3 commercial miso companies (not including those in Hawaii).

Natural Foods and Vegetarian Movements Grow. The basic philosophy of natural foods and vegetarianism became more widely accepted, and this greatly helped the soyfoods movement.

Unprecedented Interest in Nutrition, Health, and Fitness. During this decade, the interest in nutrition grew dramatically, both among consumers and professionals. Consumers, seeking ways of protecting themselves from the ravages of heart disease and cancer, try more healthful diets. Exercise and looking healthy are now "in." For example, the New York Marathon, which had 55 finishers (no women) in 1970, boasted 10,477 finishers (including 1,621 women) in 1979. Preventive medicine is becoming a new profession.

Steady Increase in Population of Asian-Americans. The number of Asian- and Pacific-Americans living in the USA increased from about 800,000 in 1960 to 1,369,000 in 1970 to 3,500,000 in 1980, at which time they comprised 1.5% of the total U.S. population. Their burgeoning numbers were a major factor in steadily growth of the soyfoods industry, since many Asians use soyfoods in their daily diets.

U.S. Soy Sauce and Miso Consumption Grows. Soy sauce consumption grew from about 9,000 kiloliters in 1970 to about 38,000 kl in 1979, a 4.2-fold increase during the decade. In 1974 domestic production passed imports.

U.S. miso consumption grew from about 750 metric tons (tonnes) in 1970 to about 1,800 tonnes in 1979, a 2.4 fold increase.

Shipments of Soy-Fortified Foods in the Food For Peace (P.L. 480) Program jumps. Shipments of two products in 1970 totaled 131,000 tonnes. In 1979 a record 664,000 tonnes of ten products were shipped to needy countries, a 5-fold increase during the decade. In 1979, the main products shipped were SFB (soy-fortified bulgur), CSM (corn-soy-milk), and WSB (wheat-soy blend).

The Ongoing Protein-Versus-Calories Debate. As Nevin Scrimshaw concluded prophetically in his insightful 1977 lecture "Through a Glass Darkly: Discerning the Practical Implications of Human Dietary Protein-Energy Interrelationships": "To the extent that the pendulum swung too far in emphasizing protein in the 1960s, and too far in emphasizing calories in the 1970s, it must come to a more appropriate position for the 1980s and beyond." He noted that two big protein issues concerned (1) human requirements for protein at different ages and physiological states, and (2) the evaluation of the protein quality of foods as related to human requirements.

Reappraisal of the Value of Plant and Animal Proteins. During the late 1960s and early 1970s, animal proteins probably reached their historical peak of popularity in the U.S. A diet rich in animal protein was considered a "better diet." However during the 1970s a growing body of nutritional and ecological evidence, and changing attitudes toward world hunger and animal rights, led to a new appreciation of the quality, now more broadly defined, of plant (and soy) proteins. They were more healthful, less expensive, more efficient in utilizing farmland, energy and water, less polluting, and obviated animal slaughter.

Switch from Animal to Vegetable Oils. In the early 1950s Americans were consuming approximately equal amounts of animal and vegetable fats. By 1978 the ratio of vegetable to animal fat was 84 to 16. The same shift occurred worldwide, where the 1978 ratio was 71 to 29.

There were at least three basic reasons for this shift: (1) The growing concern, especially after 1960, with the health dangers associated with consumption of saturated fats and cholesterol, most of which came from animal fats such as butter and lard; (2) Hydrogenation, which allowed vegetable oils to be used in making substitutes for butter and lard (i.e., margarine and shortening); and (3) the lower price of vegetable oils, shortening, and margarine.

Production of soy oil grew dramatically during the postwar period, filling most of the increased demand for vegetable oil.

Boom Years for U.S. Agriculture. The 1970s was a decade of rapid growth for U.S. farmers. With high inflation and low interest rates, American farm products dominated world trade. The boom ended with the second "Oil Shock" of 1979-80, which set off the most serious recession of the post-war era, and marked the start of the Latin American debt crisis that later had a major negative effect on U.S.

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soybean farmers. 1979 was the last year of roughly 50 years of essentially non-stop, rapid soybean growth. During the next decade, U.S. soybean production zigzagged sideways and declined slightly.

Rapid Increases in Soybean Production in New Third World Countries. Prior to the 1970s, soybeans had never been widely grown in the tropics or semi-tropics (except perhaps in Indonesia). But during this decade a host of countries in such areas started to grow soybeans on a large scale for the first time. Major causes for this were the U.S. soybean boycott of 1973, the pioneering work done by INTSOY in Illinois, IITA in Nigeria, and AVRDC in Taiwan, and the development of day-neutral soybean cultivars that gave high yields at low latitudes. The major areas of rapid new production growth were...

Latin America. Total production increased from 1,746,000 tonnes in 1970 to 15,384,000 tonnes in 1979, an 8.8 fold increase during the decade. Latin America's three leading soybean producers in 1979 were Brazil, Argentina, and Mexico. Brazil's production rose 7.8 fold between 1970 and 1979, but Argentina's jumped 137-fold!

In 1979 soybean production in Latin American passed that in all of Asia, the birthplace of this ancient crop, and became second only to that of North America (61,722,000 tonnes in 1979/80).

In 1974, Brazil passed China to become the world's second largest soybean producing nation after the USA. The ranking in 1979 by tonnage was USA, Brazil, China, Argentina, Mexico, Indonesia, Paraguay, USSR, Romania, India, and North Korea.

Africa: Total production increased from 67,000 tonnes in 1970 to 300,000 tonnes in 1979, a 4.5 fold increase during the decade. By 1979 Egypt had become the largest soybean producing country in Africa, followed by Zimbabwe, Nigeria, and South Africa. This promising growth was doubly important because it came at a time of steadily falling per capita food production in Africa as a whole, down 20% from 1970 to 1987.

India. Total production increased from a mere 18,000 tonnes in 1971 (production was negligible in 1970) to 450,000 tonnes in 1980, an astonishing 25-fold increase in ten years, and a growth rate greater than that of Latin America. Meanwhile, in Asia as a whole soybean production was slowly declining.

893. Tajiri, Takashi. 1979. Mamerui moyashi no seizô to sendo hojisei ni kansuru kenkyû. II. Mamerui moyashi no sendo hoji ni oyobosu chozô ondo to hôsô shizai [Studies on production and keeping quality of bean sprouts. II. Effect of packaging materials and storage temperatures on the keeping quality of bean sprouts]. *Nippon Shokuhin Kogyo Gakkaishi* (*J. of the Japanese Society for Food Science and Technology*) 26(12):542-46. [6 ref. Jap; eng]
• ***Summary:*** The shelf life of soy sprouts, mung bean sprouts, and adzuki bean sprouts was studied in 6 packaging materials. PVDC (Saran Wrap) and PVDC laminated with cellophane were found to be suitable packaging materials. Shelf life at 0-5ºC was 14-15 days for soy sprouts, versus 10-11 days for the other two types of sprouts. Address: Lab. of Food Process, Faculty of Agriculture, Kinki Univ., Kowakae, Higahsi-Osaka, Osaka-fu.

894. **Product Name:** [Green Milk (Soy Milk Beverage), and Hae Pyo Doo Yoo Soymilk].
**Foreign Name:** Green Milk, Hae Pyo Doo Yoo.
**Manufacturer's Name:** Green Milk Co., Subsidiary of Dong Bang Oil and Flour Mills Co., Ltd.
**Manufacturer's Address:** No. 2 Yangpyung-dong 4-ka, Yungdungpo-ku, Seoul, South Korea. Plant at Jin Hae, Kyung Nam.
**Date of Introduction:** 1979.
**New Product–Documentation:** Soya Bluebook. 1981. p. 60.

Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 16, 81-83. Dong Bang, Korea's biggest oilseed crusher, established a subsidiary, Green Milk Co., in 1979 in Seoul to make Green Milk brand soymilk. In 1981 they made an estimated 3,000 tons in four flavors, packaged in cartons, increasing to 5,253 tons in 1983.

895. Han, Bong-Ho; Kim, K-S; Cho, D-J. 1979. [Processing of soy curd powder with soybean and krill]. *Bulletin of the Korean Fisheries Society* 12(3):137-41. [6 ref. Kor; eng]
• ***Summary:*** Soy curd [tofu] was made using the traditional process. The use of 3% glucono-delta-lactone (GDL) at 90ºC gave the highest bulk yield in relation to the crude protein of the tofu. Soy curd powder was prepared by spray drying soybean milk. It was then suspended in water and coagulated by adding GDL at 90ºC. When krill autolysate was dried with the soymilk then made into tofu, coagulated under the same conditions, it produced a softer tofu. Another powder, made by spray drying the mixture of soybean milk, krill autolysate, and GDL could be coagulated by suspending in water, bringing to a boil, then letting it stand at room temperature for 2 minutes.

Note: Krill (*Euphasia superba*) are planktonic crustaceans and larvae that constitute the main food of baleen whales. Address: Dep. of Food Science & Technology, National Fisheries Univ., Busan, Korea.

896. Ko, Tokubo. 1979. Kankoku no hakkô shokuhin [Korean fermented foods]. *Hakko to Kogyo* (*Fermentation and Industry*) 37(3):202-11. [75* ref. Jap]
• ***Summary:*** Shoyu and varieties of miso: 1. Historical background: The major foods used in Korea that contain

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soy are soy sauce (kan jang), soybean miso (doen jang), and red-pepper miso (kochu jang). Also there are jonkutsu jang, tamusu jang (makujang) and jupu jang. The suffix jang is the same as the Chinese chiang and the Japanese hishio, meaning mash. The origins of the varieties of shoyu and miso are not clear. But there was a character, tojang, in "Ronko" which was written by Oju? of the Gokan period. Also, there are some references to jang in the Analects of Confucius (Lun yu; Jap. Rongo). They indicate that jang existed years before Christ. In the "Kaitoyakushi?" there is a quotation from "Shintosho?" (618-907) that "shi" (fermented black soybeans or misodama) was a well known product of Bokkai (north of the Yellow Sea) in those days (Sakueki). It is thought that jang first appeared in Manchuria (Manshu was called Kokuri in those days) where soybeans were originally grown. Soybeans later spread to China and Japan.

In Korea the oldest record of any variety of jang was found in *Sangokushiki* (683) as "shôshi?". This indicates that people were already making shoyu and miso quite early on. In the *Ch'i-min yao-shu* (AD 530-550) a method of shi (or kaki) making was recorded. We guess that shi was the predecessor to today's meju (= misodama). The classic book Kyukosetsuyo? that was compiled in 1554 (Richo? period–Meisoo 9) is the oldest book that contains the techniques for making the Korean varieties of jang. About 8 different methods of production were recorded, amongst them the sink gan (chinjangho) and zojangho methods. In those days, meju (= misodama) was called misho. It is written that they steamed the soybeans, roasted and ground the wheat, then mixed the soy and the wheat in a 2:1 ratio. From this they made koji and dried it in the sun. That method was very similar to the koji-making method used in Japan. In Japan it was called kokori, hishio, or misho. Later, shoyu became known as jang? Miso became massho? and then returned to being called misho. Address: Presently: Tokyo Daigaku Biseibutsu Kenkyusho #3 Kenkyubu. Formerly: Seoul, South Korea. Tokoku Daigaku Shokuhin Kogakubu.

897. Kwon, S.H. 1979. Soybean breeding for selected tropical Asian countries (Indonesia, Malaysia, Philippines, Thailand). Rome, Italy: Food and Agricultural Organization of the United Nations. 25 p. AGPC:MISC/65. [Eng] Address: Head, Radiation Breeding Lab., Korea Atomic Energy Research Inst., Seoul, South Korea.

898. Barer-Stein, Thelma. 1979. You eat what you are: A study of ethnic food traditions. Canada: McClelland & Stewart, Ltd. xii + 13-624 p. Index. 23 cm. [550+* ref]
• ***Summary:*** This is largely a compilation of information from many other books and articles. On the cover is a color painting of The Gardener (or Vertumnus), from his series, The Four Seasons, c. 1590, by Giuseppe Arcimboldo (or Arcimboldi) of Milano.

In Chapter 12, on China, the section titled "Meats and alternates" (p. 110-13) notes that the soybean is called the "Chinese Cow" [sic, "Cow of China"] because of its versatility. Soybeans are used as whole dry beans and as sprouts, or they can be made into a firm white curd called "Chinese cheese" [sic], which can be used in many different ways. Soybean milk may be used in much the same way that westerners use cow's milk. They are fermented to make the favourite condiment, soy sauce. "Bean curd sauce is fermented bean curd that is packed in jars and sold as red bean curd sauce or white bean curd sauce,..." Cantonese names for soy products are (p. 111-12): Mien chiang: A syrup-like sweet bean paste. Dow-foo (tofu). Foo yu (fermented tofu). Tiem jook (dried yuba, broken into pieces [sweet dried yuba sticks]). Wow doo [Wu dou]. Black soybeans. Dow see [doushi, fermented black soybeans]: Salted, fermented black bean paste [sic, fermented black soybeans] often garlic flavoured and used in small amounts as a condiment or seasoning.

In Chapter 30, on Japan, the section titled "Meats and alternates" (p. 336-37) notes that products made from soybeans include: (1) "Shoyu, a sweetish soy sauce made from wheat and barley [sic], soybeans, salt, and water." (2) Miso, or "fermented soybean paste," used mostly for flavouring soups [miso soup]. (3) Tofu, or soybean curd, is a staple in Japanese cookery. "Its smooth, custard-like texture and bland flavour make it an ideal ingredient. It is extremely versatile and readily absorbs other flavours. Many "restaurants in Japan take great pride in their tofu dishes."

In Chapter 31, on Korea, the section titled "Fruits and vegetables" (p. 350-51) discusses soybeans and their products at length. Soy sauce is used to season *kim* (nori) and other edible seaweeds. Soy sauce is an ingredient in "hot pepper mash" [*kochu jang*]. Soybeans are used to make "soybean mash" [*doen jang*]. Dry soybeans are roasted in an iron pot, then ground, and the roasted soy flour is used as a garnish over rice cakes [mochi] or plain cooked rice; children enjoy eating the coarser roasted bits that are sifted out of roasted flour or meal. Soybeans sprouts are eaten lightly cooked as a vegetable. Soybeans are also made into tofu (*tu bu*)*;* a brief description of the process is given, in which the drained curds are left in their hemp bag to form a firm cake, which may be cut, dipped into soy sauce, or fried in sesame oil. "Oil can also be made from the soybeans, but it is not commonly used or prepared."

Although commercial soy sauce, made in factories, is now widely available, many Korean households still prepare their own soy sauce each fall. Boiled soybeans are pounded, molded into a cone shape, and set to dry until hard. They are then wrapped with rice straw, hung from eves, rafters or ceilings, and allowed to ferment for several weeks [until they become *meju*]. During the winter, these fermented cones may be stored in huge rice-straw bags kept in a cool place.

In the spring, break the cone into small pieces and place in a large earthenware jar, nearly filled with water. Add salt,

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spices, red peppers, and a few charcoal lumps. Leave this in the sun for a few days [sic, 30-60 days] until the molded soybean chunks float to the top and the resulting liquid turns black. Ladle out and filter the black liquid, then boil it to make soy sauce. The solids remaining in the jar are used as soybean mash [after the charcoal is removed].

A portrait photo of the author, with a brief biography, appear on the back cover and in the Introduction. Address: Ph.D. student, Ontario Inst. for Studies in Education, Toronto, Ontario, Canada.

899. Jansen, G. Richard; Harper, Judson M. 1979. Application of low-cost extrusion cooking to weaning foods in feeding programs. Fort Collins, Colorado: Dept. of Agricultural and Chemical Engineering. 43 p. Illust. 28 cm. [31 ref]

• ***Summary:*** Introduction: Background, food extrusion, alternative extrusion systems (low cost extrusion cookers), objectives of the LEC program (at Colorado State Univ.). Description of food products: Blended foods (such as CSB or corn/soy blend), full-fat soy flour, full-fat cottonseed flour, costs of processing. Current applications in developing countries: Sri Lanka and Thriposha, Costa Rica, Tanzania and Lisha, Guyana and Cerex, other countries (Guatemala, Honduras, Korea, India, Indonesia, Philippines, Thailand). Commercial applications: Pro-Nutre in Costa Rica, Maisoy in Bolivia, Ciatech in Mexico. Nutritional issues: Calories, protein-calorie ratio, fiber, vitamins and minerals, impact of supplemental food in Sri Lanka. Significant aspects of development: Technology transfer, funding, raw material aspects, quality control, packaging, storage and distribution, implementation and evaluation. Conclusions.

"The concept of adapting low-cost extruders to the production of low cost weaning foods in developing countries was originated by Mr. Paul R. Crowley, USDA, and the program has been under his general guidance since that time."

Tanzania: The Tanzanian Government decided to locate a weaning food plant at the National Milling Corporation in Dar es Salaam. "With assistance from Colorado State University, an LEC plant (fig. 4) went into production in May 1978, and since then has been continuously making CSM by extruding a corn soy mixture and blending in milk solids, vitamins and minerals." Named Lisha, the product is distributed to Maternal and Child Health (MCH) Centers under the auspices of the MInistry of Health. It is intended to augment CSM imported into Tanzania under the Food for Peace Program (p. 13).

"CIATECH of Chihuahua, Mexico, has designed an LEC full-fat soy processing plant at Delicious, S.A., an agricultural cooperative. The product is being sold commercially to bakeries as an egg solids replacer in small bags through retail grocery channels and as a major ingredient in a frozen ice cream like product" (p. 20).

Note: Also published as an article in *Food and Nutrition* 1980; 6(1):2-9 and 6(2):15-23. Address: Colorado State Univ.

900. Wang, Hwa L.; Hesseltine, C.W. 1979. Mold-modified foods. In: H.J. Peppler and D. Perlman, eds. 1979. Microbial Technology. 2nd ed. Vol. 2. Fermentation Technology. New York: Academic Press. 544 p. See Vol. 1, p. 95-129. [90 ref]

• ***Summary:*** Volume 1. Microbial processes. Volume 2. Fermentation technology. Contents: 1. Introduction. 2. Soy sauce. 3. Miso. 4. Hamanatto. 5. Sufu [fermented tofu]. 6. Tempeh. 7. Ang-kak (red rice, used as a color agent). 8. Absence of mycotoxins in fermented foods. 9. Conclusions.

For each food is given: General description, method of preparation, composition [chemical / nutritional]. In addition for tempeh is given: Tempeh-like products, biochemistry and physiology of *Rhizopus oligosporus*, changes occurring during fermentation, nutritional value.

"Soy sauce "is known as chiang-yu on China, shoyu in Japan, kecap in Indonesia, kanjang in Korea, toyo in the Philippines, and see-iew in Thailand. In the Western World the product is often referred to as soy sauce." Japan is the leader worldwide in sauce production; it has the largest fermentation plant and uses the most advanced technology.

Hamanatto: Products similar to Japan's hamanatto are known as tou-shih in China, tao-si in the Philippines, and tao-tjo [sic] in the East Indies [Indonesia]. A typical process for making hamanatto in Japan, based on information supplied by Dr. T. Kaneko of Nagoya Univ., Japan, is as follows: Wash soybeans, then soak, steam until soft, drain, and cool. Mix with parched wheat flour in the ratio of 2 parts soybeans to 1 part flour. Inoculate the soybeans with a short- or medium-stalked strain of *Aspergillus oryzae*. Incubate for 1-2 days until the beans are covered with a fragrant mycelium and have become soybean koji. Pack the soybeans in a container [wooden keg] with (for example) 2.5 kg soybean koji, 650 gm salt, 3.6 liters water and some freshly sliced gingerroot. Cover the container tightly and age under pressure for 6-12 months. Remove beans from liquid and dry them in the sun to give hamanatto. The composition of the brine may differ among manufacturers.; thus the finished hamanatto differs somewhat in taste and appearance. "Japanese hamanatto is rather soft, having a high moisture content. Chinese tou-shih has a much lower moisture content... and therefore is not so soft. Tao-tjo tends to have a sweet taste because sugar is often added to the brine."

Shoyu in Japan: Although there are more than 4,000 shoyu makers in Japan, the largest 4-5 companies produce about 50% of the total.

Note: A wide variety of dairy cheeses, especially those of French origin, are made with surface mold growth. Typical varieties are Camembert, Coulommiers, and Brie. Address: Northern Regional Research Center, Peoria, Illinois.

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901. Scourtes, Mary D. 1980. You can dine Korean-style in Tampa. *Tampa Tribune* (*The*) (*Tampa, Florida*). Jan. 10. p. 73, 77 (p. E1, E5).
• ***Summary:*** Tampa has its first Korean restaurant named Madame Butterfly at 3715 West Cypress St. It is actually half Japanese and half Korean. "Both countries serve meals on 10-inch tall lacquer-finished tables. They remove their shoes and sit on cushions [on the floor] while eating. In both countries all foods are served at the same time, rather than in courses."

"Koreans eat sashimi too, but serve it with vegetables and a hot bean sauce called kochujang made with vinegar, sesame oil, garlic and a dash of sugar." Address: Tribune food writer.

902. White, Jim. 1980. Close encounter of the tofu kind: A white custardy thing zooms out of the Orient onto your lunch counter. *Toronto Star* (*Ontario, Canada*). Jan. 18. Family section.
• ***Summary:*** This full-page feature states: "Brace yourself, Toronto, for the experience, because there's every indication tofu's going to do more than hover on the horizon like a fleet of sci-fi spacecraft." Victor Food Products in Scarborough [a suburb of Ontario] says that sales of tofu have nearly tripled in one year, from 720 lb/day to more than 1,900 lb/day. Shoppers can now buy tofu in selected Dominion, Lowlaws, Miracle Mart, and A&P outlets. "When the big boys take a bite of the action, you know something is cooking."

The article includes a listing of tofu makers and retailers in the Toronto area. Makers: (1) Pyung Hwa Co., 2139 Dundas St. W. Jhasun Koo. Phone: 534-0237. Korean-style tofu. Firm, 10-oz. cakes cost $0.55. (2) Wah Chong Co., 88 Ossington. Phone: 532-0841. Chinese style. $1.20/dozen. (3) Yet Sing Co., 11 Baldwin St. Phone: 863-0818. Custardy tofu. $0.70/dozen. (4) Victor Food Products. A photo shows Stephen Yu, standing with has packaged tofu and soymilk products.

Paul Smith, owner of Baldwin St. Natural Foods, runs a small night class once a month on making tofu. Branson Hospital (Seventh-day Adventist) has been serving vegetarian meals to patients for 22 years. Much of the protein comes from soyamilk, soya curd, and other soya products. Interest in tofu has been spread by the publication of *The Book of Tofu*, by William Shurtleff and Akiko Aoyagi.

Note: This is the earliest published document seen (Aug. 2019) about Victor Food Products of Scarborough. Address: Star Food Writer.

903. *Soycraft* (*Colrain, Massachusetts*). 1980. Soybeans for sprouting [from Rodale Press' Organic Gardening & Research Center]. 1(2):9. Winter.
• ***Summary:*** "Those who have sprouted soybeans, at home or commercially, have probably noted that they tend to be more problematical to sprout than other smaller seeds. Partly in recognition of this difficulty, and pursuing the possibility that raw soybeans may have a cancer inhibitory effect, the Organic Gardening and Farming Research Center in Kutztown, Pennsylvania, is actively developing lines of small-seeded soybeans suitable for home or commercial sprouting. The following report was submitted by Anne Duncan Edwards, researcher for Rodale Press:

"We feel that the soybean has potential as a sprouting bean because of its high nutritional value, its ease of cultivation, and its range of climatic adaptability. Varietal selection now needs to be researched for type suitability. The small-seeded soybean plots here are made up of yield trials and seed increases for some of our more promising sprouting soybean types. These varieties were chosen from 111 different soybeans grown in 1978 that included varieties from Korea, Indonesia, Taiwan, and the United States.

"Size is one important factor considered in the evaluation of these soybeans for sprouting purposes. Differences among varieties can easily be seen by observing the weight (in grams) of 100 beans of each type. Corsoy, a commercial bean, weighs between 17 and 19 grams per 100 seeds. Varieties being considered for sprouting include: No. 11, Korean, 6-10 gms; No. 46, USA, 5-6 gms; No. 48, USA, 8-9 gms; No. 17, Korea, 9-11 gms. Also considered is attractiveness, taste, and agronomic characteristics. Results of last year's yield trials are not yet available, but many of the beans set large numbers of well-filled pods.

"The soybean project for next season is being expanded to include sprouting bean, vegetable bean, and tofu bean variety trials. Our plot work will be closely linked to the Test Kitchen in Emmaus, where taste testing, recipe formulation, and suitability for tofu-making will be analyzed. We hope to add many more varieties to our collection for next year's research and are currently in the midst of a search for suitable types.

"For more information write: Organic Gardening & Research Center, P.O. Box 323, RD 1, Kutztown, PA 19530."

904. Meals for Millions / Freedom from Hunger Foundation. 1980. Annual report 1979: A commitment to self-help for a hungry world. Santa Monica, California: MFM Foundation. 16 panels. Each 9 x 22 cm. March.
• ***Summary:*** Peter J. Davies is president; he works at the New York office. Alfred C. Bartholomew, Ph.D., D.D., is chairman of the board of trustees and executive committee. On the green, black and white cover is a photo of a two children. MFM's logo of a plant growing in an upturned bowl is at the bottom of the cover.

Contents: Message from the president. Overseas programs: Ecuador, Honduras, Caribbean (Barbados, Jamaica), India, Korea ("The new food processing plant in Wonseong County was dedicated on March 31, 1979 and began processing a high protein, vitamin and mineral

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enriched snack food called Wooryang-a for young children") Philippines. Transfer of technology. Multi-Purpose Food (small quantities sent to Haiti, Brazil). Domestic programs: Papago Indians, Tucson seed bank [Arizona], urban community gardens, reaching the youngest ("Anti-junk food Public Service Announcements were widely aired on radio and TV during National Nutrition Week, March 5-9, 1979 and throughout the following months), reaching the oldest ("through the Healthy Lifestyles for Seniors program in Santa Monica and Active Wellness in Tucson..."). Training in food and nutrition (Training school, nutrition training in Central America, Fiji). Research and development (leaf protein). Resource center. Highlights of 1979 ("Early in 1979, we were asked by the American Freedom from Hunger Foundation to assume their limited remaining assets. Our Board supported the move... Freedom from Hunger is perhaps a more apt description of our role today than Meals for Millions, a name by which we have become well known to many of you. We are considering a name change to MFM / Freedom from Hunger Foundation. Is it a good idea?"). Financial highlights: Contributions from nearly all sources amounted to $1.295 million in 1979, up from $1 million in 1978. Individual donors across the country provided the largest share (36.7%), followed by US AID (23.2%), foundations (22.3%), churches 8.7%, host governments 5.4%, etc. The many agencies that made generous grants are listed. Where the money goes: Program services 75.0%, administration 10.2%, public support [fund raising] 14.8%. Total expenses: $1.278 million. National Committee of Sponsors. Board of Trustees and executive committee. MFM officers. Address: 1. 1800 Olympic Boulevard (P.O. Box 680), Santa Monica, California 90406; 2. 815 Second Ave., Suite 501, New York City, NY 10017. Phone: (213) 829-5337 or (212) 986-4170.

905. Edwards, Anne Duncan; Hirsch, Anita. 1980. Sprouting soybeans. *Rodale Research Report* (*Emmaus, Pennsylvania*) No. 80-5. 9 p. April. [5 ref]
• ***Summary:*** Small-seeded soybeans, weighing less than 10 grams per 100 beans, can be used to make highly nutritious and tasty sprouts. Research at the Organic Gardening and Farming Research Center (conducted from May 1978 to Nov. 1979) has led to the selection of the five most promising varieties from 209 accessions tested. Tables show: (1) Soybeans tested for sprouting. For each is given: Accession number, seed source, maturity group, pedigree/variety. (2) Top five soybeans with potential as sprouts. For each is given: Accession number, origin/source (The source of four of these was Korea), pedigree name, grams/100 seed (ranges from 5.5 to 9.1), yield on farm (kg/ha; ranges from 1,681 to 1,524), flower color, kitchen germination percentage (ranges from 80% to 100%), average length (ranges from 1.62 to 3.18 inches). Raw taste (acceptable or good). Address: 1. New Crops Section; 2. Rodale Test Kitchen. Both: Emmaus, Pennsylvania.

906. Harrison, Kelly. 1980. Promotion important to sustain U.S. soybean efforts. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). April. p. 19.
• ***Summary:*** "We are still assessing the short- and long-term impacts of the President's suspension of soybean exports to the Soviets, as a result of their aggression in Afghanistan... "Our more mature markets in developed countries seem to be indicating a slower growth trend. Our sales success in developed foreign markets has led to increased competition from other soybean exporters such as Brazil and Argentina. Thus, to maintain our foreign market sales growth in the years ahead, a larger share of U.S. exports must be to emerging growth markets such as Korea and Mexico." Address: General Sales Manager and Associate Administrator, Foreign Agricultural Service.

907. Hesseltine, C.W.; Wang, H.L. 1980. The importance of traditional fermented foods. *BioScience* 30(6):402-04. June. [12 ref]
• ***Summary:*** Table 1 gives, for each food, the name, area or country, microorganism used, substrate, nature and uses. The following soy-related foods are included: Soy sauce (chiang-yu, shoyu, toyo, kanjang, kecap, see-ieu), miso (chiang, doenjang, soybean paste, tauco), Hamanatto (toushih, tao-si, tao-tjo [sic, tao-tjo = tauco is Indonesian-style miso]), sufu (fu-ru, fu-ju, tou-fu-ju, bean cake, Chinese cheese), tempeh, bongkrek, ontjom (oncom), natto. Address: Northern Regional Research Center, Peoria, Illinois.

908. United Press International (UPI). 1980. Tofu–Food that mixes with almost anything. *Journal Star* (*Peoria, Illinois*). July 7.
• ***Summary:*** This article begins: "Remember the lovable schmoo in Al Capp's Dogpatch comic strip–the critter that could turn itself into the most succulent dish or almost anything else? The oriental version of the schmoo could be tofu (toe-foo)." Lee L. Lee, tofu manufacturer and owner of Tofu, Inc. in Roseville, a suburb of Minneapolis, says tofu can be used to make anything from appetizers to desserts. He considers tofu the perfect health food. Lee came to the USA from Korea in 1963. His handmade tofu began to sell well in about 1975. In 1977, when one woman started buying ten pounds at a time, he bought Japanese equipment to mass produce the product. By April 1978 his production has reached 2,000 lb/week, rising to 13,000 lb/week by Jan. 1980. His tofu retails for $0.90 to $1.00 a pound.

909. Lukoskie, Suni. 1980. Popular Korean soy sprout recipes (Interview). *SoyaScan Notes.* July 9-13. Interview conducted by W. Shurtleff of Soyfoods Center.
• ***Summary:*** Suni's sister-in-law is a gourmet Korean cook.

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The recipes are listed here in order of popularity: Clear and hot soy sprout soup (*Kongnamul kuk*). Cooked soy sprout salad (*Kongnamul*). Soy sprouts atop rice (*Kongnamul pap*). Ingredients (but not amounts) and the method of preparation are given for each recipe. Address: Island Spring, P.O. Box 747, Vashon, Washington 98070. Phone: 206-622-6448.

910. **Product Name:** Tofu, and Soymilk.
**Manufacturer's Name:** Jack and the Beanstalk.
**Manufacturer's Address:** Buckeye Building, 65 W. Carmel Valley Rd. (P.O. Box 525), Carmel Valley, CA 93924. Phone: 408-659-4366.
**Date of Introduction:** 1980 July.
**How Stored:** Refrigerated.
**New Product–Documentation:** Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. The owners are Paula and Nobukatsu Terui. Bill and Akiko Shurtleff visited them and stayed overnight at their home in the Carmel Valley at about the time they started production.

Michael Shedlin. 1985. Monterey Life. Feb. p. 12 "Tofu: That chameleon of the food world." Buck and Leslie Patton, owners of Jack and the Beanstalk, make tofu in Carmel Valley Village. They make 1,700 lb/week of nigari tofu.

Letter announcing sale of business. 1985. "Jack and the Beanstalk began manufacturing tofu in July 1980. Leslie and Buck Patton bought the business in May 1983. It is the only tofu manufacturer in Monterey County. Current tofu production is 1,800 to 2,000 lb/week. Soymilk production is about 15 gallons a week [it is not clear when soymilk production started]. Sale price is $50,000. The gross income grew from $43,705 in 1981 to $81,000 in 1985, when profit was $13,100."

Talk with Russel Hicks of Sweet Earth. 1991. Jan. 31. His company now buys its tofu from Jack and the Beanstalk, which is located in Salinas.

Talk with Albert Park, owner. 1991. Feb. 1. The company, whose name has not changed, is now located at 401 Victor Way, Suite 16, Salinas, California 93907. The previous owner, Mr. Hun Kim, moved it to that location from Carmel Valley about 5 years ago. Both Mr. Kim and Mr. Park are Korean-Americans. The company now makes only 3 products: tofu, soymilk, and soybean sprouts. It is a very small business that makes 1,500 to 1,700 lb/week of tofu.

911. Leviton, Richard. 1980. Soyfoods in Toronto. *Soyfoods* 1(3):14-19. Summer.
• ***Summary:*** Discusses Vital Eat, Pyung Hwa, Soy City Foods, and Victor Food Products. Victor Food products (102 Hymus Rd., Scarborough, Ontario, Canada M1L 2C9) was founded and is owned and managed by Mr. Stephen Yu. In the 3,600 square foot tofu factory, 13 workers (mostly Vietnamese refugees) produce 1,900 lb/day of tofu, 750 gallons/week of Nutrisoya soymilk, and about 200 quarts/day of kinugoshi soybean pudding. Mr. Yu, who was born in China and educated in California, came to Toronto in 1977 to make an initial market survey. He opened his plant in Feb. 1978, with an initial production of 900 lb/day. Mr. Yu now has accounts in all major Toronto supermarket chains. He reaches about 40% of the Oriental market and about 40% of the overall soyfoods market. He speaks fluent English and is "far more forward looking and market conscious than his Oriental competitors in the Toronto area." His production process and equipment are described in detail. Last summer he appeared on a 10-minute television feature that depicted the story of soybeans from field to shop to table. This was followed, in Jan. 1980, by a major article which profiled his company in the *Toronto Star.* This publicity ushered his tofu into the three big supermarket chains not yet carrying it and sales in the four chains that were rose 100%. Note: This is the earliest document seen (April 2001) that mentions Victor Food Products in Canada.

Soy City Foods, at 2847 Dundas St., is a new soy production site due to open in the spring. Pat Guardino is general manager and Leonard Bugyra is sales manager. The company is a subsidiary of Golden Age, Inc., a spiritual group which operates a successful vegetarian restaurant downtown and is currently installing a second one next door. The company will start by producing about 600 lb/day of tofu, as well as soymilk and soysage. They will supply their contiguous restaurant and sell bulk soyfoods from their own retail counter in the storefront. They will also produce tofu cheesecakes and okara cookies in the restaurant.

Photos show: (1) Soy City Foods and its owners (incl. Pat Guardino) under the storefront sign. (2) Pyung Hwa Tofu Shop, with cakes of tofu cooling in a bathtub. (3) Stephen Yu of Victor Food Products with Nutrisoya soymilk. Address: Colrain, Massachusetts.

912. Leviton, Richard. 1980. Effective soyfoods marketing: "We want to do for tofu what flavors did for yogurt." *Soyfoods* 1(3):46-51. Summer.
• ***Summary:*** Discusses the tofu marketing strategies of: (1) Steve Demos at White Wave Soyfoods (Boulder, Colorado); (2) John Paino of Nasoya Foods (Leominster, Massachusetts). Nasoya makes four tofu spreads and a tofu mayonnaise; (3) Luke Lukoskie of Island Spring, Inc. (Vashon, Washington). Each week the company produces 10,000 lb of tofu, five flavors of Soyfreeze (soymilk ice cream), soyloaf, tempeh, soymilk, and spicy Korean tofu; (4) Madeline Fox, director of Marketing at the New England Soy Dairy (Greenfield, Massachusetts).

Page 47-48: "White Wave Soyfoods of Boulder, Colorado, produces 7500 pounds of tofu and tofu products weekly and operates a bustling take-out soy deli in downtown Boulder. Company manager Steve Demos wants to penetrate the 25-45 year old market and to grab a share

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of the 2 million consumers in his immediate market area. In his view the natural foods market attracts only a minority of the real numbers of potential customers; if you reach only 1 percent of the clientele of a supermarket, you have still touched an enormous group, whereas a market penetration of 15 percent in the natural foods community represents a far smaller volume. One Denver supermarket, for example, currently moves 2000 pounds of White Wave tofu every week. White Wave's market goal is to reach 2 percent of the public in their market reach, a feat which would boost their sales, Mr. Demos estimates, to 20,000 pounds a week.

"Steve Demos emphasizes the need for a tight, coherent marketing package presentable to the supermarket purchasers, Soycraft companies should demonstrate their commitment to help the stores sell their soy products; they shouldn't just deliver tofu and leave quietly. White Wave provides recipe pads, point-of-purchase banners, in-store product demonstrations, and conducts local radio ads geared to supermarket sales. Mr. Demos cites an instance of working cooperatively with a supermarket in developing their market for tofu. King's Supermarket, the largest chain in Colorado, has a monthly Board of Directors meeting in which the food buyers present new foods for consideration. The produce buyer contacted White Wave for help; White Wave developed a product prospectus, provided heat-and-serve convenience soy-foods, and prompted the buyer in answering the expected questions. This worked nicely, and today King's 'plugs real hard and shows strong upward growth patterns,' Mr. Demos comments.

"White Wave works creatively to make tofu seem as if it were already familiar to their mainstream skeptical shoppers. Until recently, their tofu was not in the dairy section, but with the produce instead, mainly because the stores' profit mark-up on dairy is lower and, curiously, the familiarity of packaged tofu in the produce section has been established. As a remedy, White Wave has introduced two tofu packages, one graphic approach for each section. 'We want to make tofu look like it's been here for the last 15 years,' Mr. Demos remarks, 'as if it were an everyday product, like cheese or yogurt. We'll work on the familiarity of what's already there, such as vacuum sealing.' In conjunction with an ad agency and a freelance graphic artist (with experience in promoting herbal teas and yogurt), White Wave is striving to latch on to that 'uniformity in American packages, in color, shape, and phrasing. Then, people reading our tofu package will feel like they're reading the outside of a margarine package.'

"White Wave has taken their promotional campaign to the air waves, by trying to attract listeners and customers through humorous verbal vignettes. 'We want to show we are an established, professional company, one that people should know about. At a later stage we'll highlight the product advantages. We have to be practical in attracting Americans. They're convenience-oriented and often need 'spoon feeding.' We design our recipes around convenience and staple foods.' Radio ads, Mr. Demos admits, are expensive, and a company should monitor their results carefully. 'You should see immediate results, yet you need to develop an evolving program for the long run, as you develop the market. One 30-second spot can't create the whole market.' As a bottom-line measure of effectiveness, White Wave requires a 10 percent increase in sales for each ad campaign.

"Their soy deli, formerly called the Cow of China in recognition of the Oriental term for the soybean, has been renamed the Good Belly Deli. The soy deli is a wonderful showcase for the diversity of delicious soy products, ready-to-eat and take home, or 'real food, real fast,' as their slogan boasts. 'It's attracting coats-and-ties these days too,' Mr. Demos notes approvingly. 'The Cow concept appealed to too small a market. We redesigned our image and moved toward prepared soy-foods. So people can connect with this place, we're making it seem more familiar. If we give them what they want, a familiar dish, say, then they'll experiment and get a side dish of something unfamiliar and new to them. We have a very cautious and conservative public. We need to see insightfully what they are accustomed to, then match it. Maybe we have to use standard meat dishes with soy in them, as in hamburger or chicken extender recipes. It's a weaning process where we have to second-guess the public. The burden of our industry is to create the market. In four months I may have a different approach.'"

Photos show: (1) Tom Timmins (rear view) addressing a soyfoods press conference audience in Boston. (2) A waiter in a black bow tie setting up the tofu buffet at the Seventh Inn.

Note: This is an earliest document seen (June 2019) comparing the marketing of tofu to that of yogurt (the dairy product) in the title. Address: Colrain, Massachusetts.

913. Thalman, Margaret Morse. 1980. Re: William J. Morse, her father, and their trip to East Asia. Letter to William Shurtleff at Soyfoods Center, Sept. 23. 3 p. Handwritten.
• ***Summary:*** "Here is our itinerary after leaving Dairen [today's Dalian, Manchuria], Aug. 20, 1930.

Aug. 22–Arrive Heijo, Korea (Pyongyang).
Sept. 17–Leave Heijo for Seoul.
Sept. 21–Leave Seoul for Heijo.
Sept. 25–Leave Heijo.
Sept. 29–Arrive Mukden, Manchuria.
Oct. 1–Kungchuling.
Oct. 4–Arrive Dairen.
Oct. 19–Leave Dairen.
Oct. 20–Arrive Peiping, China.
Nov. 9–Leave Peiping.
Nov. 10–Arrive Dairen.
Dec. 18–Leave Dairen (by ship).
Dec. 21–Arrive Kobe, Japan.
Dec. 22–Nara & Kyoto.
Dec. 23–Leave Kyoto (8 a.m.). Arrive Tokyo (5 p.m.).

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1931–Remained in Tokyo until...
Feb. 17–Left Tokyo.
Feb. 26–Arrive Honolulu, Hawaii.
March 4–Arrive San Francisco, USA.

"Discovered another small notebook that my father had kept from Feb. 18, 1929 to Oct. 6, 1929. On Feb. 23 he wrote:

"'In the afternoon went to Vitacolor Motion Picture Lab where we saw the new Vitacolor motion pictures which were excellent. Had a long talk with Mr. Dupont, the inventor.

"'Feb. 25–In the afternoon went to Vitacolor Lab to see colored movies taken by Mr. Dorsett. Obtained our colored motion stuff and bid goodbye to Mr. Dupont.'"

"In Tokyo, Hokkaido and Dairen they rented offices, set up darkrooms and developed their own still and motion picture films.

"Mr. Beattie was interested in chestnut blight. Mr. and Mrs. Beattie met us when we first arrived in Tokyo and were very helpful in showing us around the city.

"Mr. Dorsett's main interest was in persimmons." Address: 22 Interlaken Rd., Eastchester, New York 10709.

914. Weiss, Martin G. 1980. Re: Recollections of William Morse and work with soybeans. Letter to William Shurtleff at Soyfoods Center, Sept. 26. 3 p. Typed, with signature.
• ***Summary:*** "As I told you by phone, I discussed your need for information regarding Mr. W.J. Morse with Dr. E.E. Hartwig, Stoneville, Mississippi,... and he sent a series of papers on the history of soybean development and improvement in the U.S. over the past 50 years. Dr. Hartwig wrote the first paper.

"Dr. Hartwig states that W.J. Morse began his work with USDA in 1907. I can recall him describing some of his activities starting in about 1912... soybeans introduced to the U.S. in earlier times were mostly adapted to our southern states and were mostly grown for hay. But a few varieties were also good producers of beans, as proven in W.J.'s test plots at Arlington Farm (land on which the Pentagon is now standing [in Virginia]). After the seed of these varieties was increased adequately, W.J. told how he would take a few large bags and head for the Carolinas via train. Upon arrival he would go to a livery stable and rent a spring wagon and horses, and set forth across the countryside.

"When he observed a farmer in the fields planting corn or hay-type soybeans, he would tether his horses to a post, climb over the fence and visit with the farmer. If interested, he would give the farmer enough seed to plant a few rows to determine their productivity. That was the beginning of growing soybeans for beans rather than hay. At first, the soybeans were fed directly to livestock, as there were no oil-extraction plants adapted for soybeans. Troubles ensued. The high level of unsaturated oil in the beans was laid down in the fat of hogs and gave 'soft pork.' But cottonseed crushing and oil extraction was practiced in the South and soon adapted for soybeans as their production was increased.

"Hartwig mentions that testing of soybeans and some of the other seed legumes (cowpeas, mung beans, etc.) was conducted at Monetta, South Carolina. This was the result of W.J.'s finding the [Joseph M.] Johnson family very interested in these new crops and highly cooperative. The family consisted of a brother and two sisters, and a colored man who did most of the field work. By the time I succeeded W.J. (Jan. 1, 1950) the brother and colored man had passed away but I learned to know Bessie and Mae–a delightful pair of southern ladies who continued their interest and still wanted test plots on their farm. (Mae is now deceased but Bessie is still living although, I hear, in poor health). Our research workers stationed at Raleigh, North Carolina, continued for some time to use their farm as a test site. As the Hartwig article describes, Mr. Dorsett, a plant explorer, introduced a number of soybean types from the Orient. It became evident in the late 1920's that soybeans had distinct promise in the U.S. so in each of two years (1929 and 1930, I believe) a team–Mr. Dorsett and W.J. Morse (the soybean "expert") conducted extensive, systematic collection trips, particularly in northern China, known as Manchuria at that time. I'm sure W J. considered this the highlight of his career. He took many photos of fields, harvesting and processing operations. He described this collection effort to me as being a bonanza so far as obtaining a diversity of germ plasm.

"Each village they visited had three or four distinct varieties–one or two for oilseed production, a large seeded type to produce soybean sprouts, a mild flavored type for green vegetable production, etc. And, unlike American farmers, they didn't look across the fence and decide the adjacent village had a better variety and start growing it–that would be sacrilegious! The varieties they grew had been handed down by their honorable ancestors and they wouldn't dream of growing a variety handed down by some else's ancestors! And this practice had been followed for many generations. A true bonanza for a germ plasm collector. So more than four thousand collections were made and sent to the U.S. For the sake of completeness Dorsett and W.J. also collected in Japan and Korea, but these varieties were mostly of the vegetable types.

"The numerous collections were grown in 1932 at a branch station at Holgate, Ohio, by J.L. Cartter, W.J.'s only professional employee at that time, and a technician, Joe D. Vasvery (who is retired, lives near me, and is my fast friend). The varieties which showed agronomic promise were again grown in 1934. As the Hartwig article describes, the U.S. Regional Soybean Laboratory was founded in 1936 with headquarters at the University of Illinois. Fresh with an MS degree in genetics and plant breeding, I became its first full-time field employee, located at Iowa State University. Part-time employees stationed at the University of Illinois and Purdue [West Lafayette, Indiana] were made full-time upon completion of advanced degrees and somewhat later

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the Ohio employee became full-time. Mr. Cartter and Mr. Vasvery were transferred from Holgate to Urbana, Illinois. And they told us of the extensive collections, seed of which was stored in paper bags in the attic of a barn at Holgate. So, the samples were brought to Urbana.

"This part of my dialogue does not pertain particularly to W.J. I will insert it only as background of the early soybean development which was under W.J.'s direction. In early 1937 the assembled field representatives of the Laboratory pored through these collections and each took a sample of seed of those varieties he wished to grow. With my background in genetics, I had a mania for genetic diversity, so I took a sample of each one. But the seed was 5 years old and the high oil content of soybeans causes rapid deterioration of germination. So many of the 1932-grown samples germinated as little as l%, and a few gave no germination at all. But, after 2 years of increase I had over 3,000 types! Success story? But wait. Then came World War II and Uncle Sam decided my commission in the artillery reserves was needed more than my plant breeding skills. And labor was extremely scarce at the Agricultural Experiment Stations. So my seed aged. In 1946, I tried to revive the varieties, but could get germination of less than 1500. But those are in today's germ plasm bank. But how many genes giving resistance to new pests and diseases, which breeders are frantically searching for now, went down the drain? That's why, when I succeeded W.J., I initiated the soybean germ plasm bank!" Continued. Address: 11122 Emack Rd., Beltsville, Maryland 20705.

915. **Product Name:** Tofu.
**Manufacturer's Name:** Midwest Oriental Foods.
**Manufacturer's Address:** 8243 Hascall, Omaha, NE 68124. Phone: 402-391-7730.
**Date of Introduction:** 1980 September.
**How Stored:** Refrigerated.
**New Product–Documentation:** Soyfoods Center. 1980. Sept. Tofu shops and soy dairies in the West (2 pages, typeset). Gives the company's name, address, and phone number. Owner: Mr. Kim.

916. *Soya Bluebook.* 1980-1994. Serial/periodical. St. Louis, Missouri: American Soybean Assoc.
• ***Summary:*** A directory and information book (general and statistical) for the soybean production and processing.

Titled *Soybean Blue Book* from 1947-1964; *Soybean Digest Blue Book Issue* from March 1965 to March 1972; *Soybean Digest Blue Book* from March 1973 to 1979; *Soya Bluebook* from 1980 to 1994.

In 1987 the *Soya Bluebook* contained seven major sections: Organizations (incl. Associations), Soy Directory (Crushers, Soyfoods, Industrial Products), Soybean Manufacturing Support Industries, Marketing and Auxiliary Services, Soy Statistics, Glossary, Standards and Specifications. Well indexed, with color maps. In the early 1980s the Bluebook started to include many more foreign soyfood manufacturers.

The book contains many tables, including: "World Soybean Production," which gives area and production in specified countries (1974-1980). In 1980 this included: North America: Canada, Mexico, United States. South America: Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay. Europe: Bulgaria, France, Hungary, Romania, Spain, Yugoslavia. Soviet Union. Africa: Egypt, Ethiopia, Nigeria, South Africa, Tanzania, Uganda, Zaire. Asia: Burma, China (Mainland), Taiwan, India, Indonesia, Iran, Japan, Kampuchea [Cambodia], Korea (north), Korea (South), Philippines, Thailand, Turkey, Vietnam. Oceania: Australia. World total.

In early 1988 the American Soybean Association sold the *Soya Bluebook* to Soyatech, owned by Peter Golbitz. His first print run was 8,800 copies. Yellow pages were added. In Dec. 1989 Soyatech announced that in 1988 estimated readership was 10,265 in 55 countries. 33.6% of the buyers were soybean processors / manufacturers, 28.7% were importers, exporters, transporters or marketers, 15.0% were suppliers of soybean processing or handling equipment and manufacturing support services, 9.9% were consultants, booksellers, or periodicals, 8.7% were organization or government agencies, and 4.1% were colleges, universities, libraries, and information centers. By region, 64.3% were sold in North America, 15.2% in Europe, 9.1% in Asia / Pacific / Oceania, and 9.1% in Latin America.

The 1991 Soya Bluebook appeared in Aug. with a new larger (8½ by 11-inch) format and 264 pages. The indexing system is more complete and the pages are tabbed for easy access to each section. The "reference" section was expanded by adding nutritional information on soyfoods, a new chart of soyfoods products, and soybean oil trading standards.

*Health Foods Business.* 1992. Nov. p. 218. *Soya Bluebook* now reports its circulation to be 3,000.

Talk with Joy Froding of Soyatech. 1995. Jan. 12. The 1994 print run of Soya Bluebook was 2,300 copies. An estimated 4 people read each copy.

Price of the Soya Bluebook (1 book sent to USA, Canada, or Mexico): 1992 = $28 (if paid before June 1; $38 afterward). 1993 = Same price. 1994 = $38 (no prepayment discount; Available July 1994; this book has fold-out indexing tabs and 272 pages. The order form announcing the '94 Soya Bluebook states: "For 47 years Soya Bluebook has served as *the* noted information source for the world's soybean industry"). Starting in Jan. 1994 four issues of *Bluebook Update* are available free of charge to all who subscribe to or are listed in *Soya Bluebook.* 1995-96 = $38 ($48 after 1 June 1995; then in Nov. 1995 the price is raised to $58; incl. indexing tabs, 292 pages). This 1995-96 issue is titled "Soya Bluebook Plus: the annual directory of the world oilseed industry." Crops featured on the front cover

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are "soya, corn, cottonseed, palm, canola, rapeseed, and sunflower." Address: St. Louis, Missouri; Bar Harbor, Maine (After Jan. 1988).

917. **Product Name:** Soymilk.
**Manufacturer's Name:** Pyung Hwa Food Co. Inc.
**Manufacturer's Address:** 2139 Dundas St., Toronto, ONT, M6R 1X1, Canada. Phone: 416-534-0237.
**Date of Introduction:** 1980.
**Wt/Vol., Packaging, Price:** 600 gm.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Jhasun Koo, owner and founder. 1989. May 4. He started making soymilk in 1980, but no longer makes it.

918. Tsuchiya, Kanji. 1980. Tônyû: Yomigaetta dentô shokuhin [Soymilk: Traditional food that's make a comeback]. Tokyo: Shokuhin Kenkyusha. 176 p. 2nd edition published in Dec. 1982. Illust. 17 cm. [Jap]
• ***Summary:*** This is the best book seen on soymilk in Japanese. For contents and details, see the enlarged 2nd edition (Dec. 1982). A portrait photo on the back cover shows the author, Kanji Tsuchiya, and gives a brief biography. Address: Technical consultant, Okazaki Marusan, Japan.

919. Yu, Ju-Hyun; Pyun, Yu Ryang. 1980. Korean fermented foods. In: Proceedings of the Oriental Fermented Foods. Food Industry Research and Development Institute, P.O. Box 246, Hsinchu, (300) Taiwan. iv + 229 p. See p. 46-57. Held 10-14 Dec. 1979 in Taipei, Taiwan. 7 tables. 4 figs.
• ***Summary:*** Fermented foods in Korea can be classified into alcoholic beverages, seasonings, kimchies (fermented vegetables), fermented milk (liquid type), and cakes and bread. Traditional Korean fermented foods made with soybeans are all seasonings: Ganjang is soy sauce, doenjang is soybean paste, and gochoojang is a red pepper paste containing rice and/or barley and soybeans. Sikcho (vinegar) is the only traditional Korean seasoning that contains no soybeans.

In Korea, production of soy sauce (ganjang) has increased from 93,355 kiloliters (kl) in 1975 to 97,830 kl in 1978. Production of soybean paste (doenjang, Korean miso) has decreased from 67,227 tonnes (metric tons) in 1975 to 51,237 tonnes in 1978. Production of red pepper paste (gochoojang) has increased from 29,000 tonnes in 1975 to 33,525 tonnes in 1978. A detailed description is given of the production process, and nutritional composition of gochoojang. The production of monosodium glutamate by fermentation was begun in 1963 by Miwon Co. and Chiel Sugar Co. Address: Dep. of Food Engineering, Yonsei Univ., Seoul, Korea.

920. Root, Waverley. 1981. A cordial bow to the byproducts of the soybean. *Los Angeles Times.* Jan. 15. p. J42.
• ***Summary:*** This article is indebted to: Simonds, Nina. 1979. "Chinese cuisine: Bean curd." *Gourmet.* Sept. p. 28-29, 84-91.

The soybean, which offers extraordinary versatility as a human food, can be transformed into soybean milk, "the soybean milk skin [yuba] derived from the milk, the bean sticks [dried yuba sticks] made from the milk skin, the also edible sediment given off by the milk [okara], untreated bean curd [regular tofu and perhaps silken tofu], pressed bean curd which produces bean curd noodles [pressed tofu noodles], more tightly compressed bean curd cakes, and frozen-and-thawed bean curd [dried frozen tofu]." Note: This is the earliest English-language document seen (April 2013) that uses the term "frozen-and-thawed bean curd" to refer to dried-frozen tofu.

In the process of making "pressed bean curd, another soybean food is created–bean curd skin [*pai yeh,* pressed tofu sheets], which should not be confused with soybean milk skin [yuba]. Dried bean curd skin," which needs no refrigeration and is often stuffed, for example with chopped meat, is sold by weight by Chinese specialty shops throughout the world; five or six sheets weigh one ounce.

"There is a whole family of foods made from fermented bean curd" [fermented tofu]. Bean curd can be fermented in various ways. Bean curd loaves, for example, can be stored for the winter in a cool dark place; micro-organisms from the air cause fermentation. "The loaves acquire a fungoid coating, which has to be scraped off, and as far as I know is not used for food,..." Fermented bean curd, which has been called "soybean cheese," is easier to digest than unfermented bean curd. Bean curd can also be marinated in rice wine, flavored with spices, and then allowed to ferment. A most unusual type of fermented tofu is stinky bean curd (*sh'ou tou fu*), a favorite Chinese snack. In Taipei [Taiwan], there are many street vendors who ply the streets with their portable deep fryers. This fermented tofu is usually deep-fried and usually eaten with one's choice of soy sauce, vinegar, mashed garlic, and chili paste.

Other fermented foods include miso, natto, hamanatto (which is of Korean origin), tempeh (of Indonesian origin), and shoyu (Soybean sauce, soy sauce).

"It is said that the best grades of soy sauce can take as much as six to seven years of aging to reach perfection, and that the making of a superb soy sauce requires 'as much art in its preparation as good French wines.'"

Flavorings are added to some Chinese soy sauce "various herbs, especially citronella; spices (ginger); aromatic vegetables (onions); and not only fermented fish, but even fermented chicken meat. To produce three liters (3.1 quarts) of sauce requires on kilogram (2.2 pounds) of beans.

"Fukien has the reputation of producing the best soy bean sauce in China and consequently stews many foods in it, giving them a color which has caused the culinary

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techniques of this region to be called 'red cooking.'"

Soybean sauce is "often an important ingredient in many more complicated sauces–for instance Hoisin sauce in China and Worcestershire sauce in England."

921. EMI Corporation. 1981. How do they say "soybean processing" in Jinhae? "EMI" of course (Ad). *J. of the American Oil Chemists' Society* 58(1):58. Jan.
• ***Summary:*** This full-page ad shows a Korean lady, holding a fan and smiling. The text:

"Dong Bang Oil and Flour Co. Ltd. [in Korea] processes 1250 metric tons of soybeans per day, to produce the highest quality hydro-winterized salad oil and meal for animal feed. How? With a system designed by EMI and built in record time.

"This speedy construction was accomplished by using equipment fabricated here in the Republic of Korea to EMI specifications. Dong Bang depended on EMI to do it, just as people around the world depend on EMI's versatile, creative capabilities in soybean processing, fatty acid processing, and much more." Address: 3166 Des Plaines Ave., Des Plaines, Illinois 60018.

922. Wang, H.L.; Hesseltine, C.W. 1981. Use of microbial cultures: Legume and cereal products. *Food Technology* 35(1):79-83. Jan. [38 ref]
• ***Summary:*** Contents: Introduction. Use of nontoxin-producing cultures. Safety of fermented foods: Several factors contribute to their safety: Soaking and cooking, salting, acid formation, antibiotic production, alcohol production, low surface moisture, decrease of aflatoxin by *Rhizopus* and *Neurospora.* Shelf life of fermented foods. Nutritive value of fermented foods: Complementary effect of mixed proteins, protein efficiency ratio and digestibility, vitamins. Future of fermented legume-cereal foods.

The following fermented soy-related foods are described briefly, including names, area of origin, organisms used, substrate, and nature and use: Soy sauce (chiang-yu, shoyu, toyo, kanjang, kecap, see-ieu). Miso (chiang, doenjang, soybean paste, tauco). Fermented bean (hamanatto, tou-shih, tao-si). Sufu (fu-ru, fu-ju, tou-fu-ju, bean cake, Chinese cheese). Tempeh (tempe kedelee). Natto. Ontjom (onchom). Address: Northern Regional Research Center, Peoria, Illinois.

923. Hesseltine, C.W. 1981. Aflatoxins in soyfoods (Interview). *SoyaScan Notes.* Feb. 18. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Concerning the 1969 *Time* magazine article on aflatoxins in homemade miso and soy sauce in Korea–There is a lot of incorrect information in the literature based on a problem with determining aflatoxins, since not all things that fluoresce are aflatoxins. A test for fluorescence needs to be followed by a chemical test. He found that one-third to one-half of all oats sampled in the USA contained fluorescent material that looked like aflatoxin–but was not. The oats were fed to animals and no problems resulted.

A study in Japan showed that when homemade miso was properly inoculated, it contained no aflatoxins, but when inoculated with natural spores, it did contain some aflatoxins. He has never seen any figures on the aflatoxin content of the latter miso. He has seen no evidence to indicate that there are problems with aflatoxins in naturally inoculated homemade misos. Good studies conducted in Japan have found aflatoxins in homemade miso but they were found only in a few samples and the levels were so low that there was no problem. No aflatoxins have ever been found in commercial misos as far as he knows. In short, he feels there is no risk is consuming any type of miso.

Dr. Hesseltine is now on a low-sodium diet and has therefore started eating a lot of tofu. In addition, he and Dr. Wang are conducting an interesting study on microbial spoilage of tofu. Address: Northern Regional Research Center, Peoria, Illinois.

924. Leviton, Richard. 1981. Tofu plant profiles: Soycrafters on the Island [Luke and Suni Lukoskie of Island Spring on Vashon Island, near Seattle, Washington]. *Soyfoods* 1(4):42-44. Winter.
• ***Summary:*** "From the back step of Island Spring's soyfoods plant on Vashon Island near Seattle, Washington, when you take a moment's break from making tofu and look out over the orchard and small plane airstrip, you enjoy a stunning view (when the sky is clear) of towering, snowcapped Mt. Rainier, rising 14,000 feet above sea level some 120 miles to the south. Island Spring, Inc., founded in 1977 by Luke Lukoskie and Suni Kim, his wife, shares space in a broad, squat building with Wax Cannery, a small-scale orchardist and fruit juice bottling company that constructed the Island Spring production space to their specifications. Outside the tofu plant, there's a miscellany of second-hand steam kettles and bulk holding tanks and Army surplus discards, that Mr. Lukoskie was quick to scrounge up and rejuvenate for his production needs.

"The Island Spring plant is tightly laid out with five long aisles of equipment, workspace, and production supplies, flanked by an overhead loft that runs along the back wall and houses dry materials, coagulants, labels, and boxes. Immediately outside the shop, a metal silo stores 50,000 pounds of dry bulk soybeans which are augured, when needed, into the shop for soaking in either steam kettles on wheels or in stainless steel twin compartment moveable tanks. The soaked beans are then scaled up in measures (the batch size is 140 pounds of beans and 30 gallons of water) on a large industrial scale wrapped in plastic against the ubiquitous moisture, placed in polyethylene tubs, and hoisted to the floor of their five-foot raised platform. The worker mounts the platform to dump the hydrated beans

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into the hopper of their soybean mill (a J.C. Ford Master wet corn grinder, which they bought for $2,850 in 1976; 548 Monterey Pass Road, Monterey Park, California).

"The worker tends two adjacent 60-gallon steam kettles that receive (alternately) the ground soybean puree from the mill; the foam is sprayed down with cold water, and when the cooking is finished, the slurry is pumped into their home-made, hand-hydraulic soymilk press. After extraction, the soymilk is pumped into one of three steam kettles that serve as curding barrels. Each barrel, which has a 120-pound capacity, produces three 40-pound batches of tofu curds, or enough for three forming boxes. The soymilk is coagulated using either nigari or calcium sulfate. The curds are then ladled into the three forming boxes, most of the whey is drained off before ladling, and buckets filled with water are hoisted on top of the lids for weight. The finished tofu is sliced on the lid which floats in the water in the cooling tank; it's sliced according to an imprinted grid that forms a cutting pattern on the tofu during pressing. The cooling tank, which is 25 feet long and was purchased for only $300, holds 1,800 pounds of tofu, has circulating cold water, and Freon coils for chilling the water (not presently used). Metal screens on four-inch risers are set on the tank bottom to facilitate packing and to prevent the tofu from making contact with the tank bottom. Almost all of the tofu (silken and regular) is packaged in 16-ounce tubs, then packed in cardboard boxes and cooled until delivery. In late October the daily tofu production was 15 batches (1,800 pounds) requiring four people working 6½ hour shifts. Mr. Lukoskie reports that 70 percent of their tofu sales are to Washington supermarkets.

"Island Spring produces both regular and silken tofu (calcium sulfate-based, made every 10 days in 120-pound batches) for a weekly total of 10,000 pounds. One thousand pounds are converted into Delicious Steamed Tofu, fresh griddled slabs of tofu packed in a soy sauce, 480 pounds of Soyloaf, 210 quarts of Soyfreeze [soy ice cream] (described in With Spoon in Hand, this issue), nine gallons of soymilk daily, and some 700 pounds of soy tempeh every week.

"Let's look briefly at the Island Spring tempeh process. For tempeh, the daily batch size is 80 pounds of dry soybeans that produces 260 eight-ounce units. They use a CeCoCo dehuller for bean dehulling, an item they purchased second-hand in 1976 for less than $1,000 (purchased originally in Japan in 1966); this removes most of the hulls and the rest are skimmed off when the beans are boiled. The dehulled beans are kept at a racing boil for 30 minutes in a portable steam kettle, followed by spin-drying in the centrifuge. This requires three or four loads to get the beans sufficiently dry. This stage is slow as each load handles only 25 pounds of beans.

"The inoculated beans are packed in shallow tofu tubs which have no bottom aeration or drainage; therefore excess moisture in the beans condenses on the top lid and "rains" down on the fermenting soybeans (rather than escaping as steam), sometimes causing spoilage or retardation of the Rhizopus. The beans and inoculant are blended thoroughly in a Leland rotary mixer and vinegar is added; then the inoculated beans are scooped out and placed in eight-ounce tubs to be stacked on trays on moveable bakery racks. The tubs are heat-sealed with film and holes are pricked in the film with a special nail punch. This punch has been sterilized for one hour in a special Sterilizing Hood that purifies and filters air with fans and ultraviolet light; the hood is also used as a sterile workspace for tempeh starter production. The tempeh is incubated in a 6 foot x 6 foot incubator at 85ºF for 12 to 18 hours. For the last step, they apply 'crack-and-peel' tempeh labels over the pin-pricked film, and refrigerate until delivery.

"As a soy plant, Island Spring is a model to emulate, impressive for its efficiency, economy and scale, thrift, ingenuity, and product wholesomeness. Specifically, here are 14 points of commendation: (1) their bulk soybean storage and auguring system, one of only a few such systems in the country; (2) the innovative use of steam kettles and the concept of 'kettles on wheels' which saves space; (3) the efficient but inexpensive dehuller and wet grinder, both not commonly known; (4) the trim production floor layout designed for compartmentalization of products, high-volume production, and efficiency; (5) the large cooling tank with inside raised mesh and Freon coils' that was still inexpensive; (6) the use of removable steam injection hoses for the 'kettles on wheels'; (7) the marvelous steaming bell that is lowered over the racks of Soyloaf to the floor with a steam hose injected in the side, then hoisted up out of the way when not in use;

"(8) iodine dip buckets for hand disinfecting, soaking tanks for production cloths, and the general high level of sanitation awareness; (9) the Sterilizing Hood used for tempeh starter production and purification of the nail punch; (10) the use of shallow broad sinks at the curding barrel stations for utensils used in coagulation; (11) the electric insect grill suspended from the ceiling; (12) the simple pumping system that moves the puree from the grinder to cooker, slurry from cooker to press, and soymilk from press to curding barrels; (13) the use of both nigari and calcium sulfate, unusual among Western shops; (14) their unique batch-piecework payment schedule that enables some production workers to earn over $7 an hour, including a health plan and flexible schedule, making Island Spring workers just about the highest paid soycrafters in the country.

"Island Spring has not only mastered the demands of engineering a smooth production system with low-technology, low-expense solutions, they have also introduced North America's pioneer Soycrafters Apprenticeship Program, an invaluable service where soycrafters are trained for three weeks in all aspects of soyfoods production and business management. Apprenticeship Program Director Steven Sloan reports they receive 50 inquiries a month, that

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they have graduated 15 students already, and that several of them have since inaugurated their own soy plants in places like Utah and Mexico. Other innovations continue. The tempeh makers are experimenting with producing preformed tempeh burgers by incubating the tempeh in round petri dishes; already they are selling 75 four-ounce patties weekly. To streamline tofu production, Mr. Lukoskie will install a new Okita three-compartment cooker and a Brown-Sweco soymilk extraction unit; and to simplify forming box tofu pressing, he will construct a series of overhead hydraulic beam presses with cement weights. With this new system he expects to increase his production capacity per hour by 25 percent. In addition, Island Spring is the first shop in America to install Bean Machine's brand new BMI Disintegrator for soybean grinding.

"As for new products, Younghee Kim, Suni Kim's sister, is developing a commercial *kim che* [*kimchi, kim chee, kimchee*] (fermented Chinese cabbage, very popular among Koreans) for the Western, rather than Oriental (which has suppliers) market in Seattle. Their label describes *kim che* as 'a spicy Korean pickled condiment in a piquant sauce,' and includes, in one-pint jars, 'napa cabbage, green onions, garlic, ginger, red pepper, water, salt.' *Kim che* contains no preservatives with a shelf life of at least 50 days, and requires refrigeration after opening."

Photos show: (1) Emptying hot okara into a steel barrel at Island Spring. (2) Suni Kim Lukoskie. (3-4) Two views of the inside of the plant. (5) "Laminar sterilizing hood for tempeh-starter." Address: Colrain, Massachusetts.

925. Shurtleff, William. 1981. Dr. Harry Miller: Taking soymilk around the world (Continued–Document part II). *Soyfoods* 1(4):28-36. Winter.

• ***Summary:*** (Continued): "Pioneering Soymilk in China (1925-1939): In 1925 Miller accepted the church's invitation to return to Shanghai to develop a network of Adventist health care facilities, the first of which was the Shanghai Sanitarium and Hospital, which opened January 1, 1928, with Dr. Miller as medical director. Deeply touched by the high infant mortality rate caused by malnutrition, Dr. Miller began again in 1926 to turn his attention to soymilk, working on it steadily in his spare time at a small food plant located behind the hospital building. A growing number of orphaned infants began to appear at the hospital. Their only hope of finding food was to find a wet nurse or to be fed cow's milk, which was very expensive in China and which not all infants tolerated well.

"Dr. Miller was determined to develop a soymilk that had good flavor and digestibility, could be formulated to nutritional equivalency to mother's milk, was low in cost, and had a good storage life. Preparing his soymilk at the small soy plant in the typical Chinese way, with cold extraction of the soymilk from the okara, followed by cooking, he began to study ways to remove the beany flavor and make the soymilk more digestible.

"On his medical travels in other parts of China, and in Korea and Japan, he visited tofu shops and studied their methods. He believed that the beany flavor resulted from natural oils in the soybean; perhaps if the soymilk were spray dried and then reformulated with fresh soy oil, the flavor would improve.

"In the early 1930s, returning to America on furlough, he purchased the necessary equipment for a small soy dairy and had it shipped to China; a motorized stone mill, an American extractor, and a small homogenizer. Soon he was making improved formulated soymilk for the babies, patients, and staff at the Shanghai Sanitarium. The Chinese, too, liked the flavor. Some friends cajoled that it was 'undignified for a talented surgeon to be always playing around with beans.' Miller was undaunted, yet the beany flavor persisted.

"One day, in the mid 1930s, the breakthrough came as he was standing in the kitchen of the compound working with slurry from a tofu maker. He later wrote: 'I heard a divine voice behind me that said "why don't you cook it longer with live steam?" No one had ever thought of that before. Soon the staff and patients noticed the improved flavor and digestibility, and he added some soy oil or peanut oil during homogenization to make it even better. With new enthusiasm he began more baby feeding experiments. Soymilk was added to what was called the sanitarium's 'Universal Diet,' which also included whole wheat bread and half polished rice, plus other soyfoods. During a trip to the Philippines at this time he learned from refiners of coconut oil that steam distillation and flash pasteurization improved flavor of foods containing fats by driving off volatile oils and gases.

"So promising was the new product that Miller began to move forward on three fronts: controlled feeding studies on infants, establishment of a commercial soy, dairy, and application for a U.S. patent. In 1932 Dr. Miller had established the Vetose Nutritional Laboratory for furtherance of his research. For two years (1936-37) he fed formulated soymilk to several hundred small children at the Shanghai Clinic, running control tests with fresh cow's milk and various types of American and European prepared baby foods. The study turned out well and the results were published in the April 1936 issue of the prestigious *Chinese Medical Journal*, an English-language publication read widely in the U.S. and China. Here it was officially noted that babies could be nourished from birth fully as well with soymilk as with animal milks. This led to increased interest in the product. Dr. Miller later wrote: 'I regarded that work as of far greater importance than the building up of the sanitarium because it had to do with the preservation of thousands of lives that otherwise would be lost if they did not have a proper substitute for mother's breast milk, since cow' milk is beyond the economic level of the Chinese people and almost all Oriental races.' In later years follow-up infant

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feeding studies were done by other researchers using Dr. Miller's soymilk at the Indigent Hospital in the Philippines, at Tokyo University, and at Ohio State University at the Children's Hospital in Columbus, Ohio.

"In January 1936 Dr. Miller and his oldest son, Willis (who did much of the plant design and equipment construction and was the production manager), opened a full-scale soy dairy, the first of its kind in the world, on Pingliang Road in Shanghai, not far from the Shanghai clinic. The milk was cooked with live steam in open-top kettles. Soon a fresh liquid beverage, called Vetose Soya Milk, was available in natural, chocolate, and acidophilus flavors, in half-pint and quart bottles. The tangy acidophilus, cultured, bottled (but not sterilized) and delivered chilled was a real favorite. Ice cream was sold to institutions and meat analogs were under development. Production skyrocketed, doubling each month. Eventually the entire city of Shanghai had a soymilk route with thousands of families receiving door to door deliveries (by three-wheel pedicycles with carts behind them) of 3,000 quarts and 4,000 half-pints a day. The commercial product sold for less than dairy milks and cost less than one-fourth as much to produce. The soymilk proved so successful that it was soon included in rations for the Chinese army. A system for making dehydrated soymilk was also set up using a locally made Grey Jensen spray dryer; the government planned to use the dehydrated soymilk in rations that were lighter in weight and could be stored longer.

"But the Japanese were now invading China and on August 13, 1937, just eight months after the plant opened, it was totally destroyed by Japanese crossfire and bombs. (At the same time another soy dairy was being run by Julean Arnold of California and Nellie Lee, a Chinese, both of the China Nutritional Aid Council, in Dr. Fu's Children's Hospital in Shanghai. They provided their soymilk to 25,000 to 37,000 refugee children a day and distributed millions of biscuits containing 40 percent okara from their soy dairy.) The Japanese occupied Shanghai in November, 1937, and soon thereafter the Shanghai Sanitarium was closed, to become a refugee center. The political situation forced Miller to leave Shanghai.

On May 4, 1937, while his Shanghai soy dairy was still in full swing, Dr. Miller was awarded U.S. Patent No. 2,078,962. He introduced methods for eliminating beany flavor, and for the use of a centrifuge, and an homogenizer. In the patent he referred to his product as 'vegetable milk;' however subsequent pressure from the powerful dairy industry and the USDA convinced him to Latinize the name to Soya-Lac. This term was first used in late 1939 for Miller's first American soymilk; the spelling had been changed to the present one-word Soyalac by September 1941.

"Miller's patented process was as follows: Soak 1 part by weight of soybeans in 8 parts of water at 60 to 75ºF for 6 to 10 hours. Grind well in a burr mill, adding a little water while grinding, to produce a mixture of 20 gallons water and 25 pounds ground beans. Extract the soymilk through a fine cloth in a centrifuge at 2,500 RPM in either of two ways: (1) before heating; or (2) after bringing to a boil, stirring constantly, in a caldron and simmering briefly. Now to the simmering soymilk add 7 pounds each grain sugar (dextrose, maltose) and oil plus 3 ounces salt. Return to the boil and simmer, stirring constantly, for 30 to 60 minutes, or until the flavor changes from 'beany' to 'nutty.' Homogenize in a colloid mill or homogenizer to give a milk containing 3.5 to 4 percent protein and 5 percent fat. Cool, bottle, and refrigerate, or dehydrate.

"From late 1937, Dr. Miller was in Hankow-Wuhan establishing the Wuhan Sanitarium Hospital, where he also had a small soy dairy. Eventually over 15,000 Chinese refugees, escaping the Japanese troops in the north, filled the hospital compound. Finally in January 1939, as the war got too hot, Dr. Miller left China and returned to America in April of that year" (Continued). Address: Lafayette, California.

926. Hymowitz, T.; Kaizuma, Norihiko. 1981. Soybean seed protein electrophoresis profiles from 15 Asian countries or regions: Hypotheses on paths of dissemination of soybeans from China. *Economic Botany* 35(1):10-23. March. [30 ref]
• ***Summary:*** This is a remarkable, pioneering paper that presents new evidence, based on seed protein electrophoresis, concerning the paths of dissemination of the soybean from its place of origin in northeast China.

Soybean seed protein extracts from 1,603 accessions obtained from 15 Asian countries or regions (not including Japan) were analyzed for the presence of alleles of 2 proteins. The countries were: Northeast China [Manchuria] (661 accessions), Korea (417), India (219), south and central China (142), Thailand (34), Indonesia (33), Philippines (20), Taiwan (18) USSR (16), Nepal (14), Malaysia (13), Vietnam (5), Afghanistan (5), Pakistan (4), and Burma (2). Three alleles of the Kunitz trypsin inhibitor, designated as Ti-a, Ti-b, and Ti-c, are electrophoretically distinguishable from one another by their Rf values. The seed protein beta-amylase has 2 alleles, designated as Sp1-a and Sp1-b, which are electrophoretically distinguishable from one another by their Rf values.

About 94% of all accessions had a Ti-a allele. "Only the Korean and Central Indian soybean populations have a high frequency for the Ti-b allele. Within Korea, the soybeans from those districts that lie closes to Korea have a high frequency for the Ti-b allele whereas the soybeans from those districts that lie closest to China have a low frequency for the Ti-b allele. The Ti-b allele is not present in soybeans from the Philippines, Vietnam, Thailand, Malaysia, Burma, Nepal, Pakistan, and Afghanistan. Only 1 accession each from Taiwan and Indonesia have the Ti-b allele.

"The Sp1-a allele is not present in soybeans from

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Taiwan, Vietnam, Thailand, Malaysia, Indonesia, Burma, Pakistan, and Afghanistan. The highest frequency of the Sp1-a allele occurs in soybean germ plasm from northern India and Nepal.

Soybean germ plasm pools: "At present we recognize 7 soybean [germ plasm] pools (SGP) in Asia which are as follows: (1) northeast China and the USSR; (2) central and south China; (3) Korea; (4) Japan; (5) Taiwan and southeast Asia; (6) north India and Nepal; and (7) central India. The eastern half of north China, where the soybean emerged as a domesticate around the 11th century B.C. is considered the most probable center for dissemination of germ plasm...

"The soybeans from Asia (including Japan) were divided into 3 gene centers... The primary soybean germ plasm pool, or in Vavilov's terminology the primary gene center, is China... From the first century A.D. to the Age of Discovery, soybeans were introduced and land races were established in Japan, southeast Asia and southcentral Asia. These regions comprise the secondary gene center for soybeans... Japan should be considered a very active microcenter and northern India a passive microcenter within the secondary gene center.

"Central India may be considered a recent or tertiary soybean gene center. Another tertiary soybean gene center lies within the U.S., while incipient tertiary centers are being established in South America and Europe. The concept of primary, secondary and tertiary gene centers unifies time and space relationships with regard to the establishment of new genetic combinations within the species *Glycine max.* Another feature of this concept is that it establishes the foundation upon which future soybean germ plasm collection activities can be built."

Maps show: (Fig. 2) Korean peninsula divided into 9 districts showing geographical distribution of the Ti and Sp1 alleles. (Fig. 3) India, with 5 states outlined, showing geographical distribution of the Ti and Sp1 alleles. One of these states is Assam, which includes the Brahmaputra valley; soybeans analyzed from Assam contain no Ti or Sp1 alleles.

Paths of dissemination: Fig. 4 is a map on which an oval shows the primary gene center of the soybean in China (in the region about 200 miles southeast of Beijing, in the moist, low plain near the mouth of the Yellow River (*Huang Ho*), largely in Hopei and Shantung provinces) and on which arrows show the paths of dissemination of the soybean from China to Korea, Japan, Taiwan, Malaysia, Indonesia, and northern India. "By combining seed protein banding data with available historical, agronomic and biogeographical literature, we have developed an hypothesis concerning the dissemination of the soybean from China to other countries or regions in Asia. Our ideas are based partly upon the pioneering studies of Nagata (1960) who primarily used physiological and morphological data to point out possible paths of dissemination of the soybean from China to the rest of the world.

"In developing our hypothesis, we identified 2 major restraints concerning the movement of the soybean. One restraint is physiological and the other historical. Due to the fact that soybeans are day-length sensitive, they spread much easier between east and west than between north and south. Hence, in the dissemination process quantum latitudinal movement of soybeans was rare. Secondly, according to Ho (1975) the movement of the soybean out of its home area did not take place until the seventh century B.C. Therefore, the trial and error period for the adaptation, establishment and dissemination of the soybean from region to region within China, after the seventh century B.C., proceeded at a very rapid rate. As part of the dissemination process, the soybean was moved back and forth across geographical areas as a consequence of wars, famine, emigration, immigration, and trade.

"The suggested paths of dissemination of the soybean from the eastern half of north China to other regions in Asia are shown in Figure 4 and summarized below:

"1. The soybeans grown in the U.S.S.R. (Asia) came from northeast China.

"2. The soybeans grown in Korea are derived from 2 or 3 possible sources–northeast China, north China and the introduction of soybeans from Japan especially in the southern part of Korea.

"3. The soybeans grown in Japan were derived from the intermingling of 2 possible sources of germ plasm–Korea and central China. Most probably the first points of contact were in Kyushu and then the soybean slowly moved northward to Hokkaido. In addition the soybean moved southward from Kyushu to the Ryukyu Islands where they came in contact with the soybeans moving northward from Taiwan.

"4. The soybeans originally grown in Taiwan came from coastal China.

"5. The germ plasm source for the soybeans grown in southeast Asia is central and south China.

"6. The soybeans grown in the northern half of the Indo-Pakistan subcontinent came from central China.

"7. The soybeans grown in central India were introduced from Japan, south China and southeast Asia." Address: 1. Prof. of Plant Genetics, Dep. of Agronomy, Univ. of Illinois; 2. Assoc. Prof., Faculty of Agriculture, Iwate Univ., Morioka, Iwate, Japan.

927. Kwon, S.H.; et al. 1981. [Studies on plant breeding and genetics by radiation application]. Seoul, South Korea: Korea Advanced Energy Research Inst. 152 p. March 25. 28 cm. [66 ref. Kor; eng]
Address: Seoul, South Korea.

928. Meals for Millions / Freedom from Hunger Foundation. 1981. Annual report 1980: A commitment to self-help for a hungry world. Santa Monica, California: MFM Foundation.

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20 panels. Each 9 x 22 cm. One large sheet folded.
• ***Summary:*** Peter J. Davies is president; he works at the New York office. Alfred C. Bartholomew, Ph.D., D.D., is chairperson, board of trustees. On the red, black and white cover is a photo of a boy. MFM's logo of a plant growing in an upturned bowl is on the cover.

Contents: Message from the president. Food and Nutrition Institute, Santa Monica. Overseas training courses: Sierra Leone and Antigua. Caribbean Community Food Technology Program. Nutrition education training program in Central America. Fiji community education workshop. Korea nutrition education program. Transfer of technology: Africa, India leaf protein fractionation project, India village texturizer project, Thailand. Information resource center. Kampuchea (Cambodia).

Multi-Purpose Food "is no longer being manufactured, therefore MFM / FFH will no longer be shipping it." The end of an era; a strange way to express it! Highlights of 1980. Financial highlights of 1980: Contributions from all sources amounted to $1.5 million in 1980, up 10% from the previous year. Where the money comes from: General public 33.4%, US AID 25.3%, churches 18.1%, foundations 16.9%, host governments 3.5%, etc. The many agencies that made generous grants are listed. Where the money goes: Applied nutrition programs 43%, food and nutrition institute 26%, fundraising 13%, management and administration 8%, etc. National Committee of Sponsors. Board of Trustees and executive committee. MFM officers.

As of 1980, MFM has largely discontinued its work with soy. Therefore, we will give less detailed summaries of annual reports from now on. Address: 1. 1800 Olympic Boulevard (P.O. Box 680), Santa Monica, California 90406; 2. 815 Second Ave., Suite 501, New York City, NY 10017. Phone: (213) 829-5337 or (212) 986-4170.

929. Shurtleff, William; Aoyagi, Akiko. 1981. The book of miso: Food for mankind. Revised. New York, NY: Ballantine Books. xx + 618 p. March. Illust. by Akiko Aoyagi Shurtleff. Index. 18 cm. [82 ref]
• ***Summary:*** Contents: What is miso? Preface. Acknowledgments. Part I. Miso: Savory, High Protein Seasoning. 1. Soybeans, protein and the world food crisis. 2. Miso as a food. 3. The miracle of fermentation. 4. The varieties of miso: Regular Miso: Rice miso (red / aka, light-yellow / shinshu, mellow red / amakuchi akamiso, mellow beige / amakuchi tanshoku, mellow white / shiro koji, sweet red / edo or edo ama-miso, sweet white / Kyoto shiro miso), barley miso (karakuchi mugi, mellow barley / amakuchi mugi), soybean miso / mamé miso (miso-dama, Hatcho miso, soybean miso / mame miso, tamari miso). Special Miso: Finger lickin' miso / Namemiso (Kinzanji miso, moromi miso, hishio, namémiso, natto miso, goto miso), sweet simmered miso / nerimiso. Modern Miso: Akadashi miso, dehydrated or freeze-dried miso, low-salt / high-protein miso.

Part II. Cooking with Miso (400 recipes). 5. Getting started. 6. Recipes from East and West. Part III. The Preparation of Miso. 7. Making miso at home and in communities. 8. Japanese farmhouse miso. 9. Traditional and modern miso production.

Appendixes: A. A history of chiang, soy nuggets [fermented black soybeans], miso, tamari, and shoyu. B. Other East Asian misos: Chiang, jang, taucho, and tausi. C. The microbiology and chemistry of miso fermentation. D. People and institutions connected with miso. E. Miso additives. F. Miso with seafoods, chicken, and meat. G. Measures, weights, and equivalents. H. So you want to study miso in Japan? Bibliography. Glossary.

Note: This is the earliest English-language document seen (Nov. 2011) that uses the term "fermented black soybeans" to refer to Fermented black soybeans. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

930. Lukoskie, Suni Kim. 1981. Re: Korean natto and miso. Letter to William Shurtleff at Soyfoods Center, April 20–in reply to inquiry of March 5. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "About Joenkuk-jang and Damsue-jang. I always call them Chungkuk-jang and Dambuk-jang.

"To eat and serve them, we make pretty thick Miso type soup with Tofu and Vegetables in it. This is the miso that we can make very easily and quickly in the winter time.

"I can't explain what they look and taste like, but I'm sure you could buy them at Korean grocery stores in California.

"I don't know when or where they originated in Korea.

"Chungkuk-jang and Dambuk-jang are made by almost the same process.

"Chingkuk-jang: Wash soybeans then soak for 10-12 hours. Cook for 5-6 hours until they are very tender so that when you touch them they crumble. Put them in a bowl and leave it in the room with a blanket over it; no culture is added. After 2-3 days the surface will be white and sticky, and it smells rotten. Then add **salt,** garlic and cayenne, and pound it until coarse. This is the traditional method. As you may know, the Korean floor is very warm in the winter time.

"Another method is to make it more like making tempeh. My text-book says that after cooking the beans add the culture then incubate them 30-35 hours at 40ºC.

"Dambuk-jang: Same as above but no spices.

"The Korean word for okara is BéGé [piji].

"People in Korea don't eat whole soybeans much, except that sometimes we roast them.

"I have never eaten green vegetable soybeans in Korea. I don't think we even have word for them in Korean. But the general name for soybean is *Mayjekwong.*

Note: Suni was married to Luke Lukoskie. Address: 1. Island Spring Inc., P.O. Box 747, Vashon, Washington

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98070. Phone: 206-622-6448.

931. Hoefer, Hans Johannes; Lueras, Leonard; Chung, Nedra. 1981. Korea. Hong Kong: Apa Productions. 377 p. Illust. (some color). 23 cm. Series: Insight Guides.
• ***Summary:*** In the section titled "Korean cuisine" (p. 316-19), soy beans, soy sauce, *twoenjang-guk* (a popular "fermented soybean paste soup"), and soybean curd (*tubu*) are mentioned on p. 317 (right side).

Page 318 (right): "At important celebrations, steamed rice cakes (*ttôk*), sometimes embellished with aromatic mugwort leaves or dusted with toasted soy, barley, or millet flour, are presented as tasty ritual food."

Directed by Hans Johannes Hoefer; produced, edited, and designed by Leonard Lueras and Nedra Chung.

Note: The 2nd updated edition (1983) has the same number of pages as the 1st edition (April 1981).

932. FIND/SVP. 1981. The tofu market: Overview of a high-potential industry. New York, NY: FIND/SVP. 140 p. May. No index. 28 cm. [34 ref]
• ***Summary:*** This report, largely plagiarized from Soyfoods Center documents without permission or credit, predicted that "tofu may be the next yogurt." The tofu market shows many parallels to the growth of the yogurt market. Tofu must break away from its bland image, like yogurt before flavors were introduced. Sales of tofu in the U.S. are predicted to grow from their present $50 million level to $200 million by 1986.

Contents: Preface. 1. Executive summary. 2. Tofu: History, background and definition. 3. Methods of production. 4. U.S. soybean supply. 5. Tofu products currently on the market. 6. Current market trends. 7. Institutional markets: School lunch programs. 8. Tofu and the consumer. 9. Major producers of tofu: Hinode Tofu Company, Inc., Azumaya, Inc., Quong Hop, Island Spring, Nasoya, New England Soy Dairy, Swan Gardens (Miami Beach, Florida), White Wave, Tofu Inc. (Roseville, Minnesota), The Soy Plant Co-op Inc., Northern Soy Inc., American Tofu Inc. (Brooklyn Park, Minnesota), Soy Shop, Lecanto Tofu, Traditional Tofu, Chicago Tofu Company, Hashizume Food Products Co.

10. Tofu imports. 11. Packaging. 12. Distribution. 13. Pricing and margins. 14. Advertising and promotion. 15. Market outlook and forecasts. Appendices: A. Names and addresses of major tofu producers in the U.S. B. List of tofu consultants. C. Bibliography of tofu literature. D. Tofu consumer survey questionnaire. E. Notes on the growth of the yogurt market in the U.S.

An advertisement is shown in Soyfoods magazine. 1981. Summer. p. 11. This study sells for $695 and its companion on Tofu Consumer Awareness sells for $650.

Concerning the growth of the dairy yogurt market in the U.S.: Though yogurt has been sold in the U.S. since about the 1930s, it did not enter the mainstream of American food consciousness until the late 1960s and early 1970s. They key event was the introduction of flavored yogurt varieties in 1968. Yogurt sales grew from 17 million lb in 1955 to approximately 580 million lb in 1978. In the ten years between 1968 and 1978, per capita sales of yogurt grew 325%–remarkable for a product that was so slow to catch on. In 1970, according to one survey, yogurt was perceived as a "new product" with 43% of consumers having eaten the product for less than one year. Yogurt's popularity has been attributed to changes in the American lifestyle: more health and weight conscious, faster paced, and more interested in natural foods. Yet yogurt is eaten mainly for its taste. Yogurt's protein is digested twice as fast as that of plain cow's milk. Only about 30% of Americans consume yogurt, and of those that do, 26.4% consume 76.2% of all the yogurt sold. The average American consumes about 3 lb of yogurt per year. U.S. sales of yogurt in the USA in 1980 were about $500 million; the market is highly decentralized, with about 100 manufacturers. Today yogurt, the "glamour of the dairy case," is the fastest growing dairy product in America.

Note: This is the earliest document seen (Feb. 1999) which compares the potential market for tofu with the current market for yogurt. Address: The Information Clearinghouse, 500 Fifth Ave., New York NY 10110.

933. Hesseltine, C.W. 1981. Future of fermented foods. *Process Biochemistry* 16(3):2-6, 13. April/May. [11 ref]
• ***Summary:*** Discusses shoyu, miso, natto, and tempeh in Korea, the USA, and Japan. There are nine factors that favor the increased use of fermented foods. Address: Northern Regional Research Center, Peoria, Illinois.

934. Hildebrand, D.F.; Hymowitz, T. 1981. Two soybean genotypes lacking lipoxygenase-1. *J. of the American Oil Chemists' Society* 58(5):583-86. May. [32 ref]
• ***Summary:*** The USDA soybean germplasm collection was screened for genotypes lacking lipoxygenase-1. Two varieties or plant introductions (PI) were found: 133226 from Indonesia and PI 408251 from Korea.

Lipoxygenase [linoleate: $O_2$ autoreductase, EC 1.13.11.12] is widely considered to be the principal cause of the undesirable flavors in soy products, especially soymilk. Moreover, the lipid hydroperoxides resulting from lipoxygenase action can lead to loss of nutritive value by the destruction of certain vitamins and protein. In addition, lipid hydroperoxides and their breakdown products may have toxic effects.

Soybean seeds contain at least three lipoxygenase isozymes, each having a molecular weight (MW) of about 100,000. With linoleic acid the substrate, lipoxygenase-1 (L-1) has a pH optimum at 9.5, L-2 has a pH optimum at 6.5, and L-3 has a broad pH optimum from 4.5 to 9.0. The isoelectric points of the three isoenzymes are also different.

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L-1 is the most acidic. L-1 is the most reactive with free linoleic acid, whereas L-2 and L-3 are most reactive with methyllinoleate or trilinolein. On an equal protein basis, L-1 is 2.5 times as active as L-2 at its optimum pH, and L-2 is 2.5 times as active as L-3 or L-3b. L-1 is at least 36 rimes more stable than L-2 at 69ºC. Address: Dep. of Agronomy, Univ. of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

935. Sugiyama, Mieko; Griffis, Gil. 1981. Japan–Soybean market extraordinary. *Soyworld* (*American Soybean Association, St. Louis, Missouri*) 3(2):1, 4-5. Spring.
• ***Summary:*** "When George Strayer, then the Secretary of ASA, announced in a 1956 edition of Soybean Digest that 'In Japan, soybeans are food!' he was not only expressing one difference in the cultures of the U.S. and Japan, he was defining the state of the market.

"During that year, Japan imported only 717,000 tonnes (26 million bushels) of food soybeans, of which only 80 percent came from the United States. The domestic market for these beans was limited. Human consumption preferences were for carbohydrates and animal feed protein was supplied from fish meal. Rapeseed oil was the standard cooking medium.

"Considering the conditions, leadership of ASA and the Foreign Agricultural Service (FAS), showed great foresight in establishing the first international office in Japan. Born the Japanese-American Soybean Institute (JASI) it was made up of the five leading soybean user organizations: the crushers, manufacturers of soy sauce, miso and tofu and the oil and fat importer/exporters.

"The initial program of JASI was to check the arrival of cargoes and indentify which American varieties best met the strict requirements of Japan's soy-food industry. Our competition was China and the poor quality of U.S. beans which were high in foreign matter and did not meet Japan's exacting requirements. Our primary objective was to develop a food bean market.

"In 1956 Mr. Shizuka Hayashi was appointed managing director. With the assistance of Ersel Walley, a past president of ASA, Marion Hartz of Jacob Hartz Seed Co. and Howard Akers, Assistant Agricultural Attache, he developed JASI's first activity–a soybean exhibit at the Osaka Fair. In his review of the market potential for soybeans following the fair, Mr. Walley noted that the Japanese may have difficult problems because of insufficient foreign exchange.

"Vision of an Industry: In spite of this not totally optimistic appraisal, JASI proceeded with arrangements to host its first study team to the U.S. The eight man team represented the leadership of oil importers and manufacturers and the food bean processors. Among them was Yukio Sakaguchi, then President of the Nisshin Oil Co. During his tour of U.S. crushing plants he and other leaders developed a vision of a similar industry for Japan. Six years later he presided over the opening of a new plant. Other crushers followed.

"To increase consumption of food soybeans in Japan, JASI sent two senior scientists to work at the USDA's Northern Region Research Lab in Peoria [Illinois] in 1958. They conducted production research on tofu and miso to determine which U.S. varieties of soybeans could best be used in Japan. Partially as a result of their work, U.S. exports of variety soybeans totaled over 750,000 tonnes in 1979. Even today, Japan continues to be the world's largest consumer of food quality soybeans.

"In 1959 JASI conducted a survey of soy oil consumption in the Tokyo area. The study clearly showed the need for dietary improvements and the potential for soy oil as a nutritious substitute for the popular animal fats. Promotional activities and nutrition-education campaigns that came about from this modest research effort resulted in soy oil gaining a 47 percent share of the total vegetable oil market in Japan.

"Lessons in Promotion: In 1961 JASI hosted a series of seminars on public relations and sales promotion. Many senior officials of the industry participated in the study of these marketing concepts. They learned the lesson well–last year one oil processing company alone spent over $12 million for sales promotion.

"Also in 1961 JASI hosted the first team of nutritionists to visit the U.S. Escorted by Ms. Yoshiko Kojima, team members had their first sample of vegetable oil based margarine. Their enthusiasm resulted only three years later in the production of Japan's own 100 percent soy oil margarine, Uni Soya.

"During the year we had another special success. Based on many discussions with the government and the increase in demand for soybeans, import duty on soybeans was no longer collected. In 1980, soybeans became zero bound. In 1964, when another new margarine was introduced to the market, the amount of soy oil used by the margarine and shortening industry was about one metric tonne per day. Today the industry uses over 148 metric tons every day of the year and ASA is continuing efforts to increase usage levels.

"By 1970 the one-year-at-a-time program of JASI was finally recognized as a major contributing force to the marketing of U.S. soybeans in Japan. One result was that our name was officially changed to correspond to that of our parent organization–the Japan office of the American Soybean Association.

"Embargo Shock Waves: The close relationships which we worked so hard to establish were tested in 1973 when the soybean embargo sent shock waves through the industry. Although Japan had record soybean imports that year, the memories of that event remain strong.

"Utilizing the marketing experience gained in Japan, the Tokyo office assumed responsibility for developing new and

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promising markets elsewhere in Asia. In 1975, we initiated market development activities in Korea; in 1977 we began work in Southeast Asia. Programs in both areas matured to the point that independent offices and staff were established in 1979. In 1979 we opened the new office of ASA/Japan. Our new offices, the pride of the commodity marketing community, far better reflect the one billion dollar value of America's soybean exports to Japan, the professional pride of American farmers and the Japanese staff which maintains their markets.

"America's Largest Customers: As we enter 1981, the 25th year of our program, we note with pride that Japan today represents America's single largest consumer of soybeans. This amounted to 4.4 million metric tons in 1980 alone, 97 percent of which were of U.S. origin. To sustain this market it is interesting to note that FAS and ASA funds expended in 1979-80 represented less than one percent of the value of soybeans sold to Japan during the same period. In addition, the ratio of funds provided by the Japanese with whom we work was $3.55 for each $1 invested by ASA and FAS.

"Regardless where funds originate–from grower support, from FAS or from Japanese industry–their expenditure over the last 25 years has paid very attractive dividends to farmers. In the 1956-57 crop year, the value of soybean exports to Japan was $5.4 million. Today exports to Japan represent a market in excess of one billion dollars.

"Success Brings Competition: While we are pleased with the success of our first 25 years, we are also aware of the envy these successes have created among our competitors. China maintains its traditional interest in this market for her food-quality soybeans; Brazil continually seeks opportunities. Most important, Canada, with her new Canola variety of rapeseed is making a significant marketing effort.

"To counter these competitive initiatives, and to assure a growth market of not less than three percent or 4.7 million bushels of U.S. soybeans per year will require our best effort. We must be assured of adequate program funds to maintain our strong market thrust in human and animal nutrition and to expand our work in the increasingly sensitive vegetable oil market. We cannot afford the mentality that defines our market as developed with accompanying budget reductions.

"It is with those whom we serve–the U.S. soybean farmer–and with those whom we work–the Japanese soybean industry–that we seek continued success. It is from this critical support that we have developed our anniversary theme and program philosophy of 'Together Toward the 21st Century.'"

Photos, each with a long caption, show: Gil Griffis. Shizuko Hayashi. Kitchen on wheels, which took soy nutrition to the people in the early days of soybean market development. Facilities for unloading soybeans from a ship in 1956. ASA Asian Regional Office staff. Yoshiko Kojima. Karl Sera.

936. Lee, Hyun Ja; Suh, Jung Sook. 1981. [Effect of Bacillus strains on Chungkook-jang processing. I. Changes of the components and enzyme activities during Chungkook-jang-koji preparation]. *Korean J. of Nutrition* 14(2):97-104. June. [22 ref. Kor; eng]

• ***Summary:*** Various types of koji were prepared using *Bacillus natto, Bacillus subtilis,* and the traditional method. During koji preparation, its temperature was very different depending on the microorganism used–as was the content of ethyl alcohol, reducing sugar, amino nitrogen, and water soluble nitrogen. Address: 1. National An Seoung Agricultural Junior College; 2. Seoul Junior Health College.

937. Yang, Cha-Bum. 1981. [Changes in nitrogen compounds and nutritional evaluation of soybean sprout. III. Changes of free amino acid composition]. *J. of the Korean Agricultural Chemical Society* 24(2):101-04. June. [9 ref. Kor; eng]

• ***Summary:*** Changes in free amino acid composition in the cotyledon and axis were investigated during sprouting. Free amino acids increased, especially in the axis. Arginine, proline, and methionine did not appear in the axis throughout. Free amino acids constituted 1.1% of total amino acids in soybeans but 8.8% in 8-day sprouts. Changes in amino acids during sprouting was as follows: Aspartic acid > histidine > valine > isoleucine > threonine > serine > lysine > tyrosine > phenylalanine > leucine > alanine > glycine > proline > arginine > glutamic acid > methionine. The amino acids most prevalent in 4-day soy sprouts were: Aspartic acid, serine, valine, isoleucine, lysine, and threonine. Address: Dep. of Food and Nutrition, Hanyang Univ., Seoul, South Korea.

938. Yang, Cha-Bum. 1981. [Changes of nitrogen compounds and nutritional evaluation of soybean sprout. II. Changes of amino acid composition]. *J. of the Korean Agricultural Chemical Society* 24(2):94-100. June. [17 ref. Kor; eng]

• ***Summary:*** Changes in the amino acid composition of soy sprouts were measured in the cotyledon and axis during sprouting. Total amino acid content per sprout did not change for 2 days, and thereafter decreased. It decreased in the cotyledon but increased in the axis. The ratio of essential amino acids to total amino acids decreased rapidly after 4 days, especially in the axis. Aspartic acid increased significantly while glutamic acid decreased. The limiting amino acid was methionine. Chemical score, a measure of protein quality, and essential amino acids decreased during sprouting. Address: Dep. of Food and Nutrition, Hanyang Univ., Seoul, South Korea.

939. Bader, Kenneth. 1981. Re: History of the American

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Soybean Association. Letter to William Shurtleff at Soyfoods Center, July 25–in reply to inquiry. 1 p. Handwritten, without signature.

• ***Summary:*** Dr. Bader and staff answered six questions: (1) In what years were each of the ASA overseas offices opened? Tokyo, Japan 1956. Hamburg, Germany 1969, and again in 1969. Taipei, Taiwan 1970. Brussels, Belgium 1970. Mexico City, Mexico 1971. Vienna, Austria 1974. Madrid, Spain 1976. Seoul, Korea 1979. Singapore 1979.

(2) What is the present size of the ASA overseas staff? 50. St. Louis staff? 110. Total American staff? 134.

(3) What was ASA membership in 1955? 5,400. In 1960? 5,900. In 1970? 12,368. What is present ASA membership? 20,028.

(3) How many soybean growers does the ASA represent in the 24 states having checkoff programs? 510,000.

(4) What is meant by the term "Third Party Services" in your annual budget? It is your main source of income! "It is the value of funds and services in joint projects provided by soybean and related trade organizations, private firms, institutes, and other parties. In other words, if ASA invests $10,000 in a soy oil promotion project and it is matched by $20,000 in the same project by a manufacturer, we count the $20,000 a 'third party funds.'"

(5) When was the Human Nutrition Center opened in Mexico? Early 1980. What are a few of its main activities related to soyfoods? "Identify and introduce acceptable soy food dishes in Latin America. Train nutritionists on soy products. Work with governments and institutions on soy nutrition." Address: CEO, American Soybean Assoc., St. Louis, Missouri.

940. Shurtleff, William. 1981. Low-cost extrusion cookers: revolutionary way to bring soy to the Third World. *Soyfoods* No. 5. p. 14-16. Summer.

• ***Summary:*** "The problem is familiar: how to use relatively simple technology to produce large quantities of low-cost nutritious foods that are readily acceptable to people in Third World countries; are quick and easy to use; and can play a significant role in upgrading the diets of those in greatest need such as infants, pregnant and nursing mothers, school children, and the poor. An exciting new answer has emerged during the last decade which is a combination of two factors: the low-cost extrusion cooker (LEC) and locally grown soybeans. The pioneering work with extrusion cookers has been done by researchers at Colorado State University, while that with soybeans suited to tropical and semitropical climates has been done by the INTSOY program at the University of Illinois. A number of successful programs are now underway around the world preparing precooked blended, foods, usually from combinations of locally grown cereal grains (corn, wheat, rice, sorghum etc.) and a protein source such as soybeans. These blends contain typically 16 to 20 percent protein with a quality approximately equal to that of milk (casein), and cost, on average, only $0.16 a pound total to produce and package in 1979 (less than ½ cent a pound of this is processing costs such as labor, utilities, and maintenance).

"Extruded soybeans can be made into an array of nutritious foods, of which weaning foods (baby foods) are predicted to be the most important, but which also include high-protein snacks, soy flour, textured soy protein, and the like. Extrusion cooking these foods in bulk in advance saves the homemaker time and fuel at home, allows the ingredients to be purchased at bulk discounts, and allows dehulling of grains and beans when necessary. The two main products produced on low-cost extrusion cookers are corn-soy blend (CSB) and full-fat soy flour; both are used in feeding programs and sold on the commercial market. Soybeans play a key role in these foods for several reasons: (1) they are the least expensive form of protein in most developing countries; (2) they provide both protein and food energy (calories) from their 20 percent oil; and (3) adding soy to grains makes the grains easier to extrude.

What is an extrusion cooker? Basically it is a machine constructed like a cannon with a hopper at the input end, a screw in the barrel, and a die perforated with many small holes (something like that on a meat grinder) at the muzzle end of the barrel. The screw, turned by a large diesel or electric motor at roughly 500 to 1000 RPM, forces the foods to be cooked against and through the die; the friction and pressure of the process heats the foods to roughly 143º to 163ºC (290º to 330ºF) which both cooks them and inactivates enzymes such as trypsin inhibitors. As the food bursts out of the die into the room, moisture flashes off and it dries automatically as it cools.

"Let's take a more detailed look at the types of foods produced on low-cost extrusion cookers:

"Blended Foods: The most popular blended food is corn-soy blend (CSB), which typically consists of 70 percent corn, 30 percent whole (full-fat) soybeans, and a vitamin-mineral premix. Blended foods are an excellent vehicle for introducing key vitamins and minerals into diets where they are generally deficient. It is important not to reduce the soy component to below 30 percent, as much for the food energy component from the soy oil as for the protein. There is controversy over whether soybeans should be dehulled prior to using them in weaning foods; some feel that fiber in the hull can irritate an infant's delicate digestive system, reduce the bioavailability of important minerals such as calcium, iron, and zinc, and reduce the nutrient density by adding bulk; others have found that using whole soybeans seems to cause no such nutritional problems. Hulls, however, probably cause wear on the extrusion cooker and they tend to settle in beverages, so dehulling is usually recommended.

"The protein quality of CSB is higher than that of milk (PER 2.91 v. 2.50 for milk). Valued for its high nutrition, its convenience, and its good flavor, CSB is most widely used as

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a baby food, and marketed with the image of happy bouncing babies, health, and well-being. Corn soy blend is remarkably versatile; it can be fed to babies in a bottle or spoon-fed as a soft porridge, or served to adults as a healthful cornmeal mush-type breakfast cereal, a lightly sweetened pudding or dry snack, a refreshing drink, or the key ingredient in tortillas or atoles (corn meal-and-soy mush). Another blended food, often made in the U.S. and shipped to Third World countries as part of the Food For Peace program, is wheat-soy blend (WSB). Protein-enriched pastas such as noodles and spaghetti can be made from 50 percent corn flour and 25 percent each soy flour and wheat semolina.

"Full-Fat Soy Flour (FFSF): Since most Third World countries do not have their own oil extraction plants that produce defatted soy meal or flour and since the full-fat or whole flour contains much more food energy, it is generally considered a better food ingredient. Soy flour must be precooked before it is consumed to inactivate trypsin inhibitors and to improve the flavor. It can be added uncooked to baked goods before baking, or it can be precooked by either extrusion cooking, roasting, or drum drying. While FFSF can be extrusion cooked, oil coats the surfaces during cooking and makes it necessary to use an expensive pin mill to grind it to the fineness required to pass through a 100-mesh screen. Soybeans roasted in sand or salt, since they are not sheared during cooking, can be ground to the required fineness with a simpler and less expensive hammermill. A roaster also has a greater 'throughput' and inactivates a larger percentage of the trypsin inhibitors, but it uses more energy.

"Textured and Shaped Foods: If a product such as soy flour or a soy-grain blend is extrusion cooked with a moisture content of 30 percent or more at high temperature and pressure, as it leaves the extruder die and bursts out into the room, which is at relatively low pressure and temperature, it expands greatly and can be shaped by the die into forms such as curls, twists, puffs, and granules, which can be sold as snacks or meat analogs. An extruded snack food made in Thailand, for example, contains 80 percent rice flour, 20 percent full-fat soy flour, one percent salt, and small amounts of ground chilies and other seasonings. Ten percent sesame flour can be substituted for part of the rice flour. Only the larger LECs can produce textured and shaped products.

"Low-cost extrusion cookers are now being used or installed in at least 10 Third World countries: Sri Lanka, Tanzania, Costa Rica, Bolivia, Guyana, Mexico, India, Indonesia, Korea, and Thailand. There are LEC demonstration projects in the first three countries mentioned. Sri Lanka uses a Brady extrusion cooker to make a corn-soy blend weaning food called Thriposha which is distributed by CARE and will soon be sold commercially; 14 million pounds were produced in 1978. Tanzania uses a Brady extruder to make a corn-soy-milk weaning food called Lisha. It is produced by the National Milling Corporation and distributed through the Ministry of Health Maternal-Child Health Centers. The Nutrinal company in Bolivia makes a corn-soy blend sold as Maisoy flour and flakes (like Corn Flakes); most of their sales are to the government, but their commercial Maisoy flakes sell for half the price of the imported Kelloggs brand" (Continued). Address: Soyfoods Center, Lafayette, California.

941. Shurtleff, William. 1981. William Morse: The father of soybeans in America (Continued–Part II). *Soyfoods* No. 5. p. 56-60. Summer.

• ***Summary:*** Continued: "It is truly remarkable that the authors were able to write such a complete and detailed book when neither of them had been to East Asia. (Morse would later spend two years there; 1929-1931.) Most of the book was actually written by Morse who, nevertheless, kindly listed Piper as the senior author. He gathered his information and photographs by extensive correspondence with researchers throughout East Asia and apparently drew heavily on a large collection of books on Chinese agriculture called the Swingle Collection, named after Walter T. Swingle of the Office of Crop Physiology, who spoke Chinese, had traveled extensively in the Orient collecting plants and the books, and had housed them at the USDA library, where Morse did much of his research. Decades ahead of its time, *The Soybean* soon became the standard work on the subject and was referred to by many as 'the soybean bible.' Dr. Piper died in February 1926 at the age of 69.

"Morse's fine work was already starting to give real substance to Piper's dream. In 1920, Morse helped to found the American Soybean Association (ASA) and thereafter helped to unify and direct an ongoing program of research and experimentation. Morse distributed seed from new introductions to anyone interested in soybeans. Among his closest contacts at the State Agricultural Experiment Stations were W.L. Burlison in Illinois and C.B. Williams in North Carolina. As late as 1927, most soybean agronomy research was still done on plots in Washington, D.C. outside the USDA south building. Morse sent out seeds to the states but farmers had problems; they shattered at maturity, were hard to harvest, and were abrasive on the binder canvas in those days before combines. Thus in the early years the tide of interest in soybeans ebbed and flowed. Doubters were always ready to laugh at anyone who talked of the soybean becoming a major U.S. farm crop. But this only served to spur Morse on to greater efforts. He was a very effective extension worker with many contacts, a deep knowledge of his subject, and good intuition. His desk at the USDA soon became the clearing house for information about the soybean. In 1927 he wrote: 'We may keep this work going and place the soybean where it belongs–in the King row with King Corn and King Cotton.'

"The Dorsett-Morse Expedition to East Asia (1929-1931): In the late 1920s it became evident to the USDA

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that the soybean had definite promise as a crop in America and it was decided to send W.J. Morse and P.H. Dorsett to East Asia for two years on what was officially known as the Oriental Agricultural Exploration Expedition (but which people interested in soy usually call the Dorsett-Morse Expedition) to 'make investigations regarding the utilization of the soybean in Oriental countries and the securing of varieties that might be of value to widespread American conditions' (Morse, 1929). In 1929 when the expedition left, Morse was age 45 and had worked on soybeans with the USDA for 22 years. Dorsett (1862-1943), now age 67, was a plant explorer from the USDA Office of Plant Introduction; he was described by a fellow agricultural explorer, David Fairchild, as one of the most ingenious and indefatigable workers he had ever known. Whereas Morse was a specialist, interested in soybeans, Dorsett was a generalist, interested mainly in persimmons, but also in grasses, forages, and other plants.

"During the expedition, Morse and Dorsett kept detailed daily journal notebooks, which were typewritten after the trip and bound in 17 hardback volumes. These volumes, primarily the work of Dorsett, also contain correspondence plus thousands of black-and-white photographs taken by both men. In the bound volumes there are several references to a 'special report on the soybean and its products' that Morse intended to write. Apparently he never completed it, although he did complete detailed chapters on tofu and soymilk. The only original copy of the documents described above is in the archives of the American Soybean Association in St. Louis, Missouri. [Note: As of 2011, it is in Rare and Special Collections, at the National Agricultural Library, Beltsville, Maryland].

"The group arrived in Tokyo on March 18, 1929, and set up headquarters. In August they traveled to Hokkaido, the northernmost island of Japan and center of soybean production, where they studied both soybean cultivation and food uses. In December 1929 they returned to Tokyo and spent full time until March 1930 collecting soyfoods and studying their production and use. On April 1, 1930, they arrived in Dairen, Manchuria, to study soybean cultivation and oil extraction. Dorsett left Morse in the summer of 1930 and went to Peking. He did not rejoin Morse on the trip, although he wrote regularly. Morse went to Korea on August 22, to Mukden in Manchuria on September 29, back to Dairen, the oil-processing capital of East Asia, and then to Peking on October 20; Morse apparently spent only 20 days in China on the entire trip. In late December they took a ship from Dairen back to Kyoto and then Tokyo. On February 17, after several more months of soyfoods research in Tokyo, they sailed for America, arriving in San Francisco on March 4, 1931. Morse's collection efforts–months of tramping through the fields of East Asia–were a bonanza. He discovered that almost every village in the Orient had its own distinctive soybean varieties, developed during thousands of years of close cultivation and inbreeding. Unlike their Western counterparts, Chinese farmers didn't think of looking for improved varieties in nearby villages and then growing these in their own village. They loyally grew the varieties that had been handed down by their honorable ancestors, and wouldn't dream of growing a variety handed down by someone else's ancestors. Morse's major accomplishments on the expedition were: (1) he collected approximately 4,600 distinct soybean seed samples representing roughly 2,000 soybean varieties and including 150 large-seeded vegetable type varieties collected mostly in Korea and Japan; all of these were introduced into the U.S. germplasm collection; (2) he realized for the first time the superiority and potential of the vegetable-type soybeans for food use and later played the leading role in propagating them and teaching others of their value; (3) he developed a much better understanding of soybean growing methods and technology; and (4) he collected more than 250 [commercial] food products made from soybeans, which he took back to America, and did by far the most extensive studies on soyfood production of any Westerner up to that time.

"In his journals and letters, Morse wrote more than once that he was 'amazed at the extent to which the soybean was used for food in Japan.' He was intrigued by the techniques for making tofu, miso, shoyu, natto, and other soyfoods, spent many days in small shops with producers, and described their processes in great detail, taking hundreds of pages of typed text with hundreds of photographs.

"The two-year trip was a tremendous adventure for both Morse and Dorsett. Morse later remarked that he considered it the highlight of his career. He was finally able to fully grasp the great potential of the soybean, which he had only been able to glimpse through his years of reading and work in America." Continued. Address: Soyfoods Center, P.O. Box 234, Lafayette, California.

942. Shurtleff, William; Aoyagi, Akiko. 1981. Das Tofu-Buch: Nahrung fuer alle. Band 2 [The book of tofu: Food for mankind. Vol. 2]. Soyen, West Germany: Ahorn Verlag. 288 p. Illust. by Akiko Aoyagi Shurtleff. Index. July. 23 x 21 cm. Translated from the English by Rainer Bosch and Gudrun Klein. [43 ref. Ger]

• ***Summary:*** Contains 500 recipes. Contents: How to use this book. Preface. Acknowledgements. 1. Protein East and West. 2. Tofu as a food. 3. Getting started. 4. Soybeans. 5. Fresh soybean puree (*Frisches Sojapüree*). 6. Okara. 7. Soymilk curds and soymilk (*Sojaquark und Sojamolke*). 8. Tofu (History, how to make at home, basic preparatory techniques). 9. Recipes for regular and firm tofu. 10. Deep-fried tofu: tofu cutlets, burgers, and pouches (*Vorfritierter Tofu: Tofuschnitzel, Tofuburger, Tofutaschen*). 11. Grilled tofu (*Gegrillter Tofu*). 12. Frozen and dried-frozen tofu (*Gefrorener Tofu und gefriergetrockneter Tofu*). 13. Fermented tofu (*Fermentierter Tofu*). 14. Soymilk

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(*Sojamilch*). 15. Silken tofu (*Seidentofu*). 16. Yuba. 15. Tofu and yuba in China, Taiwan, and Korea. 17. Farmhouse tofu for large families. 19. The ethos and tradition of handmade tofu production. 20. Making tofu in a traditional shop. Appendices: A. Tofu restaurants in Japan. B. Varieties of tofu in East Asia. C. People and institutions connected with tofu worldwide (Incl. directory of tofu manufacturers). D. Sources of supply for tofu production. Bibliography. Glossary. Favorite tofu recipes. About the authors and their work (autobiographical). Tofu–An opportunity for poor and rich lands. The tofu kit (from Sojaquelle in West Germany and Oekullus in Switzerland).

Note 1. This is the earliest publication seen (April 2013) that uses term "Tofurei" to refer to tofu shops / manufacturers. The term was coined by Gabriele Furth-Kuby of Ahorn Verlag.

Note 2. "Sojaquark" is used to refer to soymilk curds rather than to tofu. Published in a hardcover edition only.

Note. This is the earliest German-language document seen (Sept. 2013) that mentions soy cream cheese (p. 104), which it calls *Tofu-Käsecreme*. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

943. Wagner, Martha. 1981. Soy down under. *Soyfoods* No. 5. p. 11-12. Summer.

• ***Summary:*** First discusses the work of Marcea Weber and Debbie Schmetzer in Australia. Marcea Weber owns The Soybean Factory located just outside of Sydney, Australia. Debbie, formerly a tofu maker at Surata Soyfoods in Eugene, Oregon, is now living in New Zealand, where she plans to start a soyfoods business. "Marcea, originally from New York, began her tofu business three years ago, about a year after arriving in Australia from England where she operated a small natural foods bakery. Koreans and Chinese were already producing large volumes of tofu in Australia but her business was the first to produce a nigari tofu. After three years, tofu is still quite foreign to Australians, Marcea says...

"The Soybean Factory sells to natural food stores, restaurants, and juice bars. It produces only 600 half-pound blocks a week. Using simple Takai machinery with a 45-gallon Australian pressure cooker, only 30 pounds are produced in each batch so the selling cost is high, about double U.S. prices, and much higher than Korean and Chinese tofu sold in Australia." "The factory employs three production workers and a manager. Marcea does the promotion. She also spends much of her time teaching cooking and nutrition classes at the East-West (Macrobiotic) Center, which she and her husband, Daniel, an acupuncturist, established when they arrived in Australia."

In New Zealand, "no one outside the Chinese community had even heard of tofu until an Auckland health food store, Harvest Whole Foods, began producing it in a backroom kitchen last October [1980]. The enthusiasm for tofu was shown by several restaurants doing an alternative lifestyle festival, which featured tofu burgers, has produced healthy sales for the shop. The three owners, Greg and Ricky Chalmers and Ricky's wife, Elizabeth, are producing about 170 to 299 kilos (374 to 440 pounds) of tofu a week. They expect sales to grow and are planning to expand production facilities."

Debbie Schmetzer arrived in New Zealand in Jan. 1981 with her husband, Peter (who was born in New Zealand) and their young son. She describes the process and ingredients used to make tofu at Harvest Health Foods, then notes that "Even in the Chinese community, only two Chinese restaurants are making tofu. Harvest's main customers are Indonesians, vegetarians, people switching from dairy to soy on the advice of naturopathic doctors, and spiritual seekers such as Hare Krishna and Divine Light people." On the Run is a fast food deli that makes excellent tofu dishes in Auckland, including tofu burgers, curried tofu salad in pita bread, and tofu tacos with locally made tortillas.

Letter from Martha Wagner. 1981. July 24. "Before this article went to press I learned that Debbie and her husband had become disillusioned with attitudes in New Zealand toward food and organic agriculture, red tape, and toward setting up business–especially concerning a mold to make tempeh. So they took off for greener pastures in Australia. They are now mulling over the scene in the Melbourne are and may well do a bagel business combined with a soy deli. She would be a good person for a soyfoods information center there. Address: 35 Flower Street, Essendon 3040 Victoria, Australia.

"For the addresses of the Koreans and Chinese making lots of tofu in Australia, contact Marcea Weber, 29 Belmore St., Rozelle 2039, NSW.

"Did you meet the Australian couple Fred and Radhika Koch at the SANA conference? They are planning to set up a good size tofu operation as a support for a 26-person community in the country." Address: USA.

944. Magida, Phylis. 1981. How to eat well and still kiss salt, sugar, and fat goodbye. *Chicago Tribune*. Aug. 10. p. A11.

• ***Summary:*** Many Chinese, Japanese and Korean dishes consist largely of vegetables. Instead of using meat, many use tofu (soy bean curd) as a protein source, since tofu contains no cholesterol and relatively little fat. When eaten with rice, the protein quality of tofu increases.

To decrease salt intake, use a low-salt soy sauce available from Yamasa soy sauce company. Or you can decrease the amount of salt or soy sauce by increasing the amount of garlic and/or ginger.

945. Shurtleff, William; Aoyagi, Akiko. 1981. The soybean plant: Botany, nomenclature, taxonomy, domestication, and dissemination history. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 62 p. Aug. 28. Unpublished typescript.

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Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/soybean_plant1.php

A comprehensive history of the subject. Contents: Botany and plant characteristics. Etymology of the term "soybean" and vernacular names. History of soybean taxonomy and scientific names. Origin, domestication, and dissemination in Asia. Individual country dissemination in Asia. Dissemination to Europe. Dissemination in the U.S. South America and Africa. Address: Lafayette, California. Phone: 415-283-2991.

946. Asahimatsu Shokuhin. 1981. Asahimatsu sanjû-nen no ayumi [Asahimatsu Shokuhin: Thirty-year progress / history]. Iida-shi, Nagano-ken, Japan: Asahimatsu. 290 p. Oct. 18. Illust. No index. 23 cm. [Jap]
• ***Summary:*** Contents: History of kori-dofu. 1. History of the early days. 2. When the company began. 3. The spirit of starting the business. 4. The birth of Asahimatsu Kori-dofu K.K. 5. Becoming an independent business. 6. The construction of a new factory and problems producing soft kori-dofu. 7. The challenge of becoming first in the industry. 8. The reality of becoming first in the industry. 9. The aim of becoming a "unique first-class food business." 10. The 30th year: A new start for progress. Documents. Time table. Postscript.

Chronology:

1904–Artificially frozen tofu was displayed at the Fourth Industrial Exhibition in Japan.

1923–The Matsuo Kori-dofu Union was established.

1925 Dec. 25–The Association of Kori-dofu Unions in Nagano prefecture was established.

1930–The Anonymous Asahimatsu Improved Kori-dofu Union was established.

1932–The Anonymous Asahimatsu Improved Kori-dofu Union was reorganized as Asahimatsu Improved Kori-dofu Company, Ltd.

1932–Misuzu-dofu Sales Union (predecessor of the present Misuzu Tofu, Inc.) was established.

1935–Responsibility-guaranteed Suwa Sales Union (the predecessor of the present Daiya Tofu, Inc.) was established.

1937–Kori-dofu Union of East Tsukuma County in Matsumoto City (the predecessor of Miyama Tofu, Inc.) was established.

1939–The All Japan Kori-dofu Association was founded.

1939–The factory for making artificially frozen tofu was built in Matsuo village by Asahimatsu Improved Kori-dofu Company, Ltd.

1940 May–The All Japan Kori-dofu Union Association was established in order to serve as an organization controlling the distribution of soybeans, the raw material.

1941–The Asahimatsu Improved Kori-dofu Company, Ltd. built a branch factory in Korea.

1943–The All Japan Kori-dofu Industry Union Association was established under an order given by the Ministry of Agriculture and Forestry.

1944–The All Japan Kori-dofu Industry Union Association was re-established as The All Japan Kori-dofu Industry Control Union.

1945–The Asahimatsu Improved Kori-dofu Company, Ltd. gave their factory to Fujikura Aircraft Industry Company, Ltd. to be used as a munitions factory.

1945 Aug. 15–The Korean branch factory of Asahimatsu Improved Kori-dofu Company, Ltd. was closed due to the termination of World War II.

1945–The All Japan Kori-dofu Industry Control Union was dissolved.

1947 March–The All Japan Kori-dofu Industry Association was established and joined the Japan Soybean Association.

1950 Dec. 19–The Asahimatsu Kori-dofu Company, Ltd. was established having a total capital of 3,750,000 yen.

1950–The naturally frozen tofu industries were struck by the unusually warm winter.

1951 Jan. 19–The factory of the former Asahimatsu Improved Kori-dofu Company, Ltd. (4873 Matsuo village) was purchased from the Fujikura Aircraft Industry Co., Ltd. and reconstruction of the factory began.

1951 April–The Soybean Control Order was abolished.

1951 May 15–The Asahimatsu Improved Kori-dofu factory started operation. The average daily production was 30 sacks (1 sack = 60 kg = 132 lb) of soybeans. Labor productivity per unit was 13.90 hours/1,000 cuts.

1952–The products of Kansai (the Kyoto-Osaka area) and the natural products from all areas in Japan declined steeply.

1953 Feb.–The All Japan Kori-dofu Industry Cooperative Union Association was founded.

1954 July 1–Asahimatsu's factory was designated by the Ministry of Labor as a model plant having safety and sanitation management.

1956 Aug.–The second construction of the SupeCo style dryer was completed. A current style thawing machine was installed which made the flow of operation continuously automatic.

1957 Nov.–The third construction of a freezing process and boiler was completed. A combustion machine for coal powder was introduced. A new chimney for the boiler was built. The average daily productivity was 112 sacks.

1958 Oct.–'Asahi-dofu' was used as food by the observation party of Showa base at the South Pole.

1958–Competitive sale of kori-dofu began.

1959 March–The first TV commercials for the Kori-dofu industry began in the Osaka area.

1959 Jan. 1–The 'meter' rule was put into practice.

1959–A specialized dryer for cubes was newly installed. Sprinkler-type thawing equipment was completed. The complete continuous operation by exchanging labor made

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the increase in productivity possible after the completion of the third construction.

1960–The average daily productivity: 154 sacks. Productivity of labor per unit: 7.50 hours/1000 cuts.

1962 July–Began sales of soft tofu.

1962–Began refrigeration of products.

1963 Feb.–Frequent occurrence of browned and hardened products.

1963 July–Tenryû plant began full-scale operation.

1963 Oct. 24–Success in making the products soft. Became number one in both quality and productivity among the industries.

1963 Nov. 1–Awarded by the Japan Food Sanitation Association an official commendation for having a well controlled sanitary plant. Began to use heavy oil as boiler fuel at Iida plant. The average daily productivity: At Iida plan, 97 sacks; at Tenryû plant, 136 sacks. Productivity of labor per unit: 6.50 hours/1000 cuts (at both Iida plant and Tenryû plants).

1964 July 7–Awarded by the Nagano Labor Standards Bureau of Ministry of Labor an official commendation for having a well controlled and safe plant. Stabilization of quality of 'soft' products.

1966 Oct.–Shinshu Tofu Co. Ltd. was entirely destroyed by fire.

1966 Nov. 1–Awarded by the Minister of Health and Welfare an official commendation for having a sanitary plant.

1966 Nov.–Misuzu-tofu Co. Ltd. expanded its plants and began to make 'soft' products.

1967 July 1–Asahi-dofu Sales Co. Ltd. was founded.

1967 July–Development at Iida plant of a forming box which does not require removal of whey.

1967 Dec.–Daiya Tofu Co. Ltd. began a plant to work in concert with Asahimatsu Kori-dofu Co. Ltd.

1968 April–Daiya Tofu Co. Ltd. tied up with Asahimatsu Kori-dofu Co. Ltd. Asahimatsu has 53% of the Japanese market.

1968 June 22–Asahi Dofu Sales Co. Ltd. was dissolved. Shinshû-dofu Sales Co. Ltd. was established. Ginseki Kori-dofu Co. Ltd. consigned production to Misuzu Kori-dofu Co. Ltd. Established a sales company entering into partnership with Misuzu Kori-dofu Co. Ltd.

1969 March–Decision to install a test plant which treats liquid effluent waste by the lagoon method inside Asahimatsu Kori-dofu Company's plant.

1969 July 21–'New Asahi-dofu' began to be sold.

1970–Wrapping and boxing machines were introduced at the Iida plant. Specialized dryer for cubes was completed. Percentage of good products at Iida plant is 96% and that of Tenryû plant is 95.3%. The average daily productivity at the Iida plant: 232 sacks, and at the Tenryû plant: 224 sacks. Productivity of labor per unit at the Iida plant: 3.97 hours/1000 cuts, and at the Tenryû plant: 3.28 hours/1000 cuts.

1970 Jan. 1–Genichi Akaba became the new president of Asahimatsu Kori-dofu Co. Ltd.

1970 May–Genichi Akaba, the president of Asahimatsu Kori-dofu Co. Ltd. took office as the chief director of the Kori-dofu Industry Association Union of Nagano prefecture.

1971 Aug. 17–An overseas training program was established. The first trainee was sent to the University of Illinois. A liquid waste management facility was completed.

1972–Operations began in January in the Iida plant and in August in the Tenryû plant. 'Asahikoya with Seasoning' was developed and began its sales with a test market.

1972 Aug. 17–A second trainee was sent to the University of Illinois.

1973–'Asahikoya with Seasoning' was introduced to the public in the Tokyo market. Misuzu Tofu Co. Ltd. began to sell Koya-dofu with seasoning.

1975 Jan.–Tie-up with Mitsubishi Shoji in sales. President Fukui of the National Nutrition Research Institute and the nutritionist Kozu reported the results of an experiment using kori-dofu for preventing anemia.

1976 July–The machine for dehydrating okara at the Tenryû plant began operation.

1976 Oct. 23–The 30th anniversary of Asahimatsu Company was celebrated and a party was held. The percentage of good products at the Iida plant was 96.0%; at the Tenryû plant was 96.4%. The average daily productivity at the Iida plant was 244 sacks (1 sack = 60 kg of soybeans); at the Tenryû plant was 251 sacks. The productivity of labor per unit at the Iida plant was 1.99 hours/1000 cuts; at the Tenryû plant was 1.80 hours/1000 cuts. Address: 1008 Dashina, Iida-shi, Nagano-ken 399-25, Japan.

947. Hartwig, Edgar E. 1981. Re: History of soybeans in North Carolina. Letter to William Shurtleff at Soyfoods Center, Nov. 2. 4 p. Typed, with signature on letterhead.
• ***Summary:*** "In my early years working with soybeans in North Carolina, I traveled with Mr. W.J. Morse on several occasions and he gave me some of the early history of soybeans. One of the men that he mentioned as having an active interest in soybeans in North Carolina was Mr. Fred P. Latham of Belhaven, North Carolina. I wonder if you have the proceedings of the American Soybean Association Volume 1 covering the years 1925-1925. Mr. Latham was active in the early years of the American Soybean Association. In a report he made in 1924, he indicated that he had been growing soybeans for 16 years. He credited W.J. Morse with activating his interest in soybeans. I believe that it was in the fall of 1950, the last years before Mr. Morse retired, we visited Mr. Latham on his farm in eastern North Carolina. He also had retired from active farming. They enjoyed their visit discussing some of the early years with soybeans. I believe members of the Latham family are still farming and growing soybeans in eastern North Carolina.

"C.B. Williams was head of the Agronomy Department

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at North Carolina State for many years. He had retired at the time I began my work in 1943, but I did have an opportunity to visit with him. He also had worked closely with Mr. Morse in getting soybeans established in North Carolina. Mr. Williams recognized the importance of nodulation on soybeans for successful production and developed a system of collecting soil from fields that had grown well-nodulated soybeans to distribute to areas where soybeans were to be planted the first time.

"As to why soybeans became established in North Carolina more successfully than other areas is a matter of several assumptions. I have assumed that some of the early ships bringing material from Japan had used soybean material for ballast in their ships, and in docking at ports such as Norfolk, Virginia or Elizabeth City, North Carolina had thrown out some of the soybeans that were in excess, and types such as Mammoth Yellow were at a maturity that they were well adapted for northeastern North Carolina and fit into their agricultural practices. I could furnish you a picture of some of the early harvesters should you desire this. As to other pioneers in the field, I do not have any other names to suggest.

"Fertility studies were conducted with soybeans in North Carolina in the late 1920's. Dr. S.G. Lehman, who I have discussed somewhat in the plant pathology work, was a pioneer in the identification and describing of the diseases of soybeans. It seems that in introducing soybeans from the Orient, they introduced most of the diseases attacking the crop in China and Japan. Although soybeans were a relatively unimportant crop in the state, Dr. Lehman and some of his co-workers described many of the diseases that we now recognize as important problems in the production of soybeans. He gave me considerable assistance in learning to identify diseases and recognizing the type of injury which they caused.

"There was no active breeding program concerning soybeans in the area until I began my work in 1943. The varieties Mammoth Yellow, Tokyo, Haberlandt, and Woods Yellow were major varieties. I am assuming that Mammoth Yellow was distributed as coming from ballast material on ships. Tokyo was introduced from Japan in the early 1900's, and Haberlandt was from Korea. I assume that Mr. Morse distributed seed of these to people like Mr. Latham. Woods Yellow was selected as a somewhat later maturing type out of the Mammoth Yellow variety. Later such black seeded types as Laredo and Otootan were introduced for hay production. It was the enthusiasm of people like W.J. Morse, C.B. Williams, and Fred Latham, who, in their contacts with farmers, suggested to them that they might try this crop. There was little attention from extension agronomists or research projects to stimulate the interest in the crop.

"In 1979 the Soybean Processors Association in their annual meeting recognized the 50 years of existence as an organization. The Soybean Crop Advisory Committee in their meeting recognized some of the achievements and activities over the period. I am enclosing a copy of the report which was prepared from this meeting.

"I assume that you have read my chapter on varietal development, but I am enclosing a reprint. I am returning the copies you sent with some modifications and additions.

"I would not classify Mr. W.J. Morse as a soybean breeder, but rather as an agriculturist. He began working for the Department of Agriculture in 1907. Research was at a different level from what it is now. His job was to become familiar with the crop and see where it might fit into the U.S. Agricultural system. In the early years, the crop was considered as a forage crop and also a crop that might be grown and turned under for soil improvement. But I believe it was in the mid-1920's that Piper and Morse stated that the future of soybeans was not as a forage crop, but as a seed crop for producing protein and oil. Since this was a crop in which very few were interested, the early introductions from Asia were grown and looked at and if they did not appear to fit an immediate purpose there was no need or really no system to retain them. You may have mentioned it, but I might repeat that it was not until 1941 that as many acres of soybeans in the U.S. were harvested for seed as were grown for forage. With regard to introductions, we received a large number from Japan after World War II when the U.S. Army of Occupation took over. I believe that essentially all soybean introductions received into the U.S. since 1948 are in our collection and many of their characteristics described and many have been utilized in the breeding program.

"From a machinery standpoint, the development of the combine harvester was a very important aspect in the development of soybean production. The grain binder and stationary thresher was used for small grains and was not as satisfactory for harvesting soybeans. The early beaters developed for harvesting in North Carolina were rather unsatisfactory. This was pulled through the field by a pair of mules and the beaters hit the soybean plants and a portion of the beans went into the box behind the beaters and many of the beans flew into the air in all directions. These beaters, to be moderately successful, required varieties that shattered rather readily. Thus, the beans had to be harvested at a very short time after they were ready to be harvested. If they were not harvested at this time, then seed would be lost to shattering. The Asiatic farmer usually grew only a very small area with soybeans. He cut these by hand and tramped them out. This system was certainly not satisfactory for American agriculture.

"In South Carolina Mr. John Wannamaker became interested in soybean production in the early 1930's. I visited his farm in 1943. He was growing some material that traced to introductions from Nanking, China that were distributed by W.J. Morse. Mr. Wannamaker was very enthusiastic about soybeans and made selections from the original seed lots that he received and distributed them to farmers in his area. His

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activities and enthusiasm helped get soybeans started in the coastal plains area of South Carolina.

"W.J. Morse seemed to have an ability to hear of anyone that was interested somewhat in soybeans. Professor Tracy had retired as director of the Mississippi Agricultural Experiment Station and had a home on the Mississippi Gulf Coast. Mr. Morse regularly sent him new introductions that were received from parts of Asia that he thought might be suitable for that latitude. One of the introductions that Professor Tracy thought well suited for the area, he gave the name Biloxi. For many years the variety Biloxi was widely grown for interplanting with corn in the southeast, and then grazed after corn was harvested by turning hogs or cattle into the fields. One of the major interests with regard to the variety Biloxi is that this variety was used by Garner and Allard in their studies in describing photoperiodism in plants. Plant physiologists all over the world still request seed of Biloxi from us when they are conducting photoperiod experiments.

"I trust these comments will be of help to you. Should you have further questions which you think I might be able to give you assistance, feel free to contact me at any time.

"Sincerely,..." Address: Research Agronomist, Soybean Production Research, Delta Station, P.O. Box 196, Stoneville, Mississippi 38776.

948. Judy, W.H.; Jackobs, J.A.; Engelbrecht-Wiggans, E.A. 1981. International soybean variety experiment: Sixth report of results, 1978. *INTSOY Series* No. 21. Nov. xi + 305 p. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: Africa: Algeria, Botswana, Cameroon, Egypt, Ethiopia, Gabon, Ghana, Malawi, Morocco, Rwanda, Senegal, Somalia, Sudan, Tanzania, Upper Volta, Zaire, Zambia, Zimbabwe.

Asia: Bangladesh, Taiwan, India, Indonesia, Korea, Malaysia, Nepal, Pakistan, Sri Lanka, Thailand.

Europe: Italy, Poland, Portugal.

Mesoamerica: Costa Rica, Dominican Republic, Guatemala, Honduras.

Middle East: Iran, Iraq, Saudi Arabia, Turkey.

North America: United States.

Oceania: Fiji, Tahiti.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Paraguay, Peru, Venezuela.

Results of the first ISVEX trials in Morocco are reported. Soybeans were grown at three sites: (1) Berkane. Date planted: 22 May 1978. Cooperator: M.A. Yacoubi. Best yield: Harcor 3,724 kg/ha. (2) Gharb. Date planted: 13 May 1978. Cooperator: M.A. Yacoubi. Best yield: Elf 3,046 kg/ha. (3) Tadla. Date planted: 12 June 1978. Cooperator: Nadah Driss. Best yield: Crawford 3,370 kg/ha. Address: Univ. of Illinois, Urbana.

949. Drake, Milan. 1981. Re: La Choy soy sauce. Letter to William Shurtleff at Soyfoods Center, Dec. 8. 1 p. + 2 p. of labels and recipes. Typed, with signature on letterhead. Preceded by an interview on Dec. 2.
• ***Summary:*** 1. Ed Neel says the first soy sauce bottled by La Choy was definitely hydrolyzed. He recalls that they bottled it pretty much as they received it.

2. Ed Neel recalls that Staley and Huron Milling were the original suppliers of HVP to La Choy.

3. La Choy did not manufacture a fermented soy sauce until after they purchased Oriental Show-You Co. in 1963– says Paul Sigo.

4. La Choy now distributes 2 types of soy sauce: La Choy Soy Sauce (made with HVP) and Oriental Soy Sauce (fermented). Of these two, the HVP product accounts for about 85-90% of all soy sauce sales. Labels for both products are enclosed. Ingredients in the HVP sauce are: Water, protein extracts from soy beans, salt, corn syrup, and caramel color. The fermented product also appears to contain some HVP.

Accompanying this typed letter from Milan Drake is a questionnaire from William Shurtleff on Soyfoods Center letterhead dated 2 Dec. 1981. It contains seven questions, with the answers written in by hand.

Milan does not know when La Choy first began making or marketing soy sauce. Ed Neel thinks it was 1922 or maybe 1923. A document indicates that by 1922 they were importing a soy sauce from China. In Sept. 1944 La Choy soy sauce was advertised in *Soybean Digest.*

La Choy started as follows: Ilhan New (a Korean man) and Charles Smith attended the University of Michigan together. Both felt there was a market for Oriental foods in the area, so they started the company in 1927 in Detroit, but soon expanded. They hired Ed Neel and expanded more. During World War II they were unable to obtain cans, so they moved the company to Archbold, Ohio, then after the war went back to Oriental Foods. Smith bought out Mr. New, then Smith was killed by lightning. Beatrice bought the company in 1943. Address: Director, Research & Development, La Choy Food Products, 901 Stryker Rd., Archbold, Ohio 43502. Phone: 419-445-8015.

950. Kim, Gai W. 1981. Re: Introducing tofu to Sri Lanka. Letter to William Shurtleff at Soyfoods Center, Dec. 18–in reply to inquiry of Nov. 18. 1 p. Typed, with signature.
• ***Summary:*** "I sincerely hope that you and your wife will come to Sri Lanka in the near future to teach me how to make aburaage [deep-fried tofu pouches], which I simply fail to make although I tried all the instructions written in your *The Book of Tofu.*

"As for my project, at present, Tofu, which I named Boncheese here because 'bean' in Sinhalese is Bonchi and the method of making tofu is just like making cheese. Soy

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Bread are daily sold at the Cornel's, the only Super Market in Colombo. I managed to make Miso out of Tempeh within a week's time and you have to taste it to appreciate its beauty. The biggest breakthrough is to supply about 50 pounds of *soyamesh* [soybeans ground in water; soybase or soy puree] every morning to the Colombo General Hospitals and the Welikada Prison to be used in lieu of coconut milk for the daily curry cooked in their kitchen. The plant I helped to set up is using about 1.5 to 2 tons of de-hulled [soya] beans a month at the moment.

"I am enclosing a report from the Super Intendent [superintendent] of the Welikade Prison in Colombo for your perusal. If you are really interested in my project in can send you some correspondence and newspaper cutouts [clippings] upon request.

"I just finished writing a letter to BMI regarding an order of BMI 100 for the expansion of the project."

A handwritten note says that Kim is contacting the Navy and Air Force canteens for her soy project.

Attached are two letters which are cited separately: (1) From H.G. Dharmadasa, Superintendent of Welikada / Welikade Prison (Oct. 1981). (2) From Dr. W.S. Weerasooria, Secretary, Ministry of Plan Implementation (16. Oct. 1981). Address: c/o UNDP in Sri Lanka, P.O. Box 1505, Colombo, Sri Lanka.

951. Kiang, Y.T. 1981. Inheritance and variation of amylase in cultivated and wild soybeans and their wild relatives. *J. of Heredity* 72(6):382-86. Nov/Dec. [17 ref]
• ***Summary:*** The cultivated soybean is *Glycine max* and the wild soybean is *Glycine soja.* Eleven wild relatives include *Neonotonia wightii,* which is a perennial with long climbing vines. It is widely distributed in Africa, Southeastern Asia, and Taiwan, and is commonly called the perennial wild soybean. Seed of *Neonotonia wightii* showed no amylase activity except in two accessions from South Africa. Some enzymes of cultivated soybeans have been studied electrophoretically, but there is only one brief report of isozyme analysis of the wild soybean (*Glycine soja*). Address: Assoc. Prof. of Plant Science and Genetics, Univ. of New Hampshire, Durham, NH 03824.

952. Oh, Hea Sook; Lee, K.H.; Yoon, S. 1981. [Preparation of soymilk yogurt and related studies]. *Korean J. of Nutrition* 14(4):175-81. Dec. [39 ref. Kor; eng]
• ***Summary:*** Yogurt was made by fermenting soymilk using lactic acid bacteria: *Lactobacillus acidophilus, Streptococcus thermophilus,* and *L. bulgaricus.* Sucrose, the main carbohydrate in soymilk, was fermented by *L. acidophilus* and *S. thermophilus.* None of the bacteria tested was able to ferment melbiose or raffinose. L. acidophilus grew the fastest during the early stage. After 16 hours of incubation, however, all the cultures except L. bulgaricus grew at nearly equal rates. All cultures except L. bulgaricus formed acid rapidly during 16 hours of incubation, bringing titratable acidity to 0.6% and pH to 4.3, which was enough to cause coagulation of the soymilk.

Three yogurts were prepared using 100% soymilk, 100% cow's milk, and 50% of each, fermented by S. thermophilus, and evaluated by a taste panel. Soy yogurt had a better, custardy texture, however scores for texture, color, and flavor did not differ significantly among the three. Soy yogurt had a significantly lower mean odor score. Total mean scores were between good and fair. Address: Dep. of Food & Nutrition, College of Home Economics, Yonsei Univ., Seoul, South Korea.

953. Cho, H.O. 1981. [Effect of rice and improved Gochujang Koji on the quality improvement of rice Gochujang]. *Korean J. of Food Science and Technology* 13(4):319-27. *

954. **Product Name:** [Dong Bang Soy Flour, and Textured Soy Protein].
**Manufacturer's Name:** Dong Bang Oil and Flour Mills Co. Ltd.
**Manufacturer's Address:** No. 2 Yangpyung-dong 4-ka, Yungdungpo-ku, Seoul, South Korea.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 60, 63.

955. **Product Name:** [Green Milk {Soy Milk Ice Cream Ingredient}].
**Manufacturer's Name:** Green Milk Co., Subsidiary of Dong Bang Oil and Flour Mills Co., Ltd.
**Manufacturer's Address:** No. 2 Yangpyung-dong 4-ka, Yungdungpo-ku, Seoul, South Korea. Plant at Jin Hae, Kyung Nam.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 60.

Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

956. Lee, Hyun-Ja; Shu, J.S. 1981. Effect of Bacillus strains on the Chungkookjang processing (I). Changes of the components and enzyme activities during Chungkookjang-koji preparation. *Korean J. of Nutrition* 14:87-104. *
• ***Summary:*** "In order to study the changes of components and enzyme activities during Chungkookjang-Koji preparation, the kojis were prepared with Bacillus Natto, Bacillus subtilis and traditional method... Amylase and protease activities showed on irregular change on standing and their activities were not remarkably different among the groups and appeared weakly."

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957. **Product Name:** [Soy Sauce].
**Manufacturer's Name:** Sampyo Foods Co. Ltd.
**Manufacturer's Address:** 647-2 Chang Dong, Dobong-Ku, Seoul, South Korea.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 69.

958. Bernard, R.L.; Nelson, R.L. 1981. USDA Germplasm Collection Inventory–1900 to 1977. Urbana, Illinois: University of Illinois. 37 p. Typed Ms.
• ***Summary:*** "Information on the origins of introduced United States and Canadian named varieties and all strains identified by FC numbers and PI numbers introduced through 1977 (PI 420.388).

"This is a working paper. Please report any errors to R.L. Bernard, Turner Hall, Univ. of Illinois, Urbana, Illinois 61801. A final document will be issued later in 1981.

"Soybean Germplasm Manual 1."

Gives contact information for the Northern Collection (Maturity Groups 000 to IV, Richard Bernard and Randall Nelson) at the Univ. of Illinois, and the Southern Collection (Maturity Groups V to X, Edgar Hartwig and Calton Edwards) at Stoneville, Mississippi.

This detailed work consists of a 3-page introduction followed by many tables.

This "collection of soybean cultivars, herein referred to as strains, from throughout the world" is maintained by the USDA "in cooperation with the Illinois and Mississippi Experiment Stations. The collection is in two sections, the northern or early-maturing strains... at Urbana, Illinois, and the southern or late-maturing ones... at Stoneville, Mississippi. The collection was established in 1949 with the objective being to obtain and maintain all significantly different soybean strains from throughout the world with emphasis on land races of eastern Asia, where soybeans originated. It was initially assembled by L.F. Williams at Urbana and E.E. Hartwig at Stoneville under the supervision of M.G. Weiss, leader of USDA Soybean Investigation, and J.L. Cartter, director of the U.S. Regional Soybean Laboratory [at Urbana, Illinois].

"The strains of the collection may be divided into three parts corresponding to their designations: 1. United States and Canadian named varieties (cultivars)...

"2. FC strains consisting of foreign introduction and domestic strains identified by a series of numbers assigned by the former Forage and Crops section of the USDA. This series was used until about 1956.

"3. PI strains, consisting of foreign introductions identified by the system described in the following section.

"In addition to the soybean germplasm collection outlined above, collections of genetic types and isolines, wild soybeans (*Glycine soja*), and perennial *Glycine* species are maintained, and lists of this material are available from the curator at Urbana."

"In 1949 when this collection was established they were able to gather from the USDA and various state experiment stations 1,521 strains, which is *19%* of the original 7,873 introductions made through 1944."

"The last page of Table 1 [p. viii] shows the results of the two large Asian collecting expeditions, the first by USDA plant explorer P.H. Dorsett [and his son, Jim] in 1924 to 1927, and the second by Dorsett and USDA soybean specialist W.J. Morse in 1929-1931. The soybeans obtained by them (5,417 varieties) represent 69% of the total received from 1900 to 1944 and make up 82% of the pre-1945 strains in the present collection."

"The major additions in recent years have been the 861 from Japan in 1977 and the 1,823 from South Korea in 1976."

"Maturity Group 00 was split into 000 and 0 in 1981 with the earliest ones in 000."

"The varieties introduced up until about 1908 (36) are mostly hay-type varieties. Those from 1910 to 1927 (61) are mostly grain-type and include virtually all of the introductions ancestral to the present U.S. commercial varieties. Those of 1929 and 1932 (41) were from the Dorsett and Morse expedition and are mostly vegetable types released for human food and home-garden use."

Tables: (1) PI numbers assigned by year, and number of strains in the USDA Soybean Germplasm Collection. The last page of Table 1 shows that from 1924 to 1927 Dorsett sent back 966 soybean PI numbers of which 260 (26.9%) are still in the collection. From 1929 to 1932 Dorsett and Morse sent back 4,451 soybean PI numbers of which 986 (22.2%) are still in the collection.

(2) A statistical history of soybean introduction.

(3A) Soybeans introduced from 1900 to 1944 by country and within country by year.

(3B) Soybeans introduced from 1945 to 1977 by country and within country by year.

(4) Number of strains in the Collection by country.

(5) Number of strains in the Collection by maturity group.

Origins of introduced soybeans which became U.S. and Canadian named varieties.

Origins of soybean strains identified by FC numbers.

Origins of soybean strains identified by PI numbers.

Note: This unpublished typescript was updated and published in two volumes in 1987 as INTSOY Series No. 30 and in 1989 as INTSOY Series No. 31. Both are extremely useful and interesting. Address: Urbana, Illinois.

959. Cho, Joong Ok. 1981. Home style Korean cooking in pictures. Tokyo: Japan Publications. Distributed by Harper & Row (New York). 96 p. Illust. (mostly color photos). Recipe index. 27 cm.
• ***Summary:*** Soy related recipes: Cooked tofu and ground

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meat (*Dubu jjim*, p. 32). Garnished rice (*Bibim bap*, p. 44, with soy sprouts).

About the author: "Mrs. Cho Joong Ok was born and raised in Seoul, Korea. A descendant of a noble family from which six Korean queens have come, Mrs. Cho is as versed in palace cuisine as she is in family cooking." She has written a number of books on Korean cooking, "contributes regularly to magazines and teaches Korean cooking on television. She lives in Tokyo with her husband..." Unfortunately, this book has a poor index. Address: Tokyo, Japan.

960. Jaffrey, Madhur. 1981. Madhur Jaffrey's World-of-the-East vegetarian cookery. New York, NY: Alfred A. Knopf, Inc. 461 p. Illust. by Susan Gaber. Index. 20 x 20 cm. A second edition was published in 1983 in London by J. Cape.
• ***Summary:*** The Indian woman author of this creative book presents 21 recipes for bean curd (tofu), 7 for tempeh, and some for yuba and miso. Green soy beans with sauce (p. 7). Cabbage with miso (p. 15). Eggplant slices with white miso (p. 22-23). Fresh soy beans, steamed (p. 57). Spinach with fermented bean curd (p. 59). Stuffed yellow squash (with yuba, p. 62-64). Pecel (Vegetable salad with spicy peanut sauce, plus tofu and tempeh; p. 73-74). Tempura (with tofu; p. 75-77). Soy bean sprouts (how to grow; p. 100). Soy-bean and mung-bean sprouts seasoned with sesame oil (p. 105). Tempeh, Fried tempeh, Fried, preseasoned tempeh, Sambal goreng tempeh kering (Sweet and sour tempeh), Tempeh cooked in coconut milk (p. 108-110). Thai fried rice (with Red Bean Curd or Nam Yee [red fermented tofu]; p. 150-51).

One chapter (p. 160-89) is titled "Soy milk, bean curd, and wheat gluten." Making your own soy milk. Making your own bean curd. Udofu (*Yudofu*, simmering bean curd with seasonings). Bean curd with watercress. Korean-style bean curd in a hot water bath. *Hiya-yakko* (Chilled bean curd). Bean curd with Chinese parsley. Bean curd with broccoli. Cabbage cooked with bean curd. Bean curd with a deliciously spicy sauce. Carrots and beans with bean curd dressing. Bean curd, mushrooms, and peanuts in hoisin sauce. Sautéed bean curd. Tofu dengaku (Toasted bean curd with a miso topping). Fried bean curd cubes, soy-bean sprouts sautéed with fried bean curd. Fried bean curd with a sweet-and-sour sauce. Fried bean curd cakes with a mustard surprise. Inari-zushi ("Bags" of fried bean curd stuffed with sushi rice). Pressed bean curd with cabbage. Salad of pressed bean curd, mung-bean sprouts, and agar-agar. How to make fried and baked wheat gluten balls (plus 5 gluten recipes). Buddha's delight (with yuba and fried bean curd).

Chawanmushi (Steamed savory custards, with tofu; p. 192-94). Omelette with bean curd (p. 198-99). Soy sauce eggs (p. 209). Paneer (milk cheese; p. 237-40). Hot or cold noodles with a soy-sauce dressing (p. 248). Noodles with a hot-and-sour bean sauce (p. 250). Vegetarian mee krob (Crisp noodles with pressed bean curd and eggs, from Thailand, p. 255-56). Noodles with quail eggs, mushrooms, spinach, and yuba (Japan; p. 256-57). Hoppers (yeast pancakes from Sri Lanka). Roti (Flat whole-wheat bread). Delicious stock made with soy-bean sprouts. Clear soup with enok mushrooms, bean curd skins [yuba], and spinach (p. 297). Clear soup with soft bean curd and celery cabbage (p. 298). Miso soup with bean curd (p. 307). Miso soup with carrots and mushrooms (p. 308). Fried, munchable soy beans [soynuts] (p. 321-22). Potato and tempeh patties (p. 339). Dipping sauces (with soy sauce; p. 357-59). Kombu relish (with soy sauce, p. 374). Shoyu daikon (White radish pickled in soy sauce). Ginger quick-pickled soy sauce (p. 375). Aomidaikon (Quick pickled small white radishes, with slightly sweet yellow miso; p. 377-78). Chinese-style jellied bean-curd sweetmeat with a peanut topping (p. 399-400).

General information (p. 418-36; lots on soyfoods, see: bean curd [regular, fried, fermented (Nam Yee), pressed, pressed seasoned], kochu chang [jang], miso, soy-, tempeh, yuba). Sources (of ingredients; p. 437-40). Address: New York City, NY.

961. Windish, Leo G. 1981. Dr. R.L. Bernard. USDA plant geneticist stationed at the University of Illinois college of agriculture. Well known modern day soybean geneticist whose work is widely acclaimed (Continued–Document part II). In: Leo Windish. 1981. The Soybean Pioneers: Trailblazers, Crusaders, Missionaries. Galva, Illinois: Published by the author. viii + 239 p. See p. 155-60. Chap. 29.
• ***Summary:*** (Continued): "Another major disease, only recently widely found in the midwest, is soybean cyst-nematode. In 1966, although it was present in Illinois in only a few southern counties, Dr. Bernard began a breeding program for cyst-nematode resistance in cooperation with the Missouri Delta Center at Portageville, Missouri. Testing for cyst reaction is done in winter in the Delta Center's greenhouses under the direction of Dr. Grover Shannon, and agronomic evaluation is done in Illinois. Last year, Franklin was released from this program to replace the old variety Custer, the only other northern variety (maturity Group IV or earlier) with resistance to soybean cyst-nematode. Earlier varieties with resistance are now being tested. Some have advanced to the regional tests and will be released for commercial production as soon as the most satisfactory one or ones can be identified.

"Other pests that have received attention include leaf-spot diseases, brown stem rot, and the Mexican beetle. Clark 63 (developed cooperatively with Dr. Williams in Missouri), Wayne, Williams, Woodworth, Union, and Franklin were also selected as resistant to bacterial pustular leaf spot. They have become the major Group III and IV varieties in the southern part of the midwest, and that formerly prevalent disease has become a rarity. On the other hand, downy mildew leaf-spot has become very prevalent in the

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area because of the high susceptibility of Clark 63, Wayne, Williams, and Woodworth.

"Dr. Bernard has identified a gene for complete resistance to downy mildew leaf-spot and has incorporated it into the variety Union, giving some hope for complete control of this disease as additional resistant varieties are released. Brow stem-rot is one of the most prevalent soybean diseases and appears to increase with frequency of soybean growing. They have been successful in developing productive varieties with resistance to brown stem-rot, discovered by Dr. Chamberlain, at Urbana.

"An extensive program has also been launched for breeding resistance to Mexican bean beetle in cooperation with entomologists here, at Purdue University in Indiana, and at Beltsville Agricultural Research Center in Maryland. Mexican bean beetle has not heavily infested Illinois soybean fields yet, but with heavy infestations in nearby Indiana and Kentucky, as well as in Maryland, it seems wise to start this effort before the problem actually develops here, especially since it will take many years to produce a commercially accepted resistant variety.

"In addition to working on specific pests, Dr. Bernard has been breeding for improved seed quality, especially in varieties adapted to southern Illinois, where quality is so frequently a problem. The related varieties Williams, Woodworth, and Union have come out of this program. While there is room for much more improvement, they are superior in seed quality to the varieties they replaced, and are also more resistant to lodging and shattering. All three varieties have gained wide farmer acceptance. Williams is currently the most popular American variety and is grown on about 9,000,000 acres annually (1979-1980 figures). Dr. Bernard's efforts are now being turned toward selection for resistance to diaporthe, a fungus involved in the seed-quality problem, and for resistance to soybean mosaic and bean-pod mottle, two virus diseases Dr. Bernard also suspects contribute to the seed-quality problem.

"Germ-Plasm: Maintenance of the northern section of the USDA's soybean germ-plasm collection has been one of Dr. Bernard's major responsibilities. The USDA's collection was initiated in 1949, when soybeans had become an important enough crop to justify a permanent collection of all available varieties from throughout the world.

"Before then, many hundreds of soybean varieties had been introduced, especially from eastern Asia, the native homeland of the soybean, but most of them had been discarded if not found immediately useful. In 1949, at the instigation of Martin Weiss, head of the USDA soybean investigations, the USDA and the experiment stations were solicited and all varieties of soybean still in existence in this country were gathered together. They totaled about 2,000. The early-maturing ones were to be maintained at the University of Illinois by Leonard Williams of the U.S. Regional Soybean Laboratory, and the late ones (Group V and later) were to be maintained by Edgar Hartwig at the Delta Branch Station in Mississippi.

"Thus, when Dr. Bernard arrived in 1954, the collection was just about four or five years old and there was much cataloging, identification, and purifying of varieties to be done. In the next few years, performance tests were run for all 2,000 varieties and evaluation reports were circulated to soybean researchers throughout the world. Thousands of seed packets are sent each year to researchers and these have been the basis for successful searches for resistance to many pests and of other research requiring diverse germ-plasm.

"At first, the collection grew rather slowly. Foreign varieties were sent to the United States from time to time, but few active solicitations were made. In the past eight years, the collection has grown much more rapidly, partly because of trips Dr. Bernard made to Japan and South Korea in 1974. While in those countries Dr. Bernard collected specimens himself and made contact with researchers and institutions that had soybean collections. Subsequently we have received a large number of varieties from Korea and Japan. The Urbana collection, which totaled about 2,000 varieties when Dr. Bernard began working with it, now includes over 6,000 domestic and foreign varieties of cultivated soybeans. Just within the past year the Soviet Union sent us over 1,500 additional varieties, which are being added to our collection.

"During Dr. Bernard's trip to Japan, Korea, and China, he collected some samples of the wild soybean (*Glycine soja*), which had never received much attention here or in Asia. From seven accessions previous to 1968 the wild soybean collection has grown to include 558 strains, which provide an interesting subject of study for those interested in the evolution of the soybean, and are a diverse potentially new source of pest resistance and other traits desired by U.S. soybean breeders. In addition to the wild soybean, there are several other species in the genus 'glycine,' all of them perennial and native to Australia, with the range of some extending to southeast Asia and the nearby Pacific islands. When the collection was begun, most American soybean researchers were unaware of these near relatives of the soybean. One or two accessions of what was then known as *Glycine javanica*, the 'perennial soybean,' were in the initial collection at Urbana, and we have since obtained several dozen accessions. Although the taxonomists have now removed this species to the genus *Neonotonia* it still has some interest as a not-too-distantly related legume species and also is a forage crop in its own right in many tropical areas.

"The other species of the genus were completely unknown to American agronomists until Dr. Bernard obtained some seeds of *Glycine tabacina*, originating in Australia. These were planted in the agronomy greenhouse in January, 1958, and produced a small, delicate, viney plant with soybean-like flowers and very small pods and seeds. Seeds of several other species have been received

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and grown in the greenhouse in subsequent years, and this collection has stimulated the study of Glycine in this country. Theodore Hymowitz and Christine Newell of the Department of Agronomy, have been particularly active in taxonomic and cytological studies of perennial Glycine species. Their work has greatly enlarged the collection of these species and augmented our knowledge about them.

"Current and Future Plans: Today, as more and more researchers at both public institutions and private seed companies are getting into soybean breeding, Dr. Bernard is concentrating more on resistance to pests important to the Midwest, or of potential importance, and on basic genetic studies which he hopes will be useful to the many now engaged in soybean research. In addition, Dr. Bernard said, 'We are greatly increasing our efforts in germ-plasm collecting, documentation, evaluation, and utilization. Before any more germ-plasm is lost we need to obtain collections from those areas that have been insufficiently sampled in the past, such as southern and western China and North Korea. Available information on the collection is being compiled and will be made readily available to interested researchers.'

"With the recent additions of USDA pathologist S.M. Lim and geneticist R.L. Nelson to the staff at the University of Illinois, Dr. Bernard is hopeful that our program of germ-plasm evaluation will be greatly increased, and that the somewhat narrow germ-plasm base of American commercial soybean production can be effectively enlarged, resulting in more efficient and stable production." Address: 101 Exchange St., Galva, Illinois 61434.

962. Tchah, Kyun Hi. 1982. Re: Dr. Chung's Foods Co., the largest soymilk manufacturer in South Korea. Letter to Dr. Chevalier F. De Selliers de Moranville, Jan. 5. 1 p. Typed, with signature.

• ***Summary:*** "Dear Dr. Chevalier: I have learned from prof. John W. Santas of University of Illinois of U.S.A. that you have interest in knowing the firms which are producing Soybean milk.

"Our company is the largest producer of the said milk in Korea, and annual sales in 1981 was around $15 million.

"We like to hear from you the points of your interest and area we could cooperate each other for mutual benefit." Address: Advisor to the President, Dr. Chung's Food Co., Ltd. Head Office, Business Dep. Insong Bldg. 18G 194.15 I-Ka, Hoehyun-Dong, Choong-Ku, Seoul, Korea. Phone: 23-2151-4-28--1234-3158.

963. Selliers, Francois de. 1982. Re: Three new soymilk manufacturers in Asia. Letter to William Shurtleff at New-Age Foods Study Center, Jan. 27–in reply to inquiry of Dec. 22. 1 p. Typed, with signature. [Eng]

• ***Summary:*** They are: Kickapoo Co. Ltd. in Thailand, makers of Lactasoy. United Milk Co. Ltd. in Thailand; part of the Nestlé Group, they make Bonus brand soymilk. Dr. Chung's Foods Co. Ltd. of Korea. Address: Chairman, IIDC (International Investment & Development Corp.) Belgium, Belgium S.A., Rond-Point de l'Etoile 3, Boite 8, B-1050 Brussels, Belgium. Phone: (02) 640-68 00.

964. Wood, Brian J.B. 1982. Soy sauce and miso. *Economic Microbiology* 7:39-86. Jan. A.H. Rose, ed. Fermented Foods. [50 ref]

• ***Summary:*** Contents: 1. Introduction. 2. The preparation of soy sauce: Introduction, preparation of raw materials (the beans, wheat), mixing, koji, moromi. 3. Of beans, microbes, and miso: Beans, microbes, miso. 4. Trade in soy sauce: Introduction, statistics. Table 1 (p. 64-66) shows exports of soy sauce in 1978, in tonnes (metric tons) from Hong Kong, Korean Republic, Singapore, Japan, and total, to almost every country in the world (with each country's population in millions), grouped by region as follows:

1. North America: Canada, USA (#1)–Regional total imports: 6,052.3 tonnes.

2. South and Central America [and Caribbean]: Argentina (#3 in region), Bolivia, Brazil, Chile, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico (#2), Nicaragua, Panama, Paraguay, Surinam, Venezuela (#1), Granada, Jamaica, Trinidad and Tobago, total. Former Dutch West Indies–Regional total imports: 1,046.4 tonnes.

3. Europe: Austria, Belgium, Czechoslovakia, Denmark, Finland, France (#4 in region), Germany (West #3), Greece, Italy, Netherlands (#2), Norway, Portugal, Spain, Sweden, Switzerland, UK (#1), USSR–Regional total imports: 3,017.7 tonnes.

4. Near and Middle East: Bahrain (#3), Egypt, India, Iran (#2), Iraq, Jordan, Kuwait, Oman, Qatar, Saudi Arabia (#1), United Arab Emirates, Yemen Arab Republic–Regional total imports: 1,193.5 tonnes.

5. Far East and Western Pacific: Brunei, Hong Kong (#3 in region), Indonesia, Japan, Korea (South), Macao, Malaysia (#2), Philippines, Sabah (#1; A state of Malaysia from 1963; Formerly British North Borneo), Sarawak (A state of Malaysia from 1963), Singapore, Taiwan, Thailand–




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Regional total imports: 3,139.4.

6. Pacific and Australasia: Australia (#1 in region), Cook Islands, Christmas Islands, Fiji, Guam (#2), Nauru, New Caledonia, New Hebrides, New Zealand, Oceania n.c.s. (#3), Papua New Guinea, Portuguese Timor, Samoa and Tonga, Solomon Islands, Tuvalu (Ellis Island), U.S. Oceania–Regional total imports: 1,647.5 tonnes.

Note: This is the earliest document seen (March 2010) concerning soybean products (soy sauce) in Kiribati (Christmas Islands), in Nauru, in Qatar, in Portuguese Timor (later renamed Timor-Leste [East Timor]) or in Tuvalu. This document contains the earliest date seen for soybean products in Kiribati (Christmas Islands), in Nauru, in Qatar, Portuguese Timor, or in Tuvalu (1978); soybeans as such have not yet been reported.

7. Africa: Algeria, Canary Islands, Ethiopia, Gambia, Ghana, Kenya, Libya, Malagasy, Malawi, Mauritius (#2 in region), Nigeria, South Africa (Republic of, #1), Sudan, Réunion Islands (#3), Tanzania, Zaire. Other African countries–Regional total imports: 365.7 tonnes. World total imports: 15,731.5 tonnes, of which 6,192.8 tonnes from Hong Kong, 1,233.5 tonnes from South Korea, 1,713.6 tonnes from Singapore, 6,591.6 tonnes from Japan. The value in pounds sterling and in pounds sterling per tons of soy sauce is given for each exporter.

Other tables show: (2) Soy sauce exports (in tonnes and value) each year from 1976 to 1976 from Hong Kong, South Korea, Singapore, and Japan. A large percentage of Hong Kong's exports are re-exports (probably from China). (3) Total soy sauce exports from Japan, 1976-1978, by container type, with amount and value. (4) Soy sauce and miso production in Japan every 5 years from 1965 to 1978 (in tonnes). (5) Soy sauce and miso production in Japan for export in 1976, 1977, and 1978. Miso production (in tonnes) averaged about 40% of soy sauce production, and miso exports (in tonnes) averaged about 13% of soy sauce exports. (6) Imports of soy sauce into Hong Kong, Singapore, and the USA from exporting countries in 1978 (with figures for exports from China in 1976 and 1977). (7) Re-exports of soy sauce (made in China) from Hong Kong and Singapore in 1978 to major importing countries worldwide, by region, by country. Small countries that are the destination of this soy sauce include: Honduras, Nicaragua, Panama, Venezuela, Trinidad and Tobago, Former Dutch West Indies [also called Netherlands Antilles; they are part of the Lesser Antilles and consist of two groups of islands in the Caribbean Sea: Curaçao and Bonaire, just off the Venezuelan coast, and Sint Eustatius, Saba and Sint Maarten, located southeast of the Virgin Islands. The islands form an autonomous part of the Kingdom of the Netherlands], Pakistan, Saudi Arabia, United Arab Emirates, Brunei, Sabah, Sarawak, Fiji, Nauru, Oceanea (non-U.S.), Oceanea (U.S.), Papua, Samoa and Tonga, Solomon Islands, Ghana, Malagasy Republic, Togo. Total from Hong Kong: 2,945.3 tonnes, and from Singapore 109.5 tonnes.

(8) Exports of miso (in tonnes) from South Korea and Japan in 1978 to major importing countries worldwide, by region, by country. The leading importers are: USA (622), Saudi Arabia (353), Singapore (66), Bahrain (64), Netherlands (38), Iran (29), Iraq (29) France (28), German Federal Republic (23), Smaller importers include: Chile, Guyana, Surinam, Bangladesh, Iran, Iraq, Jordan, Kuwait, Quatar, Saudi Arabia, United Arab Emirates, Yemen Arab Republic, Sabah, Fiji, Guam, New Hebrides, Papua New Guinea, Samoa, Solomon Islands, Algeria, Canary Islands, Ghana, Kenya, Libya, Mozambique, South Africa Republic, Zaire.

Note: This is the earliest document seen (June 2007) concerning soybean products (miso) in Quatar. This document contains the earliest date seen for soybean products in Quatar (1978); soybeans as such have not yet been reported.

(9) Exports of miso from South Korea and Japan in 1976, 1977, and 1978 (quantity and value each year; no importing country names are given).

5. Tour of South East Asia: Technical and scientific aspects, trade aspects. 6. Acknowledgments. References

The chapter on Trade states: Soy sauce and soy paste (miso) are traded between all countries of South East Asia. The Korean Republic's exports nearly quadrupled in tonnage. The Kikkoman Company's production facility in Wisconsin produced 21,6000 tonnes of soy sauce in 1978. This was equal to 3 times the total exports from Japan in the same year. Japan's total share of the world soy sauce market remains very healthy. Miso exports are still small in comparison with soy sauce. On a rising market Japan's exports still only represent 0.2% of its annual miso production; "clearly there is considerable room for expansion here."

Miso is of greater relative importance to Korea than it is to Japan. Among the European countries, Belgium and Holland import the greatest amount of miso on a per capita basis. Spain imports a fair amount of miso. The U.S.A. and Canada had total miso imports totaling about 10% of their soy sauce imports.

"In Thailand, there are about 50 soy sauce factories, the majority of which are small, producing less than 100 kilolitres per year, although it should be noted that most of them also produce soybean paste and soybean cheese [probably tofu]. The total annual consumption of soy sauce in Thailand is estimated at about 6,000 kilolitres (about 7,200 tonnes).

"In Malaysia, there are about 140 soy sauce factories producing in total an estimated 5.5 million gallons of soy sauce per year according to the proprietor of a leading brewery in Kuala Lumpur. This is about 21,000 tonnes per annum" (p. 84). Address: Dep. of Applied Microbiology, Univ., of Strathclyde, Glasgow [Scotland], U.K.

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965. Alfa-Laval. 1982. Soy milk. Product and process. Lund, Sweden. 10 p. 30 cm.

• ***Summary:*** Contents: Soybeans–Background (a bar chart shows the protein content of common food products. The soybean is highest with 40%). Nutrition (a diagram shows the basic macro-nutrient composition of a soybean. A chart shows the essential amino acid content of common food products compared with the idea FAO/WHO pattern). Soy milk–The product (a table and an illustration show its composition). Cultivation and yield (of common food products' Beef has the lowest yield of food per acre, followed by cow's milk. Soybean is by far the highest, meaning the best way of making efficient use of land to produce food). Processing (a diagram shows a flow chart of the soymilk process). Process lines: Clarified low bean flavor soy milk line, suspended low bean flavor soy milk line.

Some soy milk plants built with Alfa-Laval soy milk processing components and equipment, or complete soy milk lines are:

"Hong Kong: Hong Kong Soy Bean Product Co Ltd
"Japan: Kibun
"Malaysia: Lam Soon Oil & Soap Co
"South Korea: Dong Bang Oil & Flour Mills Co Ltd
"Taiwan: President Enterprise Corp
"Thailand: Kickapoo
"Thailand: Siam Food Products Ltd

On the back cover we read that for a century, dairy and food engineering has been Alfa-Laval's foremost specialty.

On the cover is a color illustration of a soybean plant with a schematic drawing of an Alfa-Laval soy milk processing plant on a blue background behind it. Address: Lund, Sweden.

966. Ontario Soya-Bean Growers' Marketing Board. 1982. "Canadian soyabean mission, South East Asia, Feb. 12th–27th, 1982: Mission member reports." 1982. Canadian soyabean mission, South East Asia, Feb. 12th–27th, 1982: Mission member reports. Chatham, Ontario: Ontario Soya-Bean Growers' Marketing Board. 12 p. Feb. 12 p. Feb. 24 x 11 cm. [Eng]

• ***Summary:*** Contents: Comments, by Peter H. Epp, Chairman. Japan: Home Shokuhin Tofu Manufacturing Co., Komatsuya Shokuhin (natto mfg. plant), Nihon Miso (manufacturing plant), Japan Miso Assoc., Japan Tofu Assoc., Federation of Japan Natto Manufacturers' Cooperative Society, Wako Shokuryo Co. (makes natto; Jacob Hartz in Arkansas supplies them with "936X" variety small-sized natto soybeans; Wako also supplies Nihon Miso Mfg. Plant), X-Can Far East Ltd. Korea: Seoul meeting at embassy, Chung's Food Ltd., Agriculture and Fisheries Development Corp., Korean Soybean Curd Cooperative Manufacturing Assoc. Singapore: Okura & Company Ltd., Eng Huat Pte. Ltd., Intraco. Malaysia: Yeo Hiap Seng Co. Ltd. (the largest manufacturer of soymilk in Malaysia and Singapore). Follow-up. Conclusion.

Each of the following members of the mission wrote a chapter in this book, discussing each visit mentioned in the contents: Peter H. Epp, Bernard Calhoun, Otis McGregor, Richard I. Buzzell, M.D. Pennell (General Manager, R&D, H.J. Heinz Company of Canada Ltd.), Michael Loh (Export Development Specialist, Ontario Ministry of Agriculture and Food).

Details are given on the soybean characteristics desired for each type of soyfood product, especially in the chapter by Dr. Buzzell. Popular soybean varieties include: For Miso: Enlei [Enrei], Fujimejiro, Harcor.

For natto: The main natto specifications are: 1. Seed size–small but fully developed, less than 5.0 mm diameter if possible. 2. Round seed. 3. Total sugar content < 22%. 4. Oil content > 19%. 5. White / yellow hilum. Best natto varieties: Jizuka (the smallest, from Ibaraki prefecture) and Suzuhime (small, from Hokkaido), "two domestic [Japanese] varieties used for superior quality natto, were priced at $100 U.S. for 60 kg. The U.S. varieties which have been, and are being used presently, are not satisfactory. Both Nattawa and Pioneer 1677 varieties should adapt well to the natto product." Jennett (H24) from the USA is good. (p. 5, "Natto specifications Japan, unnumbered page near rear).

For tofu: Amsoy, Coles, Harcor.

Letter from Fred Brandenburg of OSGMB. 1994. Nov. 9. "Regarding export promotion before 1982, any activities would have been part of larger government sponsored trade missions. For example, in 1979 Otis McGregor participated in a mission to Asia which was co-ordinated by Michael Loh. It included a number of marketing boards and associations from Canada."

Note: This is the earliest document seen (Dec. 1998) that (apparently) mentions the soybean variety Enrei. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

967. Ontario Soya-Bean Growers' Marketing Board. 1982. Canadian soybean mission to Japan, Korea, Singapore, Hong Kong, Malaysia. Chatham, Ontario, Canada. 12 p. Feb. 24 x 11 cm. [Eng; jap; kor]

• ***Summary:*** Small portrait photos (p. 2) show mission members: P. Epp, B. Calhoun, A. Ford, O. McGregor, Michael Loh, Dr. R. Buzzell, M. Pennell. The first four men are from the Ontario Soya-Bean Growers' Marketing Board. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

968. *Honolulu Advertiser* (*The*) (*Hawaii*). 1982. Korea House: The best chicken in town–bar none. March 7. p. 152-53.

• ***Summary:*** "... a special barbecued chicken made from nine secret ingredients. (The one secret ingredient Randy finally

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confessed to last week was Korean *kochujang*, a spicy red pepper sauce... The others are top secret. So be it.)"

969. Meals for Millions / Freedom from Hunger Foundation. 1982. Annual report 1981: Self-help for a hungry world. Santa Monica, California: MFM Foundation. 16 p. 18 x 26 cm.

• ***Summary:*** Peter J. Davies is President; he works at the New York office. Alfred C. Bartholomew, Ph.D., D.D., is chairperson, board of trustees. On the orange, black and white cover is a photo of a two women hoeing. MFM's logo of a plant growing in an upturned bowl is on the back cover.

Ecuador (p. 5): "In 1981, a group of farmers asked for our help. Because of a four-year drought, they could no longer grow soy, a cash crop we helped to introduce on the peninsula in 1974." So they are raising other crops and chickens.

"The multiplier effect: Training families; training trainers" (p. 8). "The decision made in 1980 to carry Meals for Millions training overseas was a sound one. Our first full year in the field produced an accelerated training program and an unprecedented multiplier effect that is reflected in the food and nutrition projects established by participants in their own countries.

"In June, in Kenya, we convened 12 nutrition planners and supervisors to involve them actively in the design of the two-week training of field level workers scheduled for late 1981. This cooperative advance planning resulted in a November course for 25 field workers, all hand-picked by their supervisors and described by Meals for Millions' staff as 'the best group we ever had.'"

"Our food technology transfer program" (p. 10) shows a photo of a village texturizer being used in Lampang, Thailand.

"Connections," a "twice-a-year newsletter to establish communication links among our widely dispersed overseas training participants," is now being published. A photo shows the cover of two issues.

"1981 financial support" (list of major donors). 1981 financial highlights. Total income: $1.576 million. The entire last page (p. 15) lists: Executive staff. Regional directors (Africa, Latin America / Caribbean. Asia / South Pacific, U.S. Southwest). Technical staff. Field offices (Kenya, Sierra Leone, Antigua, Ecuador, Honduras, Korea, U.S. Southwest). Honorary trustees (Henry Borsook, M.D., PhD, Willard E. Baier, Dr. Gladys Emerson). Board of trustees. National committee of sponsors.

Photos show: (1) Nelda Clinton (with signature). (2) Peter J. Davies.

Note: Included with the annual report is MFM / FFH "Highlights of 1981: Self-help for a hungry world." It is one sheet folded into 8 panels. Address: 1. Western office: 1800 Olympic Boulevard, Santa Monica, California 90406; 2. Eastern office: 815 Second Ave., Suite 501, New York City, NY 10017. Phone: (213) 829-5337 or (212) 986-4170.

970. Senanayake, E.L. 1982. Soybeans as food through the ages. *INTSOY Series* No. 22. p. 3-4. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Improvement (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** "It is true that my country [Sri Lanka] goes back 2,523 years and has not suffered a great deal from famine. But in the recent past, in 1973, '74, and '75, there was an unprecedented drought, and I saw people eating things that normally the people of our country do not eat.

"The soybean, which is called a miracle bean, is fairly new to us. Prior to the Second World War, the late Mr. Walter Moragoda, Chief Propaganda Officer in the Agriculture Department, encouraged the growing of soybeans. But the crop was adopted only in the village home gardens. We owe a great debt of gratitude to the late Mr. Bill Golden, who, with his untiring efforts, interested the Agriculture Department and the people of Sri Lanka in the soybean. His efforts got us into INTSOY, which has benefited us greatly. Since 1975, through UNDP and FAO assistance, we have had the assistance of Dr. Carl Hittle and his team, who have developed soybeans to a great extent in this country. We must thank UNICEF and CARE for having sponsored the pilot factory at Gannoruwa...

"I am happy to see Mrs. Y.Y. Kim here in this hall. [Note: She is the wife of Gai W. Kim, of UNDP, Sri Lanka]. She, in her own silent way, has been propagating the use of soybeans at the village level... Mrs. Kim has taught housewives to use the ordinary grinding stone to reduce soybean seed to a powder that is edible... I think CARE, by introducing Thriposha, has introduced an infant milk food that I hope will catch on in the future and not only stop the drain of our foreign exchange in importing infant milk foods but also give our children a wholesome protein diet...

"We are experimenting with the possibility of using 10 percent soybean flour in baking our bread, which will save a tremendous amount of money spent in foreign exchange. Soya milk for infants is also being promoted by the new Soy Foods Research Centre (SFRC)." Address: Minister, Ministry of Agricultural Development and Research, Government of Sri Lanka.

971. Shurtleff, William; Aoyagi, Akiko. 1982. History of soymilk and dairylike soymilk products. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 53 p. April 4. Unpublished typescript. Available online at www.soyinfocenter.com.

• ***Summary:*** www.soyinfocenter.com/HSS/soymilk1.php

A comprehensive history of the subject. Contents: Introduction. Etymology. Four stages of growth. Part I: History in Chinese-speaking Asia. Origin and early development. Roots of East Asia's soymilk renaissance. Hong Kong and Vitasoy. Singapore. Taiwan. Part II: History

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in non-Chinese speaking Asia. Japan. India. Philippines. Vietnam. Indonesia. Thailand. Malaysia. Korea. Sri Lanka. Part III: History in Europe. The early years (1739-1919). 1920-1939. 1940-1959. 1960-1980. Part IV: History in the United States. The early years (1898-1919). 1920-1939. 1940-1959. 1960-1980. Part V: History in Latin America and Africa. Part VI: Soymilk overview and future. Part VII: Dairylike soymilk products (nonfermented). Soymilk ice cream, 1918. Soymilk cream and whipped cream, 1932. Soymilk custards and puddings, 1935. Soymilk mayonnaise, 1936. Soymilk shakes, 1944. Soy nog, 1944. Nonfermented soymilk cheese, 1973. Other.

Note: This is the earliest English-language document seen (Dec. 2003) that contains the term "soymilk shakes" (or "soymilk shake"). Address: Lafayette, California. Phone: 415-283-2991.

972. Shurtleff, William; Aoyagi, Akiko. 1982. History of tofu. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 119 p. April 21. Unpublished typescript. Available online at www.soyinfocenter.com.

• ***Summary:*** www.soyinfocenter.com/HSS/tofu1.php

A comprehensive history of the subject. Contents: Introduction. Etymology. Part I: History of tofu in China. Origin and developments to 960 A.D. Sung dynasty, 960-1279. Yuan (Mongol) dynasty, 1279-1368. Ming dynasty, 1368-1662. Ching dynasty, 1662-1912. Developments from 1912-1948. The People's Republic of China, 1949-1980's. Part II: History of tofu in Japan. Introduction and early development (to 1185). Kamakura period, 1185-1333. Ashikaga/Muromachi, 1338-1600. Edo/Tokugawa period, 1600-1868. The Meiji period, 1868-1912. Development from 1912-1939. The war and postwar period, 1940-1959. The modern period, 1960-1982. Part III: History of tofu in South and Southeast Asia. Korea. Taiwan. Malaysia and Indonesia. Vietnam. Philippines. Thailand, Sri Lanka, and India. Part IV: History of tofu in Europe, 1613-1982. Part V: History of tofu in the United States. The early years, 1896-1919. 1920-1939. 1940-1959. 1960-1975. 1976–the awakening of American interest in tofu. Rise of the new American tofu industry. New England Soy Dairy = Tomsun Foods, Inc. from April 1984. Tofu innovation in America. Tofu in foodservice institutions. Growth of the tofu industry. Future of the U.S. tofu industry. Part VI: History of tofu in Latin American and Africa. Part VII: History of frozen and dried-frozen tofu. Frozen tofu. Dried-frozen tofu in Japan. Dried-frozen tofu in the West. Part VIII: History of other special types of tofu. Firm tofu. Pressed tofu. Smoked tofu. Deep-fried tofu. Grilled tofu. Silken tofu. Lactone silken tofu. Address: Lafayette, California. Phone: 415-283-2991.

973. Kim, Gai W. 1982. Re: Details of introducing tofu [Boncheese] to Sri Lanka. More on replacing coconut milk with soymilk. Letter to William Shurtleff at Soyfoods Center, April 23–in reply to inquiry of April 13. 2 p. Typed, with signature.

• ***Summary:*** "Thank you for your letter dated 13 April 1982 asking me for information about Sri Lanka's first tofu shop."

The name of the show was Boncheese, 128 Kitulwatte Rd., Colombo, Sri Lanka. Phone: 596-992. Owner: Mr. U.N. Gunasekera; he is one of the few big contractors in Sri Lanka.

Work on the factory was completed by March 1980. The product, Boncheese, was publicly retailed at a stall in Kolpetty Market, the largest market in Colombo. The factory had to be closed from December, 1980 to March, 1981 due to a shortage of soybeans in the local market. At the moment, Cornel's Super Market, which opened in early August, the only Super Market in Colombo, is the sole sales outlet for Boncheese; 60 lb per day is supplied.

Sri Lankans usually cut tofu into ½-inch cubes and deep fry them before adding them to curry in place of whole boiled eggs or beef. Foreigners and Sri Lankans who have lived abroad are the best customers. "I have already given quite a few demonstrations on how to use tofu but, I think, more efforts should be made.

"I named tofu as 'Boncheese' in order to give Sri Lankans a name that was more familiar to them. Locally any bean is called 'Bonchi.' I added 'Cheese' to make it 'Boncheese' because of its similarity in texture and in the way it is made like *farmer's cheese* which I used to replace with tofu when it as not available.

Sri Lankans use coconut milk to make their curries; it is not only very expensive but also very rich in cholesterol [high in saturated fats]. So far I succeeded in replacing coconut milk with diluted soya paste at the kitchens of Colombo General Hospital and Welikade Prison. The Boncheese factory delivers about 30 kg (dry weight) of soybeans wet ground every morning to those institutions 365 days a year. Since 500 gm of soybean replaces 10 coconuts, 600 coconuts are not used and that means 100% saving in cost to the institutions.

At my urging, the Nutrition section of the Ministry of Plan Implementation already ordered two grinding machines from Bean Machines, Inc. One machine will be given to the Welikade Prison kitchen so that it will not only be self-sufficient in making its own soy paste (at the moment only 30% of the coconut milk is replaced by soy paste) but will also be able to make tofu and soy bread. The prison farms are already growing their own soybeans! Address: c/o UNDP in Sri Lanka, P.O. Box 1505, Colombo, Sri Lanka.

974. Palucci, Jeno. 1982. Brief history of Chun King soy sauce (Interview). *SoyaScan Notes.* April 30. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Jeno founded Chun King in 1945. The company first began selling ready-made soy sauce in about 1947.

Note: A search of the U.S. Patent and Trademark Office

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database shows that the "Chun King" trademark (more specifically a "Word Mark") was first used and first used in commerce on 1 Jan. 1948 and was first registered (by Chun King Corporation, Duluth, Minnesota) on 16 Sept. 1957. The trademark was to be used for "Various canned unitarily packed foods." A list of these foods is given, and includes "Soya Sauce." Actually Chun King registered two similar "Word Marks. Both have the word "Chun" written in rounded Oriental-looking letters above the word "King." Both words are the same height, the same width, and the same "typeface" or design. In one, the wards are written in outline letters and in the other in solid black letters.

Chun King never made fermented soy sauce. They bought their nonfermented soy sauce by the barrel from a plant in Toledo, Ohio, run by the Donofrio Brothers, then repackaged it under the Chun King label. He does not remember the company's name but their technician was a man (perhaps Lou Minor) who had worked for La Choy. This man first got Jeno interested in soy sauce before he started buying from A.E. Staley. In the late 1940s and 1950s Jeno was not aware of any fermented soy sauce being made in the USA; it was all made from HVP. Kikkoman introduced fermented soy sauce to the USA by importing it from Japan.

Jeno thinks Chun King may initially have bought its soy sauce from A.E. Staley Mfg. Co.–but he is not sure. It was shipped by the barrel. Starting in the late 1950s, Jeno bought HVP from Staley and started blended his own soy sauce; he recalls that Staley sold both HVP and blended soy sauce.

When Jeno started selling soy sauce, La Choy had about 60% of the U.S. market and the remaining 40% was divided up among Chinese-, Japanese-, and Korean-American manufacturers. One Polish fellow in Chicago, Illinois, named Ben Gee, was also in the business. In the 1950s it became a battle between La Choy and Chun King, and in the end, when Jeno sold out, Chun King was definitely the market leader. But now La Choy has again taken the lead. Chun King is trying to re-capture the lead with a big ad campaign and a catchy jingle.

Jeno is quite sure that all Chun King soy sauce is presently made in Cambridge, Maryland. The company's plant used to be in Duluth, Minnesota, but after he sold the company, the Duluth plant was closed, and he bought it back.

Jeno also grew mung bean sprouts; he tried sprouting soybeans but was not successful. Address: Jeno's Inc. (Pizza), 525 Lake Ave. South, Duluth, Minnesota 55802. Phone: 218-723-5555.

975. **Product Name:** Soybean Curd, and Soy Milk.
**Manufacturer's Name:** Dae Han and Company.
**Manufacturer's Address:** 18300 S.W. Boones Ferry Rd., Durham, OR 97223. Phone: 503-620-8983.
**Date of Introduction:** 1982 April.
**New Product–Documentation:** Form filled out by Yeun Mo Koo (Korean). The company started on 1 April 1982.

Talk with Paul Moss, who has worked with Dae Han for 7 years. 1990. May 28. The company name is now Dae Han, Inc., 737 S.E. Alder St., Portland, Oregon 97214. Phone: 503-233-8638. Paul plans to use their plant to make tempeh. Labels sent by Paul Moss. 1990. May 10. The soymilk is now called Fresh Wonder Soy (Plain Soy Beverage). The two types of tofu are Organic Regular Tofu (Japanese Style), and Organic Firm Tofu (Chinese Style). Both are certified kosher by Rabbi Yonah H. Geller.

976. Shurtleff, William; Aoyagi, Akiko. 1982. History of green vegetable soybeans and vegetable-type soybeans. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 24 p. May 12. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/green_vegetable.php

A comprehensive history of the subject. Contents: Introduction: Comparison of green vegetable soybeans and whole dry soybeans, vegetable versus field types. Etymology: green vegetable soybeans and vegetable type soybeans. Part I: History of green vegetable soybeans in East Asia. General: How grown and used. China from 2nd century B.C. Japan. Korea and other East Asia. Green vegetable soybean leaves as a food. Part II: History of green vegetable soybeans in Europe. Part III: History of green vegetable soybeans in the United States. Early developments (1855-1929). William Morse and the popularization of vegetable-type soybeans. The 1930's, research and development. World War II (1940-45). The postwar period (1946-1974). 1975-1982. Part IV: History of green vegetable soybeans in Third World countries. Address: Lafayette, California. Phone: 415-283-2991.

977. Shurtleff, William; Aoyagi, Akiko. 1982. History of soy sprouts. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 19 p. May 25. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/sprouts.php

A comprehensive history of the subject. Contents: Introduction–soy versus mung. Etymology. Part I: History of soy sprouts in East Asia. China. Korea. Japan. Other East Asia.

Part II: History of soy sprouts in Europe. Part III: History of soy sprouts in the United States. Early developments (1896-1939). World War II and the 1940's. 1950-1969. 1970-1982. Part IV: History of soy sprouts in the Third World. Address: Lafayette, California. Phone: 415-283-2991.

978. Shurtleff, William; Aoyagi, Akiko. 1982. History of roasted soy flour, soy coffee, and soy chocolate. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 20 p. May 29. Unpublished typescript. Available online at www.

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soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/roasted_soy_flour.php

A comprehensive history of the subject. Contents: Introduction. Etymology. Use of the term "roasted whole soy flour." In Korean, *konggaru* means "roasted soybean powder." Part I: History of roasted soy flour in East Asia. China. Japan. Other East Asia. Part II: History of roasted soy flour in Europe. Part III: History of roasted soy flour in the United States. Part IV: History of roasted soy flour in the Third World. Part V: History of soy coffee. Europe. USA. East Asia. Part VI: History of soy chocolate. Europe. USA. Part VII: History of roasted soynut butter. Part VIII: Outlook for roasted soy flour.

Etymology: In China as early as the third century BC, roasted soy flour was known as *tou hsieh* ("bean powder or shavings"). By the 1700s it was also called *tou fen* ("bean flour") and by the 20th century it was called *huang tou* in standard Chinese (Mandarin) and *wong-dow* in Cantonese. Both terms mean "yellow bean." It is not known when these terms originated.

In Japanese in olden times, roasted soy flour is said to have been called *mame-ko* ("bean flour," written with the same characters as tou fen in Chinese). Later (the date is unknown) it came to be called kinako ("yellow flour"). Roasted soy flour is called *bubuk kedele* in Indonesian and *konggomul* in Korean.

In English, most of the early references to roasted soy flour were descriptive / indirect, such as "roasted soybeans ground into a fine powder" (Piper and Morse 1923). It was also referred to as "roasted bean flour" (Horvath 1927), "kinako" (Smith 1958) and "roasted full-fat soy flour" (Harper and Lorenz 1974; Shurtleff and Aoyagi 1975). The shortened term "roasted soy flour" was first used in 1976 by Shurtleff and Aoyagi in their *Book of Miso.* On packaging, to emphasize the fact that the flour is not defatted, it may be labeled "Roasted Whole Soy Flour."

Roasted soy flour is called *gerostetes sojamehl* in German and *harina de soya tostada* in Spanish. No French name is known.

Note. This is the earliest English-language document seen (Nov. 2012) that contains the term "roasted whole soy flour." Address: Lafayette, California. Phone: 415-283-2991.

979. Kikkoman International. 1982. Market share of U.S. soy sauce market (including teriyaki sauce): Dollar base. San Francisco, California. 3 p. Unpublished manuscript. [1 ref]
• ***Summary:*** The SAMI (Selling Areas Marketing Inc.) report shows that for U.S. supermarkets in Dec. 1981 the market shares based on dollar sales were Kikkoman 49%, La Choy 32%, Chun King 13%, and Other 6%. In May 1982 these figures were 50%, 32%, 11%, and 7%. In 1979 these figures were 44%, 34%, 16%, and 6%. Thus Kikkoman's gains in market share were made largely at the expense of Chun King. Address: San Francisco, California.

980. Kim, Kyung-Ja; Ryu, M.K.; Kim, S.S. 1982. [*Chungkook-jang koji* fermentation with rice straw]. *Korean J. of Food Science and Technology* 14(4):301-08. May. [33 ref. Kor; eng]
• ***Summary:*** "Chungkook-jang koji was fermented with rice straw at 40ºC and 50ºC for 72 hours. The changes in proximate composition, pH, titratable acidity, nitrogen compounds, protease activity and free amino acids during the fermentation were investigated. Moisture, lipid and protein contents remained essentially unchanged during the fermentation."

"Based on these results, it seems that the optimum fermentation conditions for *Chungkook-jang* were 40ºC and 72 hours" [3 full days]. Address: 1&3. Dep. of Food Science and Nutrition, Sook Myung Woman's Univ., Seoul 140; 2. Lab. of Sampyo Food Indust. Co., Ltd., Seoul 131, South Korea.

981. **Product Name:** [Supermil Soymilk].
**Foreign Name:** Supermil.
**Manufacturer's Name:** Kwang Ju.
**Manufacturer's Address:** South Korea.
**Date of Introduction:** 1982 May.
**New Product–Documentation:** Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 81-83. They produced an estimated 1,272 tonnes in 1983.

982. Re: Names of soyfoods around the world: Korean. 1982. Form filled out and returned to William Shurtleff at Soyfoods Center, May. 1 p. Handwritten. [Eng; kor]
• ***Summary:*** Soyfoods: Daedu skikpoom.

Green vegetable soybeans: largely unknown or poot-kong or sang kong?

Soybean: me ju kong.

Whole dry soybeans: hinkong or daedu

Soy sprouts: kongnamul

Roasted soy flour: konggomul

Soymilk: kongkuk or duyu, du-u, or du yu.

Tofu: dubu, du bu or tubu.

Soymilk curds (uncurded / uncurdled tofu): sundubu.

Deep-fried tofu cutlets: yubu (7 by 1 by 3/4 inch strips).

Okara or soy pulp: piji

Miso or Korean-Style Fermented Soybean Paste. Doenjang.

Soy sauce: kanjang

Tempeh: unknown

Natto: Chong kuk-jang or Joenkuk-jang

Soy oil: daedu yoo

Soy flour: daedu boon

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Whole soy flour: chunji daedu boon
Defatted soy flour: talji daedu boon
Soy flakes and grits: daedu appyon and daedu sa
Soy protein concentrate: nong-chook daedu danbaek
Soy protein isolate: boon-ri daudu danbaek
Textured soy protein products: cho-jik daedu danbaek jepoom
Textured soy flour: cho-jik daedu danbaek (Note that TVP is an ADM brand name and registered trademark).

983. Suh, Jeong-Sook; Lee, S.G.; Ryu, M.K. 1982. [Effect of *Bacillus* strains on *Chungkook-jang* processing. II. Changes of the components and enzyme activities during the storage of Chungkook-jang]. *Korean J. of Food Science and Technology* 14(4):309-14. May. [23 ref. Kor; eng]
• ***Summary:*** The growth process of Chungkook-jang that occurred by utilizing such traditional methods as *Bacillus natto* and *Bacillus subtilis* has been examined. The results of the experiment in which the changing process of elements during the storage period had been measured are as follows:
"1. During the growth period, concerning any change in pH, the storage period had been declined and after 18 days pH rose above 7.0. Salt content was between 5.28 and 6.40% and *Bacillus subtilis* bacteria showed the highest titratable acidity.
"2. Moisture content was between 50.94 and 56.74% and crude protein content range was 14.44-18.60% indicating irregularity in pattern resulting from the testing equipment groups, whereas crude fat and crude fiber tend to decrease in general.
"3. During the storage, total sugar and ethyl alcohol content in all of groups tended to decrease and after 18 days *Bacillus subtilis'* total sugar content was the lowest.
"4. Amino nitrogen and water soluble nitrogen content increased with days, but no difference was found between groups.
"5. Amylase and protease activity showed irregular pattern with time, but no significant difference between groups was found." Address: 1-2. Seoul Junior Health College, Seoul 100; 3. Lab. of Sampyo Food Indust. Co., Ltd., Seoul 132.

984. Foley, Terrence B. 1982. Soybeans and soyfoods in China (Interview). Conducted by William Shurtleff of Soyfoods Center, June 12. 2 p. typed manuscript.
• ***Summary:*** Terry is now in the USA, visiting American Soybean Assoc. headquarters. He has been an ASA employee for 1½ years. He is a specialist in East Asia, who studied Chinese history in college and worked in Massachusetts. He knows our work, has all our books on soyfoods, and hopes we can meet some time. There are no official statistics published by China on its agricultural production or area.
Terry's inquiries in Peking indicate that peanut oil is preferred for food use, followed by soybean oil, rapeseed oil, and lard–in that order. Sesame oil is not mentioned. He does not know what oils are preferred in southern China. He has read that Manchurians prefer soy oil. Like all basic foods, vegetable oil is rationed, to maybe a couple of cups per family per year; he has no figures on the exact amount. Vegetable oil is replacing lard. Koreans strongly prefer sesame oil; they drizzle it on foods.
About 85% of the oil made in China is obtained using traditional hand-turned screw presses; the remaining 15% comes from modern solvent extraction plants. He has visited such plants in Shanghai, and knows they are operating in Dairen and elsewhere in Manchuria such as Harbin and perhaps Shenyang. These large solvent plants probably refine their oil. He would guess that both refined and traditional unrefined soy oil are sold in China. When a consumer buys oil, she takes her own bottle to a distribution point in a store, then has it filled. He strongly suspects the quality would be very poor by Western standards.
The Chinese are moving to low-fat hogs, since the people want more meat and less fat. There are now two prices established by the government: fatty pork and lean pork.
The main area of soybean production in China is the northeast (Manchuria), followed by the North China Plain. There is now a big export push in China to raise money. Some soybeans have been exported to Japan; most soybean meal is spread on the fields.
Tofu is in especially short supply in China; housewives almost get into a fistfight waiting in long lines for it.
ASA's top priority in China is the livestock industry, including the formulation of modern livestock diets, confinement methods, disease prevention, and genetics (to get modern breeds of animals to China). Address: Director, China Office, American Soybean Assoc.

985. Lee, Sang-Hyo; Chung, Dong-Hyo. 1982. [Studies on the effects of plant growth regulator on growth and nutrient compositions in soybean sprout]. *J. of the Korean Agricultural Chemical Society* 25(2):75-82. June. [34 ref. Kor; eng]
• ***Summary:*** Soybean sprouts treated with plant growth regulators (IAA and BA) had considerably shorter roots than the control. Weight and diameter of treated sprouts were increased by 10-20% and 40% respectively. Crude protein and fat contents of the treated soy sprouts were higher by 5-10% and 10% respectively than the control. Ascorbic acid increased by 70% to 38 mg%. Soy sprouts contained 16 amino acids and the treated sprouts contained more arginine, histidine, lysine, and methionine than the control. The ratio of unsaturated:saturated fatty acids was about 4.4. Address: Dep. of Food Technology, College of Agriculture, Chung-ang Univ., Seoul, 151, South Korea.

986. Shurtleff, William; Aoyagi, Akiko. 1982. History of

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natto and its relatives. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 39 p. July 17. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/natto1.php

A comprehensive history of the subject. Contents: Introduction. Etymology. Part I: History of natto in Japan. Sources of information. Theories of origin. Heian period (794-1185). Kamakura period (1185-1333). Muromachi period (1338-1600). Edo (Tokugawa) period (1600-1868). Meiji period (1868-1911). Taisho period (1912-1925). Showa period (1926-1981 and beyond). Popular types of Japanese natto. Natto in the prefectures. Pictures of natto containers. Part II: History of relatives of natto in East Asia. Unsalted / bland fermented black soybeans in China. Joenkuk-jang in Korea. Thua-nao in Thailand. Kinema in Nepal. Sere in Bali, Indonesia. Part III: History of natto in Europe. Part IV: History of natto in the United States.

Note: This is the earliest English-language document seen (Jan. 2012) that uses the word "Joenkuk-jang" to refer to Korean-style natto. Address: Lafayette, California. Phone: 415-283-2991.

987. Tally, Gene. 1982. The Coca-Cola Company's work with soymilk in Asia (Interview). Conducted by William Shurtleff of Soyfoods Center, July 29. 1 p. transcript.
• ***Summary:*** Coca-Cola Co. (CCC) does not have a soymilk on the market in Thailand; they are still at the talking stage.

CCC has introduced soymilk, named H-C, in Hong Kong. They use their franchise Coca-Cola bottler there. They just bottle soymilk like any other soft drink by using soy protein isolates. So no need for a soymilk plant or buying soybeans etc. This is the way soft drink companies can easily get into soymilk.

In the Philippines, CCC is not presently involved with soymilk. The Magnolia Dairy Co. is owned by the same group that owns the Coke business in the Philippines. They have made it in the past, are not doing it now, but will resume soon, after they develop a new formulation. In the future they will probably not use Coke's soymilk formulations. Probably get from Dong Bang in Korea, or a group in Belgium, which has technology. Not the same as the Singapore company. This is a split-off of the Singapore company.

CCC has not yet introduced soymilk in USA, but they are looking at it. They are now in a feasibility study. They have Tetra Brik lines in the U.S. making Hi-C juices. The company's decision to go or no-go is imminent. We'll be the first to know.

Lots of talk with Vitasoy in the past about a joint venture in Hong Kong.

Thailand. CCC would probably contract with one of the local dairy companies there to co-pack for them. Probably Siam Foods. Its a bit early; only in the talk stage. Originally did a lot of exploratory work concerning Thailand with Vitasoy but it took a long time and the Los wanted to use their own formula, so they went different ways. CCC may not get a product on the market for Thailand in less than 1-1½% years.

Talley would like to be marketing manager for Morinaga's tofu products in the US. Address: Coca-Cola Co., Atlanta, Georgia.

988. *Toyo Shinpo* (*Soyfoods News*). 1982. Yoshikawa Shoji [Yoshikawa Shoji has opened a branch office in Seoul, Korea]. Aug. 11. [Jap]
• ***Summary:*** A photo shows the office.

989. Ablett, G.R. 1982. An introduction to soybeans. *Notes on Agriculture* (*Guelph, Ontario*) 18(1):9-10. Aug.
• ***Summary:*** Soybeans are presently one of the most important cultivated crops. The can be grown from the equator to latitudes of 50º or more (around Winnipeg in Manitoba, Canada). In 1978 some 80.450 million metric tons (tonnes) of soybeans were produced on over 50 million hectares of land.

Tables show: (1) The world's leading soybean producing countries in 1968 and 1978. In 1978 they were (in million tonnes): USA 50.9 (60% of the world total). China 10.5. Brazil 10.5. Argentina 3.8. USSR 0.640. Indonesia 0.523. Canada 0.520. South Korea 0.319. World total 80.450. Source: *Commodity Year Book 1980*, by Commodity Research Bureau, Inc.

(2) Soybean hectarage, yield and production, 1941-1980 in five year averages in Ontario. Source: *Agricultural Statistics for Ontario*, OMAF, Publication 20. Address: Ridgetown College of Agricultural Technology, Ridgetown, ONT, Canada.

990. **Product Name:** [Eggmil Soymilk].
**Foreign Name:** Eggmil.
**Manufacturer's Name:** Dae Won.
**Manufacturer's Address:** South Korea.
**Date of Introduction:** 1982 August.
**New Product–Documentation:** Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 81-83. They produced an estimated 1,400 tonnes in 1983.

991. **Product Name:** Firm Tofu: Soybean Curd Cake, Soymilk, Soy Sprouts.
**Manufacturer's Name:** Chunco Foods Inc.
**Manufacturer's Address:** P.O. Box 883, Kansas City, MO 64141. Phone: 913-362-8097.
**Date of Introduction:** 1982 September.
**Ingredients:** Tofu: Soy beans, water, nigari (calcium sulphate).

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**Wt/Vol., Packaging, Price:** 16 oz packed in water in molded plastic tray with heat-sealed, peel-off plastic film lid.
**How Stored:** Refrigerated.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1982. Sept. 17. President: Peter Chun. Talk with and business card from Peter Chun at Soyfoods Conference in Seattle, Washington. 1982. He is a Korean-American, who presently makes tofu, soymilk, and soy sprouts.

Label. 1983, undated. 5.5 by 4.25 inches. Plastic film. Blue, black, and orange on clear film. "No preservatives. Keep refrigerated." Contains serving suggestions. In March 1990 his tofu retailed for $1.29 for 18 oz. It was very low priced and probably not pasteurized.

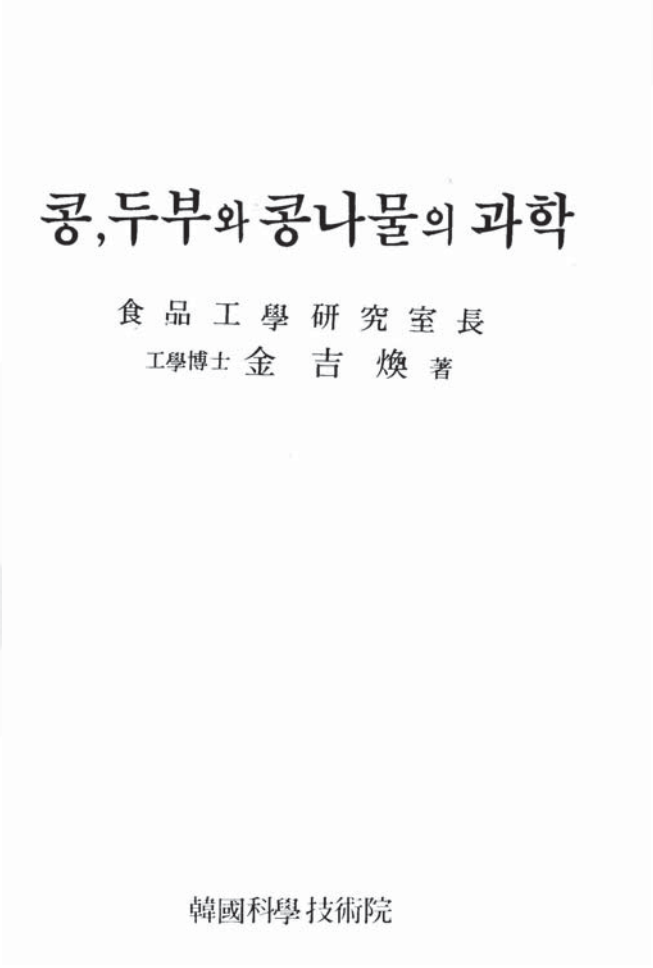
992. **Product Name:** Eastern Flavor brand Tofu [Soft, Regular, Organic, or Firm Organic].
**Manufacturer's Name:** Eastern Foods Corporation.
**Manufacturer's Address:** 3225 E. Hennepin Ave., Minneapolis, MN 55413. Phone: 612-331-3353.
**Date of Introduction:** 1982 September.
**Ingredients:** Firm organic: Organic soybeans, water, nigari (magnesium chloride derived from sea water).
**Wt/Vol., Packaging, Price:** 16 oz packed in water in molded plastic tray with heat-sealed, peel-off plastic film lid.
**How Stored:** Refrigerated.
**Nutrition:** Firm organic: Per 4 oz.: calories 80, protein 9 gm, carbohydrates 3 gm, fat 5 gm, sodium 8 mg. Percentage of USRDA: Protein 15%, iron 12%, thiamine 4%.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1982. Sept. 17. Owner: Mr. Lee & Calvin Lutzke. Labels. 1985. 5.5 by 6 inches. Red, black, and green on clear film. The soft is coagulated with calcium sulfate and glucono delta-lactone, the regular organic with only calcium sulfate, and the firm organic with nigari. Letter from Tom Menie. 1988. June. Introduced in 1985.

993. **Product Name:** [Seo Ju Mill Soymilk].
**Foreign Name:** Seo Ju Mill.
**Manufacturer's Name:** Seo Ju Industry.
**Manufacturer's Address:** South Korea.
**Date of Introduction:** 1982 October.
**New Product–Documentation:** Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 16, 81-83. They produced an estimated 4,800 tonnes in 1983.

994. McNeil, Maggie. 1982. Asian markets hungry for U.S. products. *Soybean Digest.* Nov. p. 30d.
• ***Summary:*** Global economic activity is shifting from the Atlantic to the Pacific. In 1981 Asia passed Europe to become the largest market for U.S. agricultural products. Now 4 of our top 10 ag markets are in East Asia. In FY 1981 Japan bought over $6,700 million worth of U.S. farm products. China and Korea each bought over 2,000 million, and Taiwan over $1,000 million.

995. Kim, Kil Hwan. 1982. Kong, dubu wa kong nah mul eh kwah hak [The science of soybeans, tofu and soy sprouts]. Seoul, South Korea: Korean Science Foundation. 211 p. Dec. Illust. Index. 21 cm. [200+ ref. Kor]


콩, 두부와 콩나물의 과학

食品工學研究室長
工學博士 金 吉 煥 著

韓國科學技術院

• ***Summary:*** Contents: I. Soybeans. Introduction. World soybean production: Areas of production, quantities produced, amount produced in Korea, amount imported to Korea, chemical composition of all soybeans. How to use soybeans: Foods and processed soybean foods (sauces, tempeh, natto), industrial uses. Nutritional composition of soybeans: Common components, protein and amino acids (protein, essential amino acids, necessary protein intake, necessary amino intake, chemical score, biological value of soybean protein, the need to heat soy protein, the use of soy protein as a protein supplement), soybean oil (components of soybean oil, oil assimilation / absorption), other nutritional components (carbohydrates, vitamins, minerals), references.

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II. Tofu. Introduction. Kinds of tofu and production: Soybean curd (production in factories, production at home, instant tofu, kinugoshi tofu, grilled tofu, frozen tofu, how to freeze and dry tofu). Movement of nutritional values during tofu processing: Movement of common nutrients, movement of amino acids. Nutritional components of tofu: Tofu protein, tofu protein as a protein supplement, digestion of tofu, calories in tofu, fat and cholesterol, minerals and vitamins, toxins, *hwe bun* in tofu. Tofu and group meals: School meals in Japan, in America, in Korea. Tofu factories and associations involved with tofu: Member list of food associations in Korea, regular member and extra member list of tofu packaging associations in Japan, directory of tofu shops and factories in North America, in Europe, in other countries, list of companies selling tofu coagulants, list of tofu restaurants in Japan. References.

III. Soy sprouts. Introduction. Production of soy sprouts: Soybean varieties, selecting and washing the soybeans, soaking, watering the sprouts, machines for cultivating soy sprouts, maintenance. Nutritional composition of soy sprouts: Common nutrients, increase of vitamin C during growth, changes in vitamin C during heating, changes in riboflavin during heating. Glossary.

Soybeans arrived in Korea in about 200 B.C. (p. 11). Contains many useful tables. Address: Korea.

996. Shurtleff, William; Aoyagi, Akiko. 1982. History of soya in Third World countries to which they have recently been introduced: Latin America, Indian Subcontinent, Africa, and the Middle East. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 5 p. Dec. Unpublished typescript. Available online at www.soyinfocenter.com.

• ***Summary:*** www.soyinfocenter.com/HSS/new_third_world.php

A comprehensive history of the subject. Contents: Introduction: Third World countries in which soy is "new." History and potential in "new" Third World countries: When introduced to each region, active history started in 1960 (protein gap) and 1970's: International Soybean Program (INTSOY), American Soybean Association (ASA), high prices, international conferences, call for further research, the potential: population and hunger. Basic approaches to introducing soybeans and soyfoods: Can't introduce like rice or wheat, need utilization training, how to get it, whole dry soybeans in Brazil and India, the traditional trickle-down approach (Japan–all village centered, Korea, Indonesia), the national integrated approach (examples of it–Sri Lanka, basic components: Cooperative funding, training center, well educated and inspired teachers, a publication, farm extension workers and farmers, soyfoods extension workers and resident students, soyfoods users–food industry and institutional, the people/villagers), the single enterprise integrated approach (examples of it, Soya Production and Research Association, Uganda, CARE in Costa Rica, teach farmers, guarantee crop, make food, advertise it), the commune village integrated approach (examples–the Farm, teach farmers, establish communal business, all use the food), the free market-government aid/extension/research approach (examples–Egypt, Brazil, oil mills and exports), the soyfoods missionary/mass movement approach or village uplift (examples–Blanca Dominguez, soyfoods movement in America, show others, they teach others, encourage starting of small businesses, broad-based, teach all over via books, programs, later start schools). Soyfoods applications: Oil, flour, textured soy flour (TSF), as is, traditional vs. new countries. Production and marketing approaches: Soybean crushing plant (oil and defatted meal, meal to fortify or TSF), middle level low-cost extrusion or soy dairy, small decentralized village and cottage industries, all traditional countries took this approach. Address: Lafayette, California. Phone: 415-283-2991.

997. Tsuchiya, Kanji. 1982. Tônyû. Shinban [Soymilk. 2nd ed.]. Tokyo: Shoku no Joho-sha. 223 p. First edition was published in 1980. Illust. 17 cm. [Jap]

• ***Summary:*** This is the best book seen to date on soymilk in Japanese. A detailed chronology of tofu and soymilk is given on pages 173-76. Over 20 years ago, when Mr. Tsuchiya was plant manager of the *Kyôdo Nyûgyo* dairy milk plant at Matsumoto, he became interested in using soy protein to replace dairy protein. Although soybean crushers had investigated the use of defatted soybean meal, the techniques for removing the beany flavor and smell were not yet good enough to allow substitution of soy protein for milk solids. At that time there was a shortage of imported nonfat milk for use in ice cream bars. It was said that a small numbers of manufacturers of the inexpensive ice cream products were already using some soy protein to increase their over-run. "Discovering this, Nisshin Seiyu, after some research, found a method of removing the beany smell by fermentation with a yeast; they asked if Kyodo Nyugyo could make a test run of 10 kg of spray-dried soymilk in our plant. So they dissolved soy powder (*daizu-ko;* which had been defatted at a low temperature) in water, added yeast, waited until the reaction was finished, diluted it with some water, and put it in a spray dryer. Yet the spray drying caused some protein denaturation and an increase in the viscosity of the soy powder, which made it difficult to pump the solution to the top of the spray dryer. Glucose was used to replace half the soy powder. The spray-dried powder would not dissolve in water and the resulting mixture had a muddy brown color, a flavor that was too sweet, and a beany flavor. It was useless. They had discovered that defatted soybean meal and nonfat dried milk behave differently. Defatted soybean meal contains about 20% sugars, but less than 1/3 of these are water soluble and many have a very complicated structure and high viscosity."

Therefore they started to study the basic nature of

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defatted soybean powder (*dasshi daizu-ko*) and after much trial and error, in 1961 they applied for a Japanese patent on "The method of refining defatted soybean powder" (*Dasshi daizu-ko no seisei hôhô*). They were issued the patent (#16,658) in 1962. The key to the success of this patent was the use of meta potassium bisulfite (*meta jûaryusan karium*), which lowers the viscosity, bleaches it and increases the amount of soluble nitrogen. Not enough of the beany flavor had been removed, yet at that time it was an excellent product, which could be used in place up to 30% of nonfat dried milk to make an ice cream product without a beany flavor. Mr. Masaharu Sato (who is presently head of the soybean department of Kyodo Nyugyo's central research lab) was the person who contributed most to the discovery. He is now conducting research on tofu and soymilk. "I still see him often since we are both members of Soyfoods Development Study Group (*Daizu Shokuhin Kaihatsu Kenkyû-kai*). He recently told me, 'After that incident, I became captivated by soy protein.'"

"After about 2 years of research, during the summer we received an order from Nisshin Seiyu for 200 tons of soy protein. Our plant had been losing money for a long time, and this discovery helped to make some profit during my time of work there. I will never forget it. I feel real gratitude to Nisshin Seiyu for helping us to become captivated by soybeans."

At about that time dairy farmers throughout Japan began to compete with one another in a price war which lowered milk prices. The battle between them and the owners of dairy milk companies got worse and worse. Among the leaders of this struggle were progressive dairy farmers in Matsumoto. "Although we made soy powder very secretly, one of the plant workers, who was the son of a dairy farmer, leaked the secret. This caused an uproar (we were using soy powder instead of dairy milk) and the local farmers asked us to stop immediately. However we decided to continue making soy powder for various reasons: (1) We had to fulfill the order that we had accepted; (2) Since we simply processed soy and sold it to another company, this had no effect on our plant's use of unprocessed dairy milk; (3) The soy business allowed out plant to operate profitably and this allowed us to return some money on the dairy farmers' investment." For a variety of complex reasons related to this conflict, Mr. Tsuchiya was fired as plant manager for Kyodo Nyugyo's Matsumoto dairy milk plant. Though his retirement was very near, he left the dairy industry without regret to continue his research on soy powder (p. 14-19).

"Meeting with Dr. Miller: During the period 1965-1969 I was involved in the founding of Taiwan Ryokusô Kogyô Kôshi, and I took a leadership role in constructing modern plants to make powdered soymilk and chlorella. One of the leaders in the chlorella industry, the late Dr. Yoshio Takechi, was in charge of the chlorella cultivation department and I was in charge of chlorella product development and of powdered soymilk production. In 1966 Dr. W.A. [sic, Harry W.] Miller (who was a founder of Loma Linda Foods) and his son visited our company, under the guidance of Dr. Taisei of Taikei University. At that time Dr. Miller stood on the platform atop our spray dryer, which was 20 meters tall and had 500 liters/hour capacity. Admiring it, he said: 'I've never seen a soymilk plant which has this much facilities!' He also tasted the soymilk (from which the beany flavor had been removed) and said 'I wonder if you have to refine soymilk to this degree for Chinese people.' His words left a strong impression in my memory. Sure enough, when the factory was completed and we launched our canned soymilk powder, we heard Chinese saying, 'This is not real soymilk. It's an imitation.' But we did a good marketing campaign and soon the soymilk started selling. When my 2-year contract ended, I returned to Japan. After that, the products produced in this plant were used as food for the Taiwanese army and were not sold to the public. Moreover, because of the chlorella boom in Japan, the spray dryer was used for chlorella and soymilk production stopped. Since I had great expectations for this plant, I was greatly disappointed.

"Right after I returned to Japan in 1970, I was asked to provide technical assistance to Keijô Shison Shokuhin Kenkyusho, a research lab in Korea headed by pediatrician Son Zaien. I visited there several times and even drafted a floor plan, then suddenly the Japanese government told me that the money which had been available for helping Koreans was no longer available, so I could do no more" (p. 18-21; see p. 53 for more on soymilk in Korea). Continued. Address: Technical consultant, Okazaki Marusan, Japan.

998. Tsuchiya, Kanji. 1982. Tônyû. Shinban [Soymilk. 2nd ed.] (Continued–Document part II). Tokyo: Shoku no Joho-sha. 223 p. First edition was published in 1980. Illust. 17 cm. [Jap]

• ***Summary:*** (Continued): Pages 31-32. In the literature of Japan's Muromachi period it is written that after eating confections (*tenshin* such as okashi, oyatsu) they ate light and simple food (*tanpaku na tabemono*). One of the latter was called *tofu no uwamono*, which means yuba.

A flow diagram (p. 35-36) gives Chinese names of soymilk, yuba, fermented tofu, etc.

Part III (p. 39-64) titled "Soymilk around the world," has chapters on the USA, Korea, Hong Kong, China, Taiwan, Southeast Asia, and Europe. Soymilk in America (p. 47-52) includes a 1975 table showing major manufacturers of soymilk and soy-based infant formula, their location, and the names of their products. Soymilk in Korea (p. 53-54): In 1968 the Keijo Shison Shokuhin Kenkyujo made soymilk using the regular tofu making equipment adjusted to make a product as similar as possible to dairy milk, then bottled it in cider bottles, pasteurized it, and sold it. They made 500 to 800 bottles a day and sold it nationwide. It was brownish in color and tasted like soybean cooking liquid; there was no

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comparison between that and today's soymilk in quality. The head of this research lab was Dr. Son Zaien, who also ran the children's hospital and was a professor of pediatrics at Seoul Medical University. As a pediatrician his concern was that the soymilk promote the growth and health of children; he was not concerned about its acceptance among adults. The children accepted it within 2-3 days. Later, in May 1982, Tsuchiya visited Korea again. They had developed their own method of making soymilk and the soymilk plant had been expanded. Now they produced 500,000 bottles a day (180 cc each, retort sterilized); they call it Vegemil / Vegemeal. It contains added fat and sugar to make it closer to dairy milk, but the sugar content is 10%, which is sweeter than Japanese soymilk. The plant is built on a lot of 4-5,000 tsubo and has 24 retort sterilizers; each machine has 2,500 bottles capacity. Tôhô Yuryô, as part of a Korean technical joint venture with Kibun in Japan, is going to make 120-130,000 Tetra Brik cartons (each 200 cc). Also other dairy milk makers (Sojû and Sangan) are going to have some sort of equipment to start making soymilk. Also, I heard that Tôa Shokuhin (K.K.), a pharmaceutical company, is planning a joint venture with Meiji in Japan to make soymilk.

Also, Lotte Chilsung Beverage Co. is planning to use Marusan's (Japan) technology to make soymilk. They are constructing a plant to start to making soymilk in Feb. 1983.–The population of Korea is about 40 million and the GNP 24,000 million won (unit of currency) a year; it is the largest in Asia. But it is a tough war for market share among these fine companies.

Soymilk in Taiwan (p. 57-61): People who were born in Taiwan [the former Japanese colony of Formosa (1895-1945)] have Japanese food habits and don't like soymilk as much as the Chinese. Also, Taiwanese young people don't like soymilk much. In mainland China people only drink water that has been boiled and cooled–just as they do with tea. The same with soymilk. They boil soymilk in a flat pan (*hira-nabe*) for 20-30 minutes before selling it. The buyers don't buy it without seeing that it has been properly boiled. If you cook soymilk in a flat pan for a long time, you can eliminate much of the beany smell and flavor, the antidigestion substances, and harmful bacteria. They don't care about a little burned flavor, bitterness, or beany flavor. But this is ancient wisdom. There they continue to drink soymilk up to this day and it is still very popular. It is said that the annual sale of soymilk in Taiwan is about 5,000 million yen.

In China, sellers of ice candy (like ice Popsicles) call out loudly *kaishui bingo. Kaishui* means boiled and cooled water. *Bingo* means Popsicle.

In the Philippines, about 10 years ago, the University of the Philippines developed soymilk and a blend of soymilk and coconut milk for American children. It was test marketed among the students and teachers of elementary schools, junior and senior high schools, and universities. It was acceptable only to comparatively well educated people. A 200 ml bottle (about 7 ounces) sold for 15 cents, making it more expensive than most other drinks. The taste was plain but the bean smell was not completely removed. In October 1982 Dr. William G. Padorina and other economically influential people came to Japan at the request of President Ferdinand Marcos and studied Marusan's soymilk plant. They are planning a Food Development Symposium in Feb. 1983 and they would like to have nutritious soy products that contain coconut oil (they account for 70% of the world's production). They have asked Marusan to cooperate in the effort.

In Denmark, a company named Starna [Nutana?] makes various soyfoods such as textured soy flour (*daizu nikku*), defatted soymilk, and soymilk. They are selling these products in Denmark and neighboring countries. *The Book of Tofu* by Shurtleff and Aoyagi is mentioned on pages 46 and 117.

Okazaki Marusan makes a soy yogurt named *Tôgurt / Tôguruto* in Japanese. The character *tô,* which means bean, is also the first character in the word *tôfu* (p. 71). Address: Technical consultant, Okazaki Marusan, Japan.

999. **Product Name:** [Hae Pyo (Haepyo) Soy Flour, and Textured Soy Protein; Dongbang Soy Flour, and Textured Soy Protein].
**Manufacturer's Name:** Dong Bang Oil and Flour Mills Ltd.
**Manufacturer's Address:** No. 2 Yangpyong-dong 4-ka, Yungdungpo-ku, Seoul, South Korea.
**Date of Introduction:** 1982.
**New Product–Documentation:** Soya Bluebook. 1982. p. 62, 67; 1985. p. 89. Address is now 2-4 Ka, Yangpyong-dong, Yungdungpo-ku, C.P.O. Box 3031, Seoul 150, S. Korea. Product is Haepyo Soy Flour; 1986. p. 87.

1000. Kim, Kwang Soo; Kim, S.D.; Kim, J.K.; Kim, J.N.; Kim, K.J. 1982. [Effect of blue light on the major components of soybean sprouts]. *Korean Journal of Food and Nutrition* 11(4):7-12. [30 ref. Kor; eng]
• ***Summary:*** Soybean sprouts germinated under blue light (120 lux, 3 hours/day) after 5 days underwent chemical changes. They had a significantly higher chlorophyll content (6.74 mg% fresh weight) in the cotyledons than its value when germinated in the dark (1.43 mg%). Vitamin C contents under blue light was also higher (22% and 30% in the cotyledon and hypocotyl respectively) compared to germination in the dark. Exposure to blue light caused a slight increase in root growth and some changes in protein pattern of disc gel electrophoresis. Address: Dep. of Food & Nutrition, Yeungnam Univ., Gyeongsan, South Korea.

1001. Lee, M.D.; Kim, Y.I.; Kim, J.P. 1982. An experimental study on the development of gastric cancer by Maejoo

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[Meju] (Korean fermented soybean cake) [Korean soybean koji], aflatoxin B1 and N-methyl-N-nitro'-N-nitrosoguanidine. *J. of the Korean Medical Association* 25:149-60. [24 ref]*
Address: Korea Research Inst. of Bioscience and Biotechnology (KRIBB).

1002. Song, Puju; Wishnok, J.S.; Tannenbaum, S.R. 1982. [Determination of volatile nitrosamines in soy sauce]. *Zhonghua Yufangyixue Zazhi* (*Chung-hua Yu Fang I Hsueh Tsa Chih; Chinese J. of Preventive Medicine*) 16(3):147-49. (Chem. Abst. 97:108644e). [Chi]*
• ***Summary:*** Nine commercial soy sauces. purchased at U.S. retail stores, and including representative samples from Hong Kong, China, Thailand, Japan, and Korea, were examined for the possible presence of volatile N-nitroso compounds. All samples contained substances which gave positive responses on a nitrosamine-selective detector (Thermal Energy Analyzer; TEA). These signals, in addition, disappeared or were reduced following ultraviolet irradiation; this behavior is characteristic of nitrosamines. Two of the TEA-positive substances had gas chromatogram retention times and gas-chromatogram-mass spectrometer behavior suggestive of *N-nitrosodimethylamine* and *N-nitrosomorpholine,* respectively. Address: Beijing Medical College, Beijing, China.

1003. Adachi, Iwao. 1982. Nihon shokumotsu bunka no kigen [Origins of Japanese food culture]. Tokyo: Jiyu Kokuminsha. 470 p. See p. 69-70, 113. [Jap; eng+]
• ***Summary:*** Kinako (Yayoi period): Also called "mametsuki" in Japanese, kinako is written with characters that mean "yellow soy flour." In the *Wamyosho*, it is called "Daizu-iri" or "Mametsuki." From these expressions we can learn that since ancient times, people have pounded soybeans in a mortar (*usu*). Stone mortars came to Japan during the Nara period (A.D. 710-784) and finally became popular among the people in about the middle of the Edo/Tokugawa period. Kinako was brought to Japan from China through Korea. Kinako is probably mentioned in the *Engi Shiki*. At a certain festival the people served at the altar 5 measures each of magarimochiki and mametsuki, and 10 measures of daizumochiki. These may have been the early names for kinako-mochi and/or azuki mochi.

Tamari: The original form of shoyu was tamari. The by-product of tamari was miso. And the original form of miso was *kuki* [fermented black soybeans], which was a seasoning developed in China. More on the history of kuki is given under "miso." The government office (yakusho) for miso was built at the imperial court (kyutei) in A.D. 701 (Taiho 1). Therefore tamari started there at the same time. In the book *Yamato Honso* (Japanese materia medica) by Ekiken Kaibara, tamari (written with the characters for bean + oil) was mentioned. But on the sign board (kanban) of Yuasa Shoyu (which was started in the Tenshô period, 1573-1592), Tamari Shoyu was written (and "tamari" was written with the single character for "tamaru"). In the *Vocabulary of the language of Japan* (1603; Nippo Jisho) tamari was defined in Portuguese: "Tamari, a very delicious liquid taken from miso which can be used as a seasoning when cooking foods." Furthermore, in the *Oshufushi* (1684) it is written that "The liquid from shoyu is tamari." During the Middle Ages (chûsei) in Japan, shoyu was written with the characters for bean + oil, but during the Tenshô period (1573-1592) it came to be written with the single character for "tamaru." Tamari and shoyu were first distinguished during the Kyôhô period (1716-1735). In the Chubu region of central Japan (Chûbu-Chiho; Toyama, Ishikawa, Fukui, Yamanashi, Nagano, Gifu, Shizuoka, and Aichi prefectures) one special kind of miso, which is a by-product of shoyu, is called "tamari-miso."

1004. American Soybean Assoc. 1982. Increasing pork demand to boost Korean soybean market. *Checkoff Successfile.* Korea #802. 2 p.
• ***Summary:*** "The Korean economy has been growing and with it consumer demand for meat products. Traditionally the Korean preference has been for beef but pork is gaining in popularity. Now, thanks to educational efforts by the American Soybean Association, consumer resistance to pork is declining. By developing recipes and presenting cooking demonstrations ASA is showing consumers tasty and attractive new ways to prepare pork. Today Koreans eat nearly twice as much pork as six years ago. That translates to increased demand for soybean meal to feed a growing hog population on Korean farms."

A graph shows that Korean soybean meal use increased from a low of about 25,000 metric tons in 1974-75 to a peak of about 325,000 metric tons in 1978-79. Address: St. Louis, Missouri.

1005. American Soybean Assoc. 1982. Korean farmers turn to soybean meal. *Checkoff Successfile.* Korea #803. 2 p.
• ***Summary:*** A photo shows Dr. Kyung Lee. Address: St. Louis, Missouri.

1006. American Soybean Assoc. 1982. Awareness is key in Korean soybean sales. *Checkoff Successfile.* Korea #801. 1 p.
• ***Summary:*** Contents: Summary. Problem. Program and execution. Results.

"Summary: Korea is a relatively new market for U.S. soybeans. Consequently, many Korean buyers are not aware that the U.S. offers a quality product that can fit their needs. With the opening of an office in Seoul, Korea, the American Soybean Association has concentrated on contacting Korean buyers to make them aware of the availability of U.S. soybeans and to inform them of procedures to obtain U.S. soybeans of the quality desired. The effort has resulted in a significant increase in Korean imports of U.S. food quality

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soybeans."

ASA's office in Seoul, Korea, is headed by Kyung Lee, a U.S. citizen and native of Korea. The office was opened in 1980. A portrait photo shows Kyung Lee.

"Results: As a result of increased effort in working with food bean processors, the Koreans purchased over a million bushels of food grade soybeans for tofu from the U.S. last year. In addition, over 200,000 bushels of soybeans were purchased for sprouting in 1980." Address: St. Louis, Missouri.

1007. Asian Vegetable Research & Development Center (AVRDC). 1982. Soybean. *AVRDC Progress Report Summaries* (*Shanhua, Taiwan*) No. 83-195. p. 2, 27-36. [16 ref. Eng]

• ***Summary:*** Contents: Director's foreword, by G.W. Selleck (p. 2). The chapter titled "Soybean" (p. 27-36) discusses: Plant breeding: Evaluation of soybean germplasm, evaluation of vegetable soybeans, preliminary and intermediate trials, advanced yield tests, mutation breeding in soybean, selection for soybean rust tolerance, genotypic responses for minimum and maximum input in soybean, continuous cropping of soybeans, techniques to hasten soybean maturity for generation advance, techniques for determining soybean seed storability, evaluation of Korean soybeans, optimum management input for maximum economic yield in soybean. Pathology: Mycorrhizal population dynamics in soybean-rice-rice and soybean-soybean-rice cropping systems, survey of mycorrhizal fungi and Pingtung County, the effect of cropping systems on vesicular-arbuscular mycorrhizae inoculum potential under greenhouse conditions, identification of soybean rust races at AVRDC, resistance to development of soybean rust, yield of soybean cultivars under stress from a rust epidemic, the effects of vesicular-arbuscular mycorrhizae on soybean mosaic virus infected soybeans, isolation and characterization of viruses on soybean in Taiwan, preliminary yield trial of soybean lines resistant to soybean mosaic virus. Entomology: Study of beanfly resistance inheritance in soybean, screening soybean germplasm for resistance to beanfly, evaluation of insecticides for beanfly control, host range of beanfly species on common legumes, beet armyworm resistance in selected soybean accessions, the effect of defoliation on yield and yield components of soybean, chemical control of beet armyworm on soybean, confirmation of stinkbug resistance in PI 227687. Physiology: Effect of weathering on maturing soybean and mungbean seeds, effect of storage conditions on germination and vigor of soybean, seed emergence under anoxia [oxygen free] conditions.

Evaluation: Eight of 42 vegetable soybean accessions were selected for the first AVRDC Vegetable Soybean Evaluation Trial (AVSET), to be conducted at multiple locations in the spring and summer of 1983. In summer preliminary yield trials (PYTs), five accessions gave yields of 1.6 to 1.9 tonnes/ha, and 55% of the accessions had the preferred grey pubescence.

1008. Dunn, John R.; Reynolds, B.J.; Eversull, E.E.; Skinner, R.A.; Thurston, S.K. 1982. Cooperative involvement and opportunities in oilseeds. *ACS Research Report* No. 13. v + 47 p. 28 cm. [28 ref]

• ***Summary:*** A very important and original report showing the relationship between all aspects of soybeans and other oilseed crops in the USA, and between cooperative and noncooperative soybean processors. Contents: Highlights and recommendations. Oilseed crop production: Soybeans, cottonseed, peanuts, flaxseed, sunflowerseed. Overview of cooperative oilseed system: Cooperative oilseed flows, cooperative organizational approaches, vertical integration by individual cooperatives, horizontal coordination by groups of cooperatives, vertical coordination by groups of cooperatives. Oilseed crushing: Soybeans, cottonseed, sunflowerseed / flaxseed, peanuts, potential new locations for cooperative crushing, parts inventory for processing cooperatives. Processing plant output: Soybean plant output, cottonseed mill output. Processing plant costs: Soybean plant costs, cottonseed plant costs, economies of scale. Raw product marketing. Oilseed pricing mechanisms. Transportation of oilseeds and oilseed products: Cooperative control of transportation modes, transportation by cooperative soybean processors. Refining, product manufacturing, and marketing: Demand for vegetable oil products, vegetable oil refining, increasing cooperative refining activity, marketing of vegetable oil products, manufacturing and marketing meal products, cooperative brand name oilseed products, retail product quality assurance association. The export markets for U.S. oilseeds: Global demand for oilseeds, global oilseed processing, world oilseed trade flows. Cooperative involvement in oilseed exporting: cooperative export flows, level of cooperative involvement, considerations for expansion of cooperative exporting, advantages and risks for cooperatives in oilseed exporting, the need for unified cooperative export efforts. Challenges for oilseed cooperatives: Rail transportation, energy, growth, competitive pressures and the need for coordination. Selected oilseeds references. Appendix tables.

Tables related to soy: (1) Regional shares of U.S. regional soybean production; Averages for 1959-69, 1970-79, 1976-79. (6) Soybean crushing capacity; total cooperative and noncooperative. Cooperative share of crushing capacity, 1971-1979 crop years. (7) Number of soybean crushing mills, U.S. total, co-op, and non-coop. Average mill capacity; U.S., co-op and non-co-op, 1971-1979 crop years. (8) Soybean crushed, U.S. total, cooperative crush, nonco-op crush, cooperative share of total crush, 1971-1979 crop years. (9) Utilization of soybean crushing capacity; U.S. overall average, noncooperative average, 1971-1979 crop years.

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(10) Soybean crushing capacity shares and cooperative shares of crushing capacity, by region, 1979. (11) Soybean crushing capacity and proportion of soybean production which may be crushed within each region, 1979. (12) Structural characteristics of the domestic soybean processing industry in terms of plant numbers and capacities, 1979. (16) Production of soybean oil and oil products by cooperatives, 1971-1979 crop years (Million pounds and percentage; Crude oil, degummed oil, lecithin and by-products, refined oil, hydrogenated oil). (17) Soybean meal production by cooperatives, 1971-1979 marketing years (Thousand tons and percentage; Total, high protein meal, low protein meal, mill feed production).

(20) Processing costs for cooperative soybean processing plants, 1971-1979, alternative years. (24) Soybean receiving methods by cooperative plants, 1971-1979 crop years (by rail, cooperative owned truck, other truck). (25) Soybean meal shipment methods by cooperative plants, 1971-1979 (by rail, co-op truck, other truck, barge). (26) Soybean oil shipment methods by cooperative plants, 1971-1979 (by rail, truck, barge). (27) U.S. utilization of soybean oil, by products, by crop years, 1964-1979 (million lb): Shortening, salad and cooking oil, margarine, other edible, total food, total non-food, total domestic disappearance.

(30) Total and per capita consumption of fats and oils, food and industrial products, USA, 1963-1979 (million lb and per capita) (butter, lard, margarine, shortening, edible oils, all [oleaginous] food products, all industrial products, all products). (31) Margarine: Fats and oils used in manufacture, United States, 1965-1979 (incl. soybean, cottonseed, peanut, corn, coconut, safflower, other vegetable, lard, beef tallow). (32) Shortening: Fats and oils used in manufacture, United States, 1965-1979 (incl. soybean, cottonseed, peanut, etc.). (34) Selected oilseeds, vegetable oils, and oilseed cakes and meals: value of U.S. exports, annual 1973-1979. (35) Major U.S. oilseed and products exports, 1973-1979 (Soybeans, sunflowerseed, cottonseed, peanut). (36) Global soybean annual crushing capacities of major markets, 1979 (Soybean importing countries: Belgium & Luxembourg, Denmark, France, Italy, Netherlands, UK, West Germany, Spain, Poland, Yugoslavia, Soviet Union, Japan, Korea {Rep. of = South}, China {PRC}, Taiwan, Mexico, subtotal 42%. Soybean exporting countries: USA, Brazil, Argentina, subtotal 58%). (37) U.S. soybean exports by region or country of destination, 1973-1979.

(40) Volumes of soybeans handled by regional and interregional cooperatives and regional cooperative share of total farm soybean sales, 1972-1979 marketing years. (41) Soybean shipments to cooperative and noncooperative port elevators, 1973-1979. (42) Soybean shipments to ports by port area, by regional cooperatives, 1973-1979 (Atlantic, Gulf, Great Lakes, Pacific, total). (43) Percent of regional cooperatives' soybean sales shipped to port areas 1972-1979. (44) Cooperative port elevator capacities and share of total capacity, by port area, 1980.

Figures: (1) Bar chart: Oilseed production by commodity for selected years, 1959, 1969, 1979. (2) Map of oilseed production areas, USA, 1979. (3) Cooperative export channels for raw oilseeds. (4) Cooperative channels for oilseed products. (5) Cooperative coordination paths (Complete integration, vertical integration, single activity, intercooperative coordination). (6) Bar chart: Oilseed crush shares by commodity for selected years (1959, 1969, 1979). (7) Bar chart: Oilseed production percentage crushed domestically by commodity for selected years. (8) Map: Cooperative oilseed processing plants, 1979. (9) Soybean products. (10) Flow chart: Vegetable oil refining process. (11) Map: Edible fats and oils refining plants, with maximum capacity by region, 1975. Continued. Address: USDA Agricultural Cooperative Service (ACS). Phone: 202-475-4929.

1009. Grain legumes production in Asia. 1982. Tokyo: Asian Productivity Organization. i + 550 p. Illust. No index. 22 cm. [10+ ref]

• ***Summary:*** This book is based on a symposium held in Chiang Mai, Thailand in November, 1980.

Section V, "Country reports on the status of grain legumes production," includes the following chapters:

12. China, Republic of [Taiwan], by Chih-Kang Chao.
13. India, by Tejwant Bolaria.
14. Indonesia, by Justika S. Raharsjah.
15. Japan, by Y. Tanaka and S. Konno.
16. Korea, Republic of [South Korea], by Young-Hyun Hwang. Contents: Introduction (Soybean is by far the leading grain legume in South Korea, followed by azuki bean). Trends in demand and supply of grain legumes: Demand-supply situation, production and productivity. Agronomic aspects of grain legume farming. Economic aspects of grain legume production. Government participation and support. Prospects of grain legumes production.

Tables for Korea: (1) Per calorie intake per day of calories and protein from food and grain sources, 1968-1977. (2) Comparative protein content and prices of major food items (Soybean is by far the least expensive source of protein, and beef is by far the most expensive). (3) Food demand and supply trends for soybeans, 1971-1980 (Supply: Production grew from 232,000 metric tons (mt) in 1971 to a peak of 319,000 mt in 1975 and 1978, then fell to 257,000 mt in 1980. Imports rose dramatically from 61,000 mt in 1971 to 576,000 mt in 1980. Demand grew rapidly: For animal feeds grew by far the fastest, from 27,000 mt in 1971 to 449 mt in 1980. For food use stayed constant, from 143,000 mt in 1971 to 140,000 mt in 1980). Source: KMAF (Korean Ministry of Agriculture and Fisheries).

(4) Distribution of area planted to major food crops, 1969-1978. (5) Area planted, production and yield of grain

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**Table 3. Total Demand and Supply Trends for Soybeans, 1971-80**

*(Unit: 1,000 mt)*

| Item | 1971 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| *Supply* | | | | | | | |
| Total | 229 | 410 | 468 | 496 | 601 | 778 | 936 |
| Carried forward | 6 | 30 | 38 | 50 | 59 | 63 | 103 |
| Production | 232 | 319 | 311 | 295 | 319 | 293 | 257 |
| Import | 61 | 61 | 119 | 151 | 223 | 422 | 576 |
| *Demand* | | | | | | | |
| Total | 281 | 372 | 418 | 437 | 538 | 676 | 850 |
| Animal feeds | 27 | 46 | 91 | 119 | 173 | 291 | 449 |
| Industrial use | 111 | 176 | 187 | 179 | 221 | 237 | 261 |
| Foods | 143 | 150 | 140 | 139 | 144 | 147 | 140 |
| Carried forward | 18 | 38 | 50 | 59 | 63 | 103 | 86 |
| Self-sufficiency | 83 | 86 | 74 | 68 | 59 | 43 | 30 |

*Source:* All figures for 1980 are KMAF projections.

legumes (In 1978, azuki bean production was only 9.2% of soybean production). (6) Distribution of grain legume production areas, 1978 (Gyeongbug-do is the leading South Korean province for soybean production). (7) Characteristics of major grain legume varieties. (8) Recommended fertilizer and herbicide doses for major grain legumes. (9) Costs and returns of soybean crop, 1979. (10) Comparative costs and returns of major grain legumes and competing crops, 1979. (11) Commercialization ratios of soybean, azuki bean and mungbean, 1970-1975. (12) Comparative farmgate and wholesale prices for major grain legumes. (13) Wholesale price indices, by month, for major grain legumes. (14) Long-term plan for increasing soybean area, yield and production, 1981-1986.

Figures for Korea: (1) Marketing channels for soybean. (2) Marketing channels for azuki bean. (3) Marketing channels for mungbean [sprouts]. (4) Marketing channels for groundnut. (5) Flow chart of grain legumes research and extension service [under the Korean Office of Rural Development].

17. Nepal, by M.P. Bhartai.

18. Pakistan, by M. Mumtaz Ali.

19. Philippines, by Federico B. Ballon.

20. Sri Lanka, by A.S. Kunasingham. Address: Tokyo, Japan.

1010. Hirayama, Takeshi. 1982. Relationship of soybean paste soup [miso soup] intake to gastric cancer risk. *Nutrition and Cancer* 3(4):223-33. [15 ref. Eng]

• ***Summary:*** Consumption of miso soup was found to protect against stomach cancer, as long as the soup's salt concentration was kept to a minimum. "Daily intake of soybean paste soup was found to significantly reduce standardized mortality rates for gastric cancer in an ongoing large-scale prospective study of 122,261 males and 142,857 females aged 40 and above in 29 Japanese health center districts, 1966-1978. The gastric cancer standardized mortality rates were 171.9, 210.2, 240.0, and 255.9 per 100,000 males, and 77.8, 85.3, 97.5, and 113.6 per 100,000 females in daily, occasional, rare, and noningesters, respectively... The risk-reducing effect has also been observed in case-control studies in the past, for both males and females and in urban and rural areas. This beneficial effect could arise from selected compounds such as protease inhibitors and/or other nutritious substances included in the soybean, but it is also possible that it merely reflects the effect of some frequent accompaniment to soybean paste soup, such as green-yellow vegetables...

"According to the national nutritional survey conducted by the Ministry of Health and Welfare in 1979 for 6,000 randomly selected households (21,000 persons), 40.5% of Japanese ingest soybean paste soup daily at breakfast. Another 6.7% ingest it at their evening meal."

In both men and women smokers, frequent consumption of miso soup was found to protect against stomach cancer (Table 3).

"Recently, an animal experiment bearing on the present issue was conducted in Korea [Kim, J.P.: Personal Communication, Oct. 1981]. Rats were fed various gastric carcinogens, and incidence of gastric cancer was reported to be significantly lower in those animals also fed soybean paste soup." Address: Epidemiology Div., National Cancer Center Research Inst., Tsukiji 5-1-1, Chuo-ku, Tokyo, Japan 104.

1011. Ko Swan Djien. 1982. Indigenous fermented foods. *Economic Microbiology* 7:15-38. A.H. Rose, ed. Fermented Foods. [67 ref]

• ***Summary:*** Contents: 1. Introduction. 2. Foods fermented by moulds: Roles of the moulds. 3. Foods fermented by bacteria: Fermented vegetable products, fermented fish products, fermented seeds (natto, thua-nao, dagé), fermented starch-rich raw materials (fermented maize products, fermented rice products, fermented cassava), fermented plant juice.

4. Foods fermented by a mixture of moulds and yeasts: Ragi, micro-organisms, fermented starch-rich raw materials.

5. Foods firstly fermented by moulds [as in making koji], followed by a fermentation with a mixture of bacteria and yeasts (the salt-tolerant yeasts are species of *Saccharomyces* and *Torulopsis;* the bacteria are species of *Pediococcus* and *Streptococcus*): Tane koji, soy sauce, other fermented soybean products (tauco {porridge or dry consistency}, miso, hamanatto {which is soft and has a high

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moisture content}, tou-shih {which has a much lower water content than hamanatto and is therefore not so soft}. These "fermented soybean products are also used as flavouring agents in cooking as well as table condiments or as a side dish").

6. Specific aspects of fermented foods: Mould species, lactic-acid bacteria, yeasts, salt. 7. Acknowledgement. References.

Concerning soy sauce (p. 30-31): "Japanese *shoyu* is made from equal amounts of soybeans and wheat." The "raw materials are inoculated with tane koji which contains spores of selected strains of *Aspergillus oryzae* and *A. soyae*. In less sophisticated soysauce factories throughout South East Asia, mould species grow spontaneously on the soybeans by natural contamination from the air and from the bamboo trays on which soybeans of former batches were incubated (Bhumiratana et al., 1980). The moulds involved are species of *Aspergillus, Rhizopus*, or *Mucor.* Some Indonesian *kecap* manufacturers inoculated the cooked soybeans with tempe [tempeh] inoculum which contains spores of *Rhizopus oligosporus."*

Tables: (1) Conferences discussing aspects of indigenous fermented foods (1977-1981, chronological). (a) Symposium / Workshop on Indigenous Fermented Foods, Nov. 21-26, 1977, Bangkok, Thailand. (b) World Conference on Vegetable Food Proteins, Oct. 29–Nov. 3, 1978, Amsterdam, The Netherlands, (c) Symposium on Fermented Foods, Nov. 22, 1978, London, England. (d) International Symposium on Oriental Fermented Foods, Dec. 10-14, 1979, Taipei, Taiwan. (e) United Nations University Workshop on Research and Development Needs in the Field of Fermented Foods, Dec. 14-15, 1979, Bogor, Indonesia. (f) VIth International Fermentation Symposium, July 20-25, 1980, London, Ontario, Canada. (g) Eighth Conference of Association for Science Cooperation in Asia (ASCA), Feb. 9-15, 1981, Medan, Indonesia.

(2) Origins of various fish sauces. (3) Origins of various fish pastes. (4) Names given in various countries to an inoculum used to manufacture food products. (5) Names given in various countries to fermented glutinous rice (*Oryza sativa glutinosa*). (6) Names given in various countries to rice wine. (7) Names given to soy sauce in different countries (*Chiang-yu* in China, *Kan jang* in Korea, *Kecap* in Indonesia, *Shoyu* in Japan).

Note: This is the earliest English-language document seen (April 2012) that uses the term "Kan jang" to refer to Korean soy sauce. (8) Soybean foods produced by a two-stage fermentation (*Hamanatto and miso* in Japan, Soy sauce in the Orient, *Taoco* in Indonesia, *Tao-si* in the Philippines, and *Tou-shih* in China). Address: Dep. of Food Science, Agricultural Univ., Wageningen, Netherlands.

1012. Lee, Cherl-Ho; Jul, Mogens. 1982. The effect of Korean soysauce fermentation on the protein quality of soybean. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 209-20. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [11 ref]

• ***Summary:*** Contents: Introduction. Changes in the composition of N-compounds during fermentation. Changes in the protein quality by the fermentation methods. Discussion.

Tables: (1) Per capita daily consumption of fermented foods in Korea in 1970 was as follows: Kimchi (all kinds) 43.7 gm, soybean sauce 23.3 gm, red pepper soybean sauce 13.9, soybean paste 10.4 gm, fermented marine foods 0.6 gm.

(2) Production of fermented soybean foods in Korea, 1971 (in 1,000 metric tons): Soybean sauce: industrial 107, home-made 116, total 223. Soybean paste: industrial 56, home-made 168, total 224. Red pepper soybean paste: industrial 23, home-made 89, total 112.

(3) Retention of the nutrients in soybean during the traditional meju making (%). (4) Chemical score and essential amino acid index (EAAI) of soybean and meju-brine mixtures ripened for 8 months.

(5) The lysine availability of soybean and meju-brine mixtures ripened for 8 months. (6) Effect of 20% protein supplementation with the fermented soybean products on the protein value of the rice diet in the rat feeding. (7) Comparison of protein conversion rates of soybean fermentation and animal production: Beef 5% (BV {biological value} 74). Milk 23% (BV 85). Egg 24% (BV 99). Home-made meju products 74% (BV 67*). Improved meju products 85% (BV 73*). Asterisk (*) = "Rice protein added with 20% of the product protein.

Figures: (1) Cartoon diagram of the process for making Korean soysauce and miso. (2) Flowsheet [flow sheet] of improved method of making meju. (3) Graph of Changes in the content of soluble nitrogen, free amino nitrogen, and amino nitrogen in the total nitrogen of soybean during meju making. (4) Changes in the content (%) of methionine and cystine during cooking, 3-month meju fermentation, and ripening. (5) Changes in the concentration (%) of basic amino acids during cooking, 3-month meju fermentation, and ripening. (6) Changes in the concentration (%) of total amino acid in the crude protein of soybean during the ripening of different types of meju-brine mixture. Address: 1. Dep. of Food Technology, Korea Univ., Seoul, Korea; 2. Dep. of Food Preservation, the Royal Veterinary and Agricultural Univ., Copenhagen, Denmark.

1013. Mheen, T.I.; Kwon, T.W.; Lee, C.H. 1982. Traditional fermented food products in Korea. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 63-81. Proceedings of a technical

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seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [13 ref]
• ***Summary:*** Discusses and gives a flow sheet and nutritional analysis for the following fermented soybean products: Meju, kochujang (soybean paste with red pepper added), doenjang, kochujang. "According to the available old literatures, the history of soybean cultivation for food uses in the Orient dates back to 4,000–5,000 years ago in China, 2,000 years ago in Korea, and 1,000 years ago in Japan (KIST, 1970; Watanabe et al. 1971)." Address: 1-2. Korea Inst. of Science and Technology, Seoul, Korea; 3. Korea Univ., Seoul, Korea.

1014. Shanmugasundaram, S. 1982. Role of AVRDC in soybean and mungbean improvement [for the developing tropical countries]. In: 1982. Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. 550 p. See p. 137-50. [28 ref]
• ***Summary:*** Contents: Introduction. Soybean. Importance of soybean in the Asian region. Important changes in agronomic practices. Breakthroughs in varietal development.

Tables: (1) Soybean area, production, yield, imports and exports for selected Asian countries: Taiwan (ROC; 19,000 ha; 1,644 kg/ha), India, Indonesia (755,000 ha; 795 kg/ha), Iran (70,000 ha; 150,000 metric tons; 2,143 kg/ha), Japan (100,000 ha; 2,000 kg/ha), Korea (Rep. of = South; 260,000 ha; 1,350 kg/ha), Nepal (19,000 ha; 650 kg/ha), Philippines, Sri Lanka, Thailand (160,000 ha; 783 kg/ha), China (PRC; 14,430,000 ha; 925 kg/ha) [1979 & 1980]. (2) Yield response of post-rice soybean crop to irrigation and tillage. (3) Effects of different soybean sowing methods on plant stand and yield. (4) Soybean responses to *Rhizobium japonicum* inoculum. (5) Effect of fungicide seed treatment on soybean plant stand when grown in rice stubble culture with excessive soil moisture after sowing. (6) Soybean germplasm collections available in Asian countries. (7) Soybean varieties and their characteristics identified as moderately resistant to soybean rust. (8) Soybean varieties immune to soybean mosaic virus. (9) Soybean varieties susceptible to soybean mosaic virus but are symptomless. (10) Wild soybean, (G. soya Sieb and Zucc.) accessions least affected by beanflies, (*Melanagromyza sojae* and *Ophiomyia centrocematis*) at AVRDC. (11) Soybean varieties less affected by pod borer, *Etiella zinckenella* at AVRDC. (12) Major soybean varieties grown by farmers in different countries until 1972. (13) Major soybean varieties developed after 1972 and grown by farmers until 1980. (14) Performance of AVRDC selection compared to local cultivars in Indonesia. (15) Yield of six soybean cultivars in four locations during summer in a district trial experiment. Address: AVRDC, Shanhua, Taiwan.

1015. Yokotsuka, Tamotsu. 1982. Industrial application of proteinous fermented foods. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 145-80. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [130 ref]
• ***Summary:*** Contents: Introduction. Japanese shoyu: Koikuchi, usukuchi, tamari, shiro, saishikomi, fish-soy, JAS grades. The soysauce produced in other Oriental countries (Korea, Taiwan, Singapore, southern China; Inyu, tamari-style). Miso. Manufacture: Koikuchi shoyu (treatment of raw materials, koji making, mash making and aging, pressing of the mash, refining), tamari shoyu, miso. Some recent research and technological progress in shoyu and miso manufacturing: Whole and defatted soybeans as raw materials, treatment of raw materials, koji molds, koji making, control of mash, refining (pressing of the mash, pasteurization), product (colour, flavour, flavour components).

Tables: (1) Annual production of 5 different kinds of shoyu in Japan, and total, 1979. (2) Typical composition of 6 different kinds of shoyu (analyzed by Kikkoman Shoyu Co., Ltd., 1978). For each gives: Be (Baume), NaCl, total nitrogen, formol nitrogen, reducing sugars, alcohol %, and pH. (3) Composition of 7 types of typical Japanese miso (Ebine, 1980). (4) NK cooking method of soybeans as compared to the conventional method (Tateno and Umeda, 1955). (5) Chemical analyses of shoyu fermented from soybeans denatured by methanol and by conventional cooking (Yamaguchi, 1954). (6) Analysis of liquid part of shoyu mash after 40 days prepared from defatted soybean meal denatured by ethanol, isopropanol, or NK cooking (Fukushima and Mogi, 1955, 1957). (7) Effect of cooking conditions of soybeans on the enzymatic digestibility of protein (Yokotsuka et al., 1966). (8) Cooling speed and digestibility of protein. (9) Fraction of proteases produced by *Aspergillus sojae* through Sephadex G-100 (Nakadai, 1977). (10) Changes of viable counts of yeast in shoyu mash (Mogi Keitaro et al., 1968).

Figures: (1) Flow sheet–Koikuchi shoyu fermentation. (2) Flow sheet–Miso fermentation. (3) Cross-sectional illustration–Continuous soybean cooker: Screw type and net conveyor type. (4) Temperature change of materials during koji cultivation by the conventional method using wooden trays (Shibuya, 1969). (5) Koji cultivation at 25ºC (Haga et al., 1967). (6) Preferable temperature change of the materials during 3-day koji cultivation (Haga et al., 1967). (7) Temperature change of the materials during mechanical koji cultivation with a through-flow system of aeration during 3 days (Shibuya, 1969). (8) Temperature change of the materials during mechanical koji cultivation with a through-flow system of aeration during 4 days (Shibuya, 1969). (9) Koji culturing machines with a through-flow system of aeration: Rectangular type, circular type (batch), circular type (continuous). Address: Kikkoman Corp., Noda-shi, Chiba-ken, Japan.

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1016. **Product Name:** Morning Calm brand Organic Tofu (Soy Bean Cake).
**Manufacturer's Name:** Tofu, Inc.
**Manufacturer's Address:** 1900 Oak Crest, Roseville, MN 55113.
**Date of Introduction:** 1982?
**Ingredients:** Organic soybean, water, natural nigari.
**Wt/Vol., Packaging, Price:** 15 oz packed in water in molded plastic tray with heat-sealed, peel-off plastic film lid. Retails for $1.10.
**How Stored:** Refrigerated.
**New Product–Documentation:** Label (undated) sent by Bruce Rose of Rosewood Products. 2000. Oct. 15. Black and yellow on white film. "Tofu (Vegetable protein). Tofu is a versatile, easily digestible source of vegetable protein." Contains six serving suggestions.

1017. Marter, Marilynn. 1983. Taste of the East added to U.S. 'melting pot.' *Philadelphia Inquirer* (*The*) (*Pennsylvania*). Feb. 1. p. 23, 34 (1C, 12C).
• ***Summary:*** "Korean dishes are simpler in form, although often stronger in taste, than other Asian styles. The basic flavors of Korean food are garlic, ginger, black pepper, scallion, sesame and soy. These are accented with cayenne pepper, chili powder, *gochujang* (a salty chili paste), bean paste and rice wine."

1018. Shurtleff, William; Aoyagi, Akiko. 1983. History of miso and soybean jiang. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 82 p. Feb. 21. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** http://www.soyinfocenter.com/HSS/miso1.php
A comprehensive history of the subject. Contents: Introduction. Etymology. Part I: History of soybean jiang in China. Early Chinese non-soybean jiang. Early Chinese soybean jiang (100 B.C. to 599 A.D.). 600 to 1899. The Twentieth Century. Part II: History of soybean jiang/jang in Korea and Southeast Asia. Dissemination of jiang from China. Korea. Indonesia. Vietnam. Malaysia. Part III: History of miso in Japan. Introduction; origins not clear. Early non-soybean hishios (before 700 A.D.). The Nara period (710-784 A.D.); Ganjin 754. The Heian period (794-1160 A.D.). The Kamakura period (1185-1333). The Muromachi period (1336-1568). The Edo or Tokugawa period (1603-1867). The Meiji and pre-war periods (1867-1940). The postwar period, modern times (1941-1982). Part IV: History of miso in Europe. Early European references (1597-1899). 1900-1949. 1950-1982. Part V: History of miso in the United States and Canada. Early developments (1896-1929). 1930-1959. Growth of interest in miso (1960-1982). Part VI: History of miso in other countries. India. Israel. Latin America. Address: Lafayette, California. Phone: 415-283-2991.

1019. Shurtleff, William; Aoyagi, Akiko. 1983. History of Kikkoman. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 24 p. Feb. 26. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/kikkoman.php
A comprehensive history of the subject. Contents: Introduction. Part I: Kikkoman in Japan. 1600's-1887: Mogi family starts shoyu (1754-1800), Kikkoman brand registered 1838, Tokyo Shoyu Co. new distributor 1881. The Noda Shoyu Cartel: How formed, bankruptcy of Tokyo Shoyu Co. in the 1880's, research lab and new technology 1900-09, 1910-1917: Arrival of the railroad in Noda in 1911 revolutionized transportation and provided mass distribution, early switch from water to rail, shoyu factory in Korea, miso sold in Korea and China, damaging competition, final struggle. The Noda Shoyu Co., Ltd., incorporation: Noda Shoyu Company founded 1918, history to 1920, strikes in 1923, reorganization in 1925, the 1930's and 1940's. 1947-1981: anti-monopoly hearings in the 1950's, start of U.S. promotion in 1956, socialism and internationalism in Noda in the 1960's, total figures for 1980-81, future. Part II: Kikkoman in the West. Introduction: Mostly U.S., the early years (1860's-1948). Preparing to establish roots (1949-1972): Advertising on U.S. television 1956, Kikkoman International Inc. established in San Francisco 1957, other branches, Leslie Salt Company (Oakland, California) bottled from bulk shipments from Japan (1968), Japan Foods Corp. acquired 1969. 1973-1981: Reasons for establishing first U.S. plant June 1973, new marketing approach to shoyu, 1973 cookbook (*The Kikkoman way of fine eating*, which uses the term "shoyu" throughout the book except in the recipes), two marketing decisions, change of name from shoyu to soy sauce, use of chemical preservative, sales increase to number one by 1976, types of products, the future. Address: Lafayette, California. Phone: 415-283-2991.

1020. **Product Name:** [Sun-Dew Soymilk].
**Foreign Name:** Sun Dew.
**Manufacturer's Name:** Dong-A Foods Co. Ltd.
**Manufacturer's Address:** 450-1 Suksoo-Dong, Anyang City, Kyung Ki-Do, South Korea.
**Date of Introduction:** 1983 March.
**New Product–Documentation:** Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 81-83. They produced an estimated 4,067 tonnes in 1983. Soya Bluebook. 1984. p. 79. Interview with Mr. Chung's nephew. 1986. Feb. 9. This product is Korea's second best selling soymilk after Vegemil, a distant second.

Photocopy of Label sent by Anders Lindner. 1989. An illustration on the front panel shows a pastoral house surrounded by trees, with a rainbow and sun overhead. In the lower left corner is written "tonyu inryo" (soymilk beverage)

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in Japanese characters.

1021. Meals for Millions / Freedom from Hunger Foundation. 1983. Annual report for 1982. Davis, California: MFM/Freedom from Hunger Foundation. 16 p. Back to back. Each panel 22 x 9.5 cm.

• ***Summary:*** Printed with black and green ink on white paper. Philip E. Barton is chairperson, board of trustees. On the cover is a photo of African children holding foods. Across the bottom: Self-help for a hungry world.

Contents: Board of Trustees' Annual Meeting held in Davis, California on March 20-21, 1982 ("Alfred C. Bartholomew, D.D. [Doctor of Divinity] retired as Chairman of the Board and of the Executive Committee after six years of outstanding leadership. His portrait photo and excerpts from his final address are given. Meals for Millions has "moved naturally from relief to development"). President's message, by Peter J. Davies ("1982 was a watershed year for your Foundation. MFM launched Applied Nutrition Programs in Antigua, Sierra Leone, and Thailand." "On March 20, 1983, the Board, Staff, Nutritional Committee of Sponsors, the University and Davis communities jointly dedicated (releasing a cluster of balloons) our new international center at Davis, California. To pay for this greatly needed, new functional headquarters, the Board commenced a capital campaign to raise $1.2 million over a three year pledge period").

Meals for Millions philosophy (800 million men, women and children worldwide suffer from malnutrition and nutrition-related diseases. "Freedom from Hunger... means attacking the root causes of hunger and malnutrition–poverty, poor sanitation, low levels of productivity, inadequate knowledge about good nutrition, minimum education and overpopulation–to create lasting change"). Ecuador (on the Santa Elena Peninsula; the fields "bloomed once more with corn and soy"). Honduras (ANP program now in its 5th year). Sierra Leone. Kenya.

Korea ("In 1979 MFM, in partnership with Wonseong County, built a plant to produce nutritious snack foods for distribution to schools and day care centers, and for commercial sale. In 1982, 90 metric tons of this low-cost soy, corn and wheat flour product were produced in the plant").

Thailand (In Lampang Province of northern Thailand, projects include growing of nutritious soya beans). Antigua. U.S. Southwest (native Americans). Papago Applied Nutrition Program (now in its 4th year). Solutions through appropriate technology. MFM Resource Center in Davis, California. Financials: For the year ended December 31, public support and revenue increased by 16.6% to $1.837 million. Pie charts show: Sources of support. Distribution of funds. People: Executive staff, regional directors, field officers, honorary trustees, Board of trustees, National committee of sponsors (headed by Mrs. John Steinbeck).

Note: What happened to the training center at 1800 Olympic Blvd., Santa Monica and its training programs which, until quite recently, were at the heart of MFM's activities? Address: 1. 815 Second Ave., New York, NY 10017; 2. P.O. Box 2000, Davis, California 95617. Phone: (212) 986-417 or (916) 758-62000.

1022. *Soyanews* (*Sri Lanka*). 1983. Raja Rata Food Grain introduces DSM [Dried Soya Milk]. 5(7):1, 3. March.

• ***Summary:*** Raja Rata Food Grain Processing Company introduced its main product, Dried Soya Milk powder, at a soya cookery exhibition / demonstration held last month at the YWCA, Rotunda Gardens, Colombo."

This event was also held to say farewell to Mrs. Kai Kim who, in her spare time and working independently, has helped to make soyafoods popular among Sri Lankans. Mrs. Kim is the wife of the Resident Representative of the UNDP, Mr. Y.Y. Kim.

"Mrs. Kim brought her Korean knowledge and experience in helping to introduce soyafoods to the public. She was instrumental in introducing soya milk to the Colombo Hospital and Prisons, for use in the form of a slurry, as a substitute for coconut milk." The Chairman of Raja Rata, Mr. R.S. Wijesekara, "thanked Mrs. Kim for her tireless and dedicated services to helping to add a highly nutritive food to the diet of the Sri Lankans."

A large photo shows Mrs. Gai Kim, Mr. R.S. Wijesekara, and others at the event.

Note: Dried Soya Milk powder will be on sale by about the middle of this year (p. 3).

1023. Giles, Wesley R. 1983. IPT, Vitasoy, and Shurtleff's trip to China as a consultant for STS (Interview). Conducted by William Shurtleff of Soyfoods Center, May 2. 3 p. transcript. Handwritten.

• ***Summary:*** IPT is an engineering and contracting company. They are specialists in designing and building manufacturing plants, and installing the equipment–especially plants that make dairy-type products. Vitasoy is talking with IPT about building a soymilk plant for them in America. IPT and STS could work as either competitors or cooperators. STS could be the major contractor and hire IPT.

There is a Kibun-Alfa Laval joint venture to sell soymilk plants worldwide.

STS was established by DTD and Dong Bang in Korea. Anders Lindner does not own any of it; he is just an employee of DTD.

DTD would like William Shurtleff to serve as a consultant for STS in China. He would go there with a team of two other STS men for 17 days and make presentations in numerous cities to groups and companies interested in starting soymilk plants. The rate would be about $6,000 plus expenses. Address: President, Intereps, P.O. Box 966, Orinda, California 94563-0956. Phone: (415) 253-1065.

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1024. Korean B-B-Q House. 1983. Lunch special (Ad). *Pacific Daily News* (*Agana Heights, Guam*). May 2. p. 45.
• ***Summary:*** Includes:
"Be Beam Bop–$4.75"
"Doen Jang Ji Gye–$4.95"
"Bul-Go-Gi–$5.50." Address: Between ITC Bldg, and Avis Rent-a-Car, Tamuning.

1025. Loh, Eleanor. 1983. Re: Production of soya bean milk in Tetra Pak cartons in seven Asian countries, 1978-1982. Letter to Anders Lindner at STS in Singapore, May 9–in reply to inquiry. 1 p. Typed.
• ***Summary:*** These statistics refer only to the amount of soymilk (in million packages) packed in Tetra Pak Aseptic cartons.
(1) Taiwan increased from 15.9 in 1978 to 79.2 in 1982
(2) Hong Kong increased from 28.1 in 1978 to 55.0 in 1982.
(3) Malaysia increased from 28.1 in 1978 to 44.3 in 1982.
(4) Korea increased from 5.2 in 1979 to 33.0 in 1982.
(5) Thailand increased from 13.9 in 1981 to 16.7 in 1982.
(6) Singapore increased from 1.9 in 1978 to 9.6 in 1982.
(7) Philippines was 0.7 in 1982.
The total increased from 62.9 (15.7 million liters) in 1978 to a peak of 268.4 (67.2 million liters) in 1981, decreasing to 238.2 (59.6 million liters) in 1983. Address: Brik Pak Inc., Singapore. Phone: 662266.

1026. Shurtleff, William. 1983. Fly from California to Hong Kong: First impressions, May 26 (Document part). In: William Shurtleff. 1983. Log of Soyfoods Research Trip to China and Japan: 29 May to 10 July. Lafayette, California: Soyfoods Center. 117 p. See p. 1. Unpublished manuscript.
• ***Summary:*** May 24. I leave by jet for China, from Lafayette, California, my trip paid for by Danish Turnkey Dairies (DTD/STS).
May 25. In Hong Kong with jet lag. Stay at Sheraton Kowloon, meet John Davies and Asger Somer Hansen of DTD.
Singapore soymilk regulations: The protein content must be greater than 2% to label / call it "soymilk"; if less, it must be labeled "soy drink."
When soymilk in a Tetra Pak carton stands for 6-8 months, there is: (1) Physical oil separation. (2) Graying of the color. (3) Some of the enzymes, which are not inactivated by UHT (Ultra-High Temperature) processing, can coagulate the soy protein.
I buy and taste Coca-Cola's soymilk in Hong Kong. The flavor is mediocre, a little watery and cereal-like, but not bad. A 250 ml carton retails for $HK 1.5, about US$0.22.
Ma Po Doufu (Japanese: Mabo-dofu) is a popular Chinese dish from Sichuan (W.-G. Szechuan) province. It is of fairly recent origin.
Note: It is a combination of tofu (bean curd) set in a spicy chili- and bean-based sauce, typically a thin, oily, and bright red suspension, and often cooked with minced meat, usually pork or beef. The character "ma" stands for "mazi," which refers to a person whose face is disfigured by pockmarks. "Po" translates as "old woman." Thus "Ma Po" is an old woman whose face is pockmarked. According to a Chinese legend, the pock-marked old woman lived in the Chinese city of Chengdu (Chengtu)–the capital of Sichuan province in southwest China.
Due to her condition, her home was placed on the outskirts of the city. By coincidence, it was near a road where traders often passed. Although the rich merchants could afford to stay within the numerous inns of the prosperous city while waiting for their goods to sell, poor farmers would stay in cheaper inns scattered along the sides of roads on the outskirts of the ancient city.
According to *Mrs. Chiang's Szechwan Cookbook:* "Eugene Wu, the Librarian of the Harvard Yenching Library, grew up in Chengtu and claims that as a schoolboy he used to eat Pock-Marked Ma's Bean Curd or mapo doufu, at a restaurant run by the original Pock-Marked Ma herself. You ordered by weight, so many grams of bean curd and so many grams of meat, and your serving would be weighed out and cooked as you watched. It arrived at the table fresh, fragrant, and so spicy hot, or la, that it actually caused sweat to break out."
Nowadays there are several Mapo Dofu restaurants in Chengdu. (Source: Wikipedia, at Mapo doufu, retrieved 26 June 2011).
"Dim Sum" literally means "dot heart." Lo Han Tsai ("Monk's Food") is a vegetarian recipe served at Chinese New Year. When tofu is a prominent ingredient it is called "Lo Han Tsai Doufu."
There are two words for deep-fried tofu: (1) *You doufu* (literally "Oil doufu"). (2) *Zha doufu* ("Deep-Fried Doufu"). The first has bigger holes in it.
Note: This is the earliest English-language document seen (April 2013) that contains the term *You doufu.*
Since the 1930s, affluent city people have consumed cow's milk in China.
The soymilk label of Dong Bang (from Korea) is similar to that of Kibun from Japan. An illustration (line drawing) shows the Dong Bang label. Address: P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

1027. Hesseltine, C.W. 1983. Food fermentation research and development. In: K.T. Achaya, ed. 1983. Proceedings of AHARA 82, First AFST (I) International Conference on Food Science and Technology. See p. 65-67. Held 23-26 May 1982 at Bangalore, India.
• ***Summary:*** Discusses the amounts of miso, shoyu, and natto produced in Japan. In Korea in 1978 an estimated 51,237

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metric tons of soybean paste, 97,830 kiloliters of soy sauce, and 33,525 metric tons of gochoojang (hot pepper paste) were produced. Also discusses the amounts of tofu, tempeh, and miso made in the USA. Address: USDA, Peoria, Illinois.

1028. **Product Name:** [Lotte Doo Yoo {Soymilk}].
**Foreign Name:** Lotte Doo Yoo.
**Manufacturer's Name:** Lotte Chilsung Beverage Co. Ltd.
**Manufacturer's Address:** South Korea.
**Date of Introduction:** 1983 May.
**New Product–Documentation:** Letter from Kyung Lee, ASA country director, Korea, to William Shurtleff at Soyfoods Center. 1983. Nov. 23. Gives history and production statistics.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 81-83. This company produced an estimated 3,830 tonnes in 1983.

1029. Steinkraus, Keith H.; Cullen, R.E.; Pederson, C.S.; Nellis, L.F.; Gavitt, B.K. eds. 1983. Handbook of indigenous fermented foods. New York, NY: Marcel Dekker. ix + 671 p. May. Illust. Index. 26 cm. Microbiology Series, Vol. 9. [200+ ref]

• ***Summary:*** This book is based upon the literature and papers submitted to the Symposium on Indigenous Fermented Foods (SIFF), which was held in conjunction with the Fifth International Conference Global Impacts of Applied Microbiology (GIAM V) in Bangkok, Thailand, November 21-27, 1977.

Contents: Foreword by E.J. Da Silva. Preface. 1. Indonesian tempeh and related fermentations: Protein-rich vegetarian meat substitutes. 2. Indigenous fermented foods involving an acid fermentation: Preserving and enhancing organoleptic and nutritional qualities of fresh foods.

3. Indigenous fermented foods in which ethanol is a major product: Types and nutritional significance of primitive wines and beers and related alcoholic foods.

4. Indigenous fermented amino acid / peptide sauces and pastes with meatlike flavors (p. 433-571): Introduction.

(A) Soy sauces: Japanese shoyu: Koikuchi, usukuchi, and tamari; Chinese chiang-yu, by Tamotsu Yokotsuka (p. 437-51). Taiwanese soy sauce, by Liu (p. 451-56). Malaysian soy sauce: Kicap, by Ong, Mercian, Poesponegoro and Tanuwidja (p. 456-61). Indonesian soy sauce: Kecap, by Saono, Poesponegoro and Tanuwidja (p. 461-65). Korean soy sauce, by Chang (incl. homemade kanjang and meju, p. 465-66). Taiwanese black bean sauce: Inyu, by Jan et al. (p. 466-67). Philippine taosi [fermented black soybeans], by Steinkraus (p. 467).

(B) Fermented soybean pastes: Japanese miso, by Ebine, Shurtleff and Aoyagi (p. 468-79). Indonesian tauco, by Saono et al. and Winarno (p. 479-82). Korean Doenjang and kochujang, by Chang, Shurtleff and Aoyagi (p. 482-87).

(C) Fermented fish-shrimp sauces and pastes (p. 487-526).

(D) Fish-soy sauce and fish-soy paste, by Ismail (p. 526-30).

(E) Miscellaneous Oriental fermentations. Japanese natto (itohiki natto), by Hayashi and Ota (p. 530-45). Japanese Hama-natto (hamanatto) and related products (incl. yukiwari natto, p. 545-47). Chinese red rice: Anka (Ang-kah [ang-kak, angkak]), by Lin, Su and Wang, Sooksan and Gongsakdi, and Pichyangkura (p. 547-53). Chinese sufu, by Su and L.-P. Lin (incl. nyufu, p. 553-61). Note: Chapter 4 contains about 195 references.

5. Mushrooms: Producing single cell (microbial) protein on ligno-cellulosic or other food and agricultural wastes.

6. General papers related to indigenous fermented foods: Contributions of the western world to knowledge of indigenous fermented foods of the orient, the importance of microbial genetics in indigenous food fermentations, new uses for traditional food fermentations, mycotoxin problems in indigenous fermented foods and new methods for mycotoxin analysis.

Less widely known fermented foods include: Idli, dosa (dosai, puda), dhokla, khaman (with soy, 131-35), enjera (162), tef/teff (164), wot (165), hopper (173), kishra (175), lambic (179), ogi (with soy, 189-98), mahewu (203), gari (208), dahi (249-57), srikhand and lassi (256-57), laban rayeb, laban zeer, yogurt (257-59; cultured soy yogurt is mentioned on p. 616), liban, mast, mass, taw (260), tairu (with soy, 260-65), kishk or kushuk (267), Metchnikoff (266), trahanas or tarhanas (271-76), rabdi, jalebi (275), koumiss (276), kefir (277-80).

Alcoholic beverages and foods: Honey wine, mead, metheglin (305), tej (306), sugar cane wines, basi, bubod, binubudan (307), palm wine or toddy (315-28), pulque (328-37), kaffir (344), tesguino (352), bouza (357), pito (358), busaa (365) sake (373-79), yakju and takju (379), tape = tapeh (381-400), ragi (381), tapuy (400), lao-chao (402), madhu (406), brem (408), tropical vinegar (410-14), nata (414-20), tea fungus (421), nuoc-mam (516-21).

Reviewed in Scientific American (Nov. 1983, p. 37), and in Bio/Technology (1984. p. 364). Address: Inst. of Food Science, Cornell Univ., Geneva, New York.

1030. **Product Name:** Tofu.
**Manufacturer's Name:** Wah Chong Co.
**Manufacturer's Address:** 80 Ossington Ave., Toronto, ONT, M5T 2R4, Canada. Phone: 416-532-0841.
**Date of Introduction:** 1983 June.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1983. June 20. Owner: Anthony Kim.

1031. Bernard, Richard L. 1983. Soybean germplasm, breeding, and genetic activities in the United States. *INTSOY Series* No. 25. p. 19-25. B.J. Irwin, J.B. Sinclair, and Wang

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Jin-ling, eds. Soybean Research in China and the United States (College of Agric., Univ. of Illinois at Urbana-Champaign). [16 ref]

• ***Summary:*** "As a commercially significant crop in this country, soybeans have a short history and have been important in the north-central states only since 1922. They were grown earlier in the southeast, especially North Carolina, as a forage crop. Breeding in those early years consisted of field trials of cultivars introduced from Asia and choosing those best adapted and most productive for the local farmers.

"Soybeans were experimented with in small plantings and occasionally grown on a commercial scale during the 1800's. According to Piper and Morse (1923) no more than eight cultivars were grown in the U.S. prior to 1898. In that year the U.S. Department of Agriculture (USDA) began a program of recording introduced cultivars of crop plants under 'PI' designations. Through this system, large numbers of soybeans were introduced and grown in experimental plots. The better ones were sent out to various state experiment stations for further testing.

"From 1898 to 1923 more than 1,000 cultivars were introduced, most sent by research stations or grain merchants in Asia, or brought in by agricultural explorers, diplomats, missionaries, or other travelers to Asia (Table 1). Some of the most successful cultivars were introduced into the U.S. during this period. As a result of the increasing success of soybeans, the USDA sent plant explorers to Asia (notably P.H. Dorsett and later W.J. Morse) and from 1924 to 1932, 6,651 soybean accessions were introduced. During the next 40 years little effort was made and only a few soybeans were introduced each year. With renewed interest since 1975, more than 5,000 strains have been introduced.

"During the early periods of introduction no attempt was made to save all the strains introduced and a majority of them were discarded. Only the best were kept along with some of the unusual types. In 1949, in recognition of the need to preserve the germplasm of this important crop and make it readily available, the USDA established a soybean germplasm collection. The early strains (Group IV and earlier) are maintained at the University of Illinois at Urbana-Champaign and the later ones (Group V and later) at the Delta Branch Experiment Station, Stoneville, Mississippi. The collection was initiated by M.G. Weiss, head of USDA's soybean production research, and J.L. Cartter, head of the U.S. Regional Soybean Laboratory at Urbana. The original curators were E.E. Hartwig at Stoneville and L.F. Williams at Urbana. Hartwig is still curator of the southern collection. R.D. Osler succeeded Williams in 1951, and I became curator of the northern collection in 1954.

"The guiding principle has been to maintain the basic genetic diversity of the soybean and its wild relatives by maintaining all cultivars and introductions representing different germplasm, regardless of their apparent economic worth, and to make them readily available for research purposes. In 1949 and 1950, the USDA and state agricultural experiment stations were requested to submit samples of all introduced strains and old U.S. cultivars. From the 7,873 PI strains introduced before 1945, 1,659 strains were obtained, including 138 old U.S. cultivars that originated from introductions (Table 1).

"Introduced strains plus American-developed cultivars have been added to the collection since then, until today the number of soybean entries totals over 9,500, about 70% are in the northern collection and 30% in the southern one. They were drawn from 60 countries, but the majority came from eastern Asia and especially from China (1,202 strains), Japan (1,721), Korea (3,041), and the Soviet Union (1,847) (Table 2). Soybeans from these four countries comprise 83% of the collection and many of the strains received from other countries originated from these four. At Urbana, in addition, there is a genetic collection (mutations, oddities, isolines, etc.) of several hundred lines of interest in qualitative genetic studies. We maintain also a collection of wild soybeans, *Glycine soja.* The wild soybean accessions range in maturity from Group 00 to X and were obtained in the USSR (34 accessions), China (28), China (Taiwan) (2), Korea (313), and Japan (183). Because they can be crossed with cultivated soybeans, they are an interesting potential source of useful germplasm. We have also a collection of six perennial species of *Glycine.* These species are native to Australia and some range into the south Pacific islands and south China. Though not closely enough related for easy crossing with soybeans, these species are of interest in studies on the origin of soybeans and botanical relationships within the genus. If the crossing barrier can be overcome, they may supply the soybean breeder and geneticist with some interesting and diverse material.

"The soybean germplasm collection is used actively by researchers throughout the U.S. and from many other countries. In 1982, from the collection at Urbana, we expect to send out over 40,000 seed lots.

"We hope to obtain as much of the world's wild soybean germplasm as possible, and to complete our collections from Europe, the USSR, southern Asia, South Korea, and Japan. Our greatest need is for further collections from North Korea and China, especially southern and western China, since most Chinese strains in the present collection have come from northeastern and north-central China.

"Of the 7,000 soybean cultivars introduced before 1945, more than 200 were named and promoted for commercial use in this country. References listing or describing these old cultivars appear at the end of this paper. Some of the older cultivars had small black and brown seeds with bushy or viny-type plants suited for hay production, which was a major use of soybeans in this country until the 1940's. Some of them were large-seeded vegetable types grown for direct human consumption in home gardens and occasionally

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on a small commercial scale. Most of them were grain-type soybeans. It was with these cultivars selected from introductions from eastern Asia that the U.S. soybean industry was built, since it was not until the 1940's that soybeans were developed from artificial hybridization for specific adaptation to this country.

"Virtually all of the successful cultivars for oil-seed production in the north-central states were from northeast China, which has similar climate and where large scale commercial soybean production had already been under way for several decades. Thus the successful establishment of the U.S. soybean industry was based on the successful development of a similar industry of soybean production and oil extraction in northeast China. We owe a debt of gratitude to the unknown Chinese plant breeders or farmer-selectors who developed these basic commercial-type soybeans. Beginning in the late 1930's and 1940's, soybean breeders in the USDA-state experiment station breeding programs, through hybridization and selection, developed improved cultivars with higher yielding ability and resistance to lodging and shattering and to prevalent diseases. By the 1950's virtually all hectarage was planted to these products of the scientific breeders' art, yet even down to the present day these American cultivars trace their ancestry to a small group of successful introductions, largely from northeast China.

"Mandarin was introduced from Sui Hua in Heilongjiang Province in 1911. It or a selection named Mandarin (Ottawa) is present in the ancestry of all major northern cultivars. Manchu, introduced in 1911 from Ning'an in Heilongjiang Province, is in the parentage of most northern cultivars. From AK [A.K.], introduced in 1912 from an unknown place in northeast China, two apparently identical selections named AK (Harrow) [A.K. (Harrow)] and Illini were made (in Ontario, Canada, and Illinois, respectively) and used in producing nearly every northern and southern cultivar. Dunfield from Fanjiatun, Jilin Province, in 1913, is in the ancestry of many northern and southern cultivars. Mukden, introduced from Shenyang in Liaoning Province in 1920 and Richland from Changling, Jilin Province, in 1926, are important also in the pedigrees of northern cultivars.

"These six, which were widely grown in the 1930's and early 1940's and which are preserved in the germplasm collection, along with five others (one from Japan, one from Jiangsu, China, and three from northeast China including PI 54610 from Changchun, Jilin, in 1921) have produced all of the widely grown cultivars in the north (Table 3).

"In the south, three of the above cultivars from northeast China, AK (through the late selection, S100), PI 54610, and Dunfield, appear in the ancestral parentage, but there also are important introductions from further south (Table 4). Tokio, introduced from Japan in 1901, is in the pedigree of every major southern cultivar and some of the northern. Arksoy and Haberlandt from Pyongyang, Korea, in 1914 and 1221, respectively, are in a majority of southern cultivars. CNS, which is in the ancestry of all southern and several northern cultivars, Roanoke, and Palmetto all were obtained from the University of Nanjing in 1927. (Roanoke is a reselection, possibly from an outcross.)" (Continued). Address: Univ. of Illinois, Urbana.

1032. Fukushima, Danji. 1983. Fermented soy foods in the United States. *INTSOY Series* No. 25. p. 117-19. B.J. Irwin, J.B. Sinclair, and Wang Jin-ling, eds. Soybean Research in China and the United States (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** Although chemically hydrolyzed soy sauce is widely consumed, fermented soy sauce has an annual growth rate of 15%. La Choy and Chun King, the two largest producers of chemical soy sauce, are assumed to have a combined annual production of 20,000 kiloliters. Most of the fermented soy sauce is produced by Kikkoman Foods, Inc. and annual production has reached 19,000 kiloliters.

Soy sauce manufacturing consists of three main processes: koji making, brine fermentation, and refining. Major improvements in the soy sauce process are (1) high temperature short time cooking of the soybean flakes to increase the yield, (2) use of an artificial mutant of *Aspergillus sojae* which produces twice as much proteolytic enzyme, (3) use of automatic koji making equipment, and (4) use of *Pediococcus halophilus* and *Saccharomyces rouxii*, and proper temperature control during brine fermentation. Address: Kikkoman Foods, Inc., Walworth, Wisconsin.

1033. Jackobs, Joseph A.; Staggs, M.D.; Erickson, D.R. 1983. International soybean variety experiment: Seventh report of results, 1979. *INTSOY Series* No. 24. viii + 211 p. July. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** In the ISVEX trials, soybeans were tested in the following countries: Afghanistan, Algeria, Argentina, Bangladesh, Bolivia, Burma, Chile, China (Taiwan, ROC), Colombia, Cuba, Czechoslovakia, Ecuador, Egypt, Ethiopia, Fiji, French Guiana, Gambia, Ghana, Guatemala, Guinea, Iraq, Korea, Malawi, Malaysia, Mexico, Morocco, Nepal, Pakistan, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Rwanda, Somalia, Sri Lanka, Sudan, Syria, Tahiti, Thailand, Turkey, United States, Zaire, Zambia, Zimbabwe.

Note: This document contains the 2nd earliest clear date seen for soybeans in Guinea, and the cultivation of soybeans in Guinea (1979, probably in May). Sixteen varieties were tested at Foulaya. CH-3 gave the highest yield, 2,690 kg/ha. The source of these soybeans was INTSOY (at the University of Illinois, USA) for ISVEX trials. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

1034. Kogan, Marcos. 1983. Cooperation in soybean entomology (Continued–Document part II). *INTSOY Series*

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No. 25. p. 180-83. B.J. Irwin, J.B. Sinclair, and Wang Jin-ling, eds. Soybean Research in China and the United States (College of Agric., Univ. of Illinois at Urbana-Champaign). • ***Summary:*** (Continued): "Cultural Controls: Cultural practices have a direct impact on insect pests and natural enemies. Research is under way to determine the long-term effects of changing cultural practices, such as minimum tillage, crop rotation, and intercropping, on the insect community. The technique known as trap cropping has been employed in certain areas. Traps are strips of attractive plants on which pests are concentrated and treated. A trap-cropping plan has been proposed for the control of soybean pod borers in Korea. Given the biological characteristics of the soybean pod borer, using strips of plants whose maturity coincides with the emergence of the pod borer would have a potential for use in IPM programs for this pest.

"Chemical Control: Any IPM system is not complete without a definition of the roles of insecticides in the program. This definition should be made on the basis of minimum effective rates to achieve control of the pest with the least impact on the beneficial parasites and predators. This is the key for integration of biological control with chemical control. Additional screening for new and more effective insecticides should be made not only on the target species but also on their natural enemies. As part of a chemical control program, potential shifts in the status of resistance in the natural pest populations should be monitored.

"Integrated Pest Management: When implemented, IPM programs should reduce the cost of application of insecticides and the undesirable side effects of programs that rely solely on insecticide use for pest control. I saw examples of successful IPM programs in China for the pod borer on soybeans. Integrated programs represent an area of interest to both China and the U.S., and this is the area in which much progress can be achieved by combining efforts and exchanging experiences and information.

"Exchange of Information:

"During the last 12 years Illinois has made a major effort to develop a comprehensive data base for information on soybean entomology through SIRIC, the Soybean Insect Research Information Center, and ISIC, the International Soybean Insect Collection. SIRIC is devoted to the search and retrieval of the published literature on soybean entomology and ISIC to identification of arthropods associated with soybeans in the world. Both data bases are computerized and represent a resource available to cooperators throughout the world. SIRIC made one of the first overtures to establish contact with soybean researchers in the People's Republic of China soon after the reestablishment of relations between the two countries in 1976. A letter was sent to the major institutions in China to identify sources of literature. As a result we now receive and exchange publications with several major research institutions in China.

"Through the exchange of visiting scholars, graduate students, and scientific delegations, we hope to maintain an active program in soybean entomology with the People's Republic of China. If we are to credit several estimates that have been made in many parts of the world, a yearly loss of 10% to 30% is due to the impact of insect pests. By developing sound IPM programs one may expect to substantially reduce the economic impact of these pests.

"Discussion: Wang Jin-ling stated that approximately $4,000,000 was spent in Heilongjiang Province to control a borer which is normally not destructive. Lights were turned on in one village during the night, apparently in an attempt to attract the insects.

"Zhang Zi-jin stated that there are ten major insect pests of soybeans and soybean aphids are the most important. Soybean pod borers also are important. Control is effected with resistant cultivars such as Jilin 3, 4, 33, and 13. Chemical control and biological control also are practiced.

"R.L. Bernard asked what control methods are used for soybean aphids and if there are resistant cultivars.

"Zhang Zi-jin replied that there are resistant cultivars. An example is Big White Eyebrows, which has a high level of resistance to aphids. A discussion concerning the mechanism of resistance then took place. Resistance to aphids may be due to the leaves being coarse and rough with more pubescence. This cultivar is indeterminate. There is also a determinate cultivar which is resistant and has a thick leaf.

"S.E. Halbert noticed two species of aphids colonizing soybeans during her visit to PRC and wondered if Zhang was breeding for resistance to those two species.

"Zhang Zi-jin replied that they are just beginning their research and do not fully understand the biology of these aphids.

"G. Kampmeier asked how often aphid-resistant cultivars are planted in the PRC. Again, the reply was that they are just beginning to work. The question was asked about how often alates [having wings or winglike appendages] are formed on PRC cultivars. The answer was that there may be 15 generations of nonalate aphids formed during the season. Alates may be formed only on winter hosts.

"However, S.E. Halbert stated that she saw alates during July.

"R.L. Bernard asked if chemical control is used for aphids.

"Wang Jin-ling replied that at the moment the most efficient method of control is chemical control, and the Chinese use Cygon (*dimethoate*) with low-volume applications." Address: Univ. of Illinois, Urbana.

1035. Shurtleff, William; Aoyagi, Akiko. 1983. History of soyfoods in China (Continued–Document part III).

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Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 19 p. Aug. Unpublished typescript. Available online at www.soyinfocenter.com/HSS/China1.php.

• ***Summary:*** (Continued): 9. Hakka Cuisine, which uses fresh crisp vegetables, is famous for its jiang doufu, which is firm tofu cut into pockets and stuffed with the same mince.

10. Yunnan Cuisine, a Moslem cuisine from southwest China, makes extensive use of dairy products and pork, but very little soyfoods (Anderson and Anderson 1977; Foreign Language Press 1983).

Soyfoods Recipes in Cookbooks. Since soyfoods are an integral part of the Chinese diet, extensive information on their use in cooking as well as descriptions of types of products can be found in better Chinese cookbooks, especially those with a good glossary. The People's Republic of China has produced a fine collection of the favorite recipes of China's great chefs, in various editions (1949-58, 1963, 1958-65) and various sizes (10-13 volumes), each titled *Famous Dishes of China* (*Chung-kuo Ming-tsai-p'u*). Of the works written in English since 1949 with good treatment of soyfoods, the following highly recommended and authentic ones are listed in chronological order. *How to Cook and Eat in Chinese* (*B.Y. Chao*, 1963; delightful), *The Thousand Recipe Chinese Cookbook* (Gloria Bley Miller 1966; excellent glossary), *Chinese Gastronomy* (H-J Lin and Lin 1969; refined, literate, and poetic with many vegetarian recipes), *Chinese Food* (K. Lo 1972), *Mrs. Chiang's Szechwan Cookbook* (Schrecker 1976; good glossary, excellent recipes), *Florence Lin's Chinese Vegetarian Cookbook* (Lin 1976; the best glossary and most extensive treatment of soyfoods), *The People's Republic of China Cookbook* (Sakamoto 1977; based on the 11-volume Chinese work of 1958-65), *The Key to Chinese Cooking* (I. Kuo 1977; good technique and recipes, but you should cut salt and soy sauce in half), *Chinese Regional Cooking* (Hsuing 1979; fine recipes and superb color photos), *The Modern Art of Chinese Cooking* (Tropp 1982; elegantly written and designed).

Overview of the Chinese Soyfoods Industry. Many of the following observations are based on a 3-week trip to China by W. Shurtleff in June 1983 to study soyfoods in four provinces: Guangzhou, Shenang, Beijing, and Heilongjiang. In 1983 China's most popular soyfoods in terms of the amount produced and consumed (not counting soy oil), in approximate estimated order of importance were: tofu (all nonfermented types), soybean jiang (a sort of Chinese miso but with the texture of applesauce), soy sauce, and soymilk. These were the "big four." Other lesser soyfoods included fermented tofu, yuba, fermented black soybeans (these three were found mostly in south China), green vegetable soybeans, okara, soy sprouts, and whole dry/mature soybeans. Small amounts of modern soy protein products (especially soy flour and textured soy flour) had started to be made experimentally in larger cities. Except for the modern products, this ranking has probably not changed much since 1949–or since 1900.

It is not known exactly what percent of the soybeans used in China are crushed to extract the oil. In 1983 the USDA Economic Research Service estimated 45%. Directors of the Soybean Research Institute at Heilongjiang estimated somewhat more than 50% (and they estimated that the percentage was dropping as the standard of living rose and the demand for soyfoods, such as tofu, increased). Lepley (*Soybean Update*, April 1981) and Terrence Foley, ASA Director in China (1983, personal communication), estimated that 93-95% of the soybeans in China were used to make (traditional) soyfoods, one of the highest percentages in the world; only 5-7% were used for livestock feeds.

Despite increases in soybean production and imports since 1965, per capita annual soybean availability (approximately equal to consumption) dropped sharply from 16.9 kg in 1953 to 14.0 kg in 1975, down to 7.13 kg (the lowest point) in 1965, then up a little to 7.7 kg in 1978 and 8.3 kg in 1980. Note that the latter figure is less than half the 1953 per capita availability / consumption. Nevertheless, according to FAO Food Balance Sheets, this was probably the highest per capita use of soybeans as food in the world; following China (in 1971; FAO 1965 = 6.7 kg) were Japan 5.1 kg, Korea (5.0 kg), Singapore (4.3 kg), and Indonesia (2.8 kg).

Although soybeans are consumed throughout China, far more are consumed in the north and northeast (where the most are grown) than in the south.

Within this broad context of Chinese diet and soybean utilization, there were a number of distinct features that characterized the Chinese soyfoods situation in 1983 and sharply distinguished it from that in other major soybean producing and/or using countries such as Japan, Indonesia, or Korea in East Asia, and the USA or Brazil in the West.

Information on Soyfoods. By far the most important fact noted by one wishing to study soyfoods in China since 1949 is how little information is available on the subject (relative to the importance of soyfoods in China), especially in Western languages, and how difficult it is to get the limited information that is available. There are no official statistics on any aspects of the production of any soyfoods (amount produced, number of manufacturers, etc.), no publications (scientific or popular) devoted specifically to soyfoods or to any soyfood, few books or articles (all in Chinese) on soyfoods, few people with an interest in or doing research on the subject, few conferences or university classes, and no history. It is a shame that a history of soybeans and soyfoods in China has not yet been written by an insider. By contrast, in Japan, there is abundant information in all these areas, in Indonesia there is quite a bit, but in Taiwan and Korea there is relatively little.

Various theories can be proposed to explain this (on the surface) surprising lack of information. (1) Traditional

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soyfoods are taken for granted since they are so common and widespread. It would be very difficult to gather statistics on so many, widely dispersed cottage industries. (2) The ongoing disruptions from 1958 to 1976 and decentralization of statistics gathering groups made collection of information virtually impossible. (3) Emphasis is on crop production (especially grains before 1976), not on food processing since what is produced will automatically be consumed. (4) Socialist methodology and the general lack of a Western scientific viewpoint, combined with lack of management and organizational skills, the lack of soyfoods trade associations, and a general secrecy about information, all mitigate against good statistics and information. (5) There are no private companies and, with jobs being assigned by the state, few individuals with a strong personal interest in soyfoods, their history and culture. (6) Few Westerners have access to or can read the various Chinese publications in which articles on soyfoods have been written, and few Westerners have been allowed to travel in China since 1949 to study soyfoods directly. All of these reasons have lead to the present shortage of information.

The only article we know of about soyfoods by a Chinese from the PRC published since 1949 in a Western language is Guo's brief 1983 description of 11 Chinese soyfoods, all of which have been described elsewhere in greater depth. Publications in Chinese in which articles on soyfoods occasionally appear include *Food and Fermentation Science, Science of Chinese Seasonings* (soy sauce, jiang, fermented black soybeans), and *Food Science and Technology* (a popular magazine with 300,000 circulation, written in easy-to-understand Chinese). China needs a Soyfoods magazine!

Likewise, relatively few books on soyfoods have been written since 1949. In 1958 the Shanghai Bureau of Cereals published *Integrated Application of Soybeans* (*Dadou Te Zhung He Liyun*)*;* it contains information on soyfoods. In 1982, Zhang, son of a cook in Sichuan wrote a book of tofu. Feng Teh-yi, associate professor at Heilongjiang Commercial College has written books on Soy Sauce and Vinegar Production Technology (1983) and Soyfoods Production Technology (1983). The latter work is the best one in Chinese on the subject to date. In Japan, Nakayama's *Encyclopedia of Chinese Foods* (1970) and *Chinese Cuisine: Famous Recipes* (1973, both in Japanese), contain good information and glossaries on soyfoods. (Continued). Address: Lafayette, California. Phone: 415-283-2991.

1036. Shurtleff, William; Aoyagi, Akiko. 1983. William J. Morse and Charles V. Piper: History of work with soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 26 p. Sept. 10. Unpublished typescript. Available online at www.soyinfocenter.com.

• ***Summary:*** www.soyinfocenter.com/HSS/morse_and_piper.php

A comprehensive history of the subject. Contents: Introduction: Transformation of soybean from curiosity to main crop, Morse key man. Early years (1884-1929): Birth and university, early breeding work under Piper at USDA, joint writings with Piper, *The Soybean* in 1923, tribute to Piper. The Dorsett-Morse expedition to East Asia: Purpose of expedition, 2 main objectives and minor objectives, participants and Washington, DC, contact (Ryerson), previous expeditions, departure, gear, Japan March-Oct. 1929, periodic writing, photos, collections, seasonal cycle, 2 trips to Hokkaido, 6 weeks in Korea, back to Japan until April 1930, Manchuria (Dairen) April-Oct. 1930, Dorsett ill, Morse's first trip to Korea, Morse letter to Burlison and American Soybean Growers Association, little soyfood in Manchuria, Dorsett to Peking, Morse's last trip to Korea, Morse's hectic 19-day trip to China, Morse back to Dairen, Morse to Japan Dec. 1930–Feb. 1931, Morse's return to USA Feb. 17, 1931, Dorsett's return March 27, trip a great adventure, strong friendship, 2 letters from Dorsett to Morse, logs, photos, and notebooks, special reports (*Soybeans in Manchuria* and articles for *Soybean Digest*), 4 major accomplishments of expedition, conclusion (a landmark). Later years in America (1931-1959): Return to USA, descriptions of his character, work in USA with soyfoods, continued breeding work, long-term results of collecting efforts not what they might have been, supporter of American Soybean Association, writing career, retirement, growth history of soybean crop, death at age 75 in 1959, tribute. Address: Lafayette, California. Phone: 415-283-2991.

1037. Hattori, Terumitsu. 1983. The soy sauce market in the USA (Interview). Conducted by William Shurtleff of Soyfoods Center, Sept. 19. ½ p. transcript.

• ***Summary:*** His rough estimate of market shares, including imports, is as follows: Kikkoman 40%. LaChoy 30%. Chunking 12%. Imports from Hong Kong, China, Taiwan, and Korea 9%. Imports from Japan 8%. Other USA HVP soy sauce 1-2%.

The products imported from Taiwan, Korea, and China are about 90% Shinshiki shoyu [a mixture of HVP and fermentation], as judged by levulinic acid assays. He does no know when this started. If levulinic acid is in the shoyu, it contains HVP.

Three types of Pearl River Bridge soy sauce are now being imported to the USA: Light, dark, and mushroom. Only one (the light?) has little or no levulinic acid. In a month, he'll have more accurate data. Address: Kikkoman Marketing & Planning Inc., 50 California St., Suite 3600, San Francisco, CA 94111.

1038. Leviton, Richard. 1983. Report on soyfoods research trip across America, September 1983. Colrain, Massachusetts. 8 p. Unpublished typescript.

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• ***Summary:*** Visited or discusses: Grainaissance (makes amazake and mochi), Brightsong (Dik / Richard Rose), Sonoma Specialty Foods (California), Northern Soy (Rochester, New York), Southwest Soyfoods (Richard Jennings), White Wave (Steve Demos, Boulder, Colorado), Quong Hop & Co. (South San Francisco, California), Modern Fare (Loveland, Ohio), Soyfoods Unlimited (Valerie, Gary and John Robertson, San Leandro, California). Soyfoods Center (Lafayette, California), Soyfoods of America (Doug Fiske and Ken Lee, Los Angeles), Real Foods (Polk St., San Francisco), Tumaros (Los Angeles), Unicorn (Terry Dalton, Florida), Japantown and Rainbow Grocery (San Francisco), Berkeley Natural Grocer and Berkeley Co-op (Bob Gerner, California), Hinode Tofu Co., Edensoy, Farm Foods, New England Soy Dairy, and Nasoya (Leominster, Massachusetts). Legume (Gary & Chandri Barat, New York City), Lotos / Lotus Cafe (Greg Weaver, Rochester, New York).

NRRL (Hesseltine and Wang, Peoria, Illinois): Their work is in mixed starter culture fermentation, vitamin B-12 work. Japanese man from Tokyo to work one year on natto at NRRL, paid by Japanese government. B-12 can withstand some heat during cooking and the percentage of B-12 lost depends on the initial percentage present. Natto research: examine all Japanese publications for review article. Experiment using U.S. soybeans to make natto since the Japanese buy Chinese beans for their thinner seed coat. See what happens to the oil to protein ratio during fermentation. Natto as such has no possibilities in the U.S. as it is a slimy food with a rotten smell; hard to tolerate. There might be vitamin B-12 in natto produced by *Bacillus subtilis.* Koreans have done lots of B-12 research with kimchee and other pickled vegetables. Earl Swain died this summer of a heart attack at age 36. Natto research will help U.S. soybean exports. USDA bureaucrats are making it difficult for Dr. Hesseltine to do natto research. They have 65 objectives, but Dr. Wang's projects don't fit any of them clearly, so they won't mention "food" in their research outlines, just fermentation methods. Secretary of Agriculture John Block [served 1981-86 under President Ronald Regan] says the U.S. needs more ag exports and more basic information about crops uses, so he is in support of this natto research.

Out of business: Michiana Soyfoods, St. Ignatius shop, Sunshine Soy, Heartsong, probably Joy of Soy and a Korean shop in Salt Lake City, Utah.

Concerning soymilk: 10. In Oak Park, Illinois, a natural foods retailer says Edensoy outsells San-J by two to one. (Note: San-J imports "To-Neu Natural Soy Beverage" made in Japan by Kibun). Teenagers buy the carob Edensoy along with popcorn in the store, and use it as a soft drink. But most retailers say the Eden package [stand-up foil retort pouch] is a disaster; it is impossible to open without scissors, then if you squeeze, it sometimes spills out. San-J [in a Tetra Brik carton] is convenient but the taste is poor and the front graphics are confusing–too many words and images. According to Shurtleff, both are inferior products compared to Japan's best.

22. Concerning Edensoy at the NNFA show in Denver, Colorado: Mike Potter says "it went over great." He sold two container loads right away. People liked the package and the taste. About 4,000 people sampled it and were "generally amazed." The results were as good as they could want; it generated interest and excitement. Now they are setting up the distribution system. Address: 100 Heath Rd., Colrain, Massachusetts 01340. Phone: 413-624-5591.

1039. Shurtleff, William; Aoyagi, Akiko. 1983. The book of miso. 2nd ed. Berkeley, California: Ten Speed Press. 278 p. Illust. by Akiko Aoyagi Shurtleff. Index. Sept. 28 cm. [223 ref]

• ***Summary:*** Contents: What is miso? Preface to the second edition. Preface to the first edition. Acknowledgments. Part I. Miso: Savory, High Protein Seasoning. 1. Soybeans, protein and world hunger. 2. Miso as a food. 3. The miracle of fermentation. 4. The varieties of miso: Regular Miso: Rice miso (red / aka, light-yellow / shinshu, mellow red / amakuchi akamiso, mellow beige / amakuchi tanshoku, mellow white / shiro koji, sweet red / edo or edo ama-miso, sweet white / Kyoto shiro miso), barley miso (karakuchi mugi, mellow barley / amakuchi mugi), soybean miso / mamé miso (Hatcho miso, soybean miso / mame miso, tamari miso). Special Miso: Finger lickin' miso / Namemiso (Kinzanji miso, moromi miso, hishio, namémiso, natto miso, goto miso), sweet simmered miso / nerimiso. Modern Miso: Akadashi miso, dehydrated or freeze-dried miso, low-salt / high-protein miso.

Part II. Cooking with Miso (400 recipes). 5. Getting started. 6. Recipes from East and West. Part III. The Preparation of Miso. 7. Making miso at home and in communities (incl. Homemade natural shoyu, and Homemade namémiso, p. 184). 8. Japanese farmhouse miso (how to make miso at home). 9. The traditional miso shop. 10. The modern miso factory. Appendixes: A. A history of miso and soybean chiang. B. Other East Asian misos: Chinese chiang, Korean jang and Indonesian Taucho. C. The microbiology and biochemistry of miso fermentation. D. Miso manufacturers in the West. E. People and institutions connected with miso. F. Miso with seafoods, chicken, and meat. G. Measures, weights, and equivalents. H. So you want to study miso in Japan? I. Miso additives. Bibliography [223 references]. Glossary. About the authors (autobiographical). The Soyfoods Center.

In May 1993 a new printing of this book appeared, containing many small changes made by the authors. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

1040. Shurtleff, William; Aoyagi, Akiko. 1983. Appendix

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A: A history of miso and soybean chiang [jiang] (Document part). In: W. Shurtleff and A. Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 278 p. See p. 214-41. Illust. by Akiko Aoyagi. [223 ref]
• ***Summary:*** Contents: Introduction: Etymology. Soybean chiang in China: Early Chinese non-soybean chiang, 600-1899. Soybean chiang in Korea and Southeast Asia: Dissemination of chiang from China, Korea, Indonesia, Vietnam, other Southeast Asia.

History of miso in Japan: Introduction, early non-soybean hishios (before AD 700), the Nara period (AD 710-784), the Heian period (AD 794-1160), the Kamakura period (1185-1333). The Muromachi period (1336-1568), the Edo or Tokugawa period (1603-1867). A brief overview of origins. the Meiji and pre-war periods (1867-1939), World War II and the postwar period: Modern times (1940-1983).

History of miso in Europe: Early European references, 1900-1949, 1950-1982.

History of miso in the United States and Canada: Early developments (1896-1929), 1930-1959, growth of interest in miso (1960-1982; Shibasaki and Hesseltine at the NRRC, Peoria, Illinois, Ichiro Ouchi, the macrobiotic movement, Herman Aihara, George Ohsawa, Miso and Aveline Kushi in Boston, Massachusetts, Noboru Muramoto, George Gearhart, Thom Leonard, Allen Ginsburg and Gary Snyder, Mt. Tamalpias, Tassajara Zen Mountain Center, Miyako Oriental Foods, Kanemasa Miso Co., Ohio Miso Co., Shin-Mei-Do, American Miso Inc., South River Miso Co., Joel Dee and Miso-Cup), miso's future in the West.

Miso in other countries: Israel, India, Latin America (Brazil, Mexico), Africa.

Illustrations: Evolution of Chinese characters. Hideyoshi Toyotomi and a robber on the bridge (Hatcho miso history, p. 219). Making miso-damari (p. 220). Graph of the miso market in Japan (1880-1980) (p. 226). Ohio Miso letterhead and logo (p. 238). U.S. miso imports, production and consumption (1970-1983) (p. 240). Page 219: "The origins of modern shoyu can be traced more clearly to the mid 1200s when the Japanese priest Kakushin returned from China, having learned there the technique for preparing Kinzanji miso. Establishing himself at Kokoku-ji temple near the town of Yuasa..." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

1041. IBPGR. 1983. Genetic resources of soyabean. Rome, Italy: International Board for Plant Genetic Resources, Secretariat. 19 p. 30 x 21 cm. Oct. IBPGR Working Group on the Genetic Resources of Glycine Species, held at the International Soybean Program (INTSOY) at the University of Illinois, Urbana, 9-11 Aug. 1982. [2 ref]
• ***Summary:*** This report, distributed free to developing countries but with restricted distribution to developed countries, was written after an ad hoc Working Group on the Genetic Resources of *Glycine* was held. A minimum list of descriptors is included. Address: Crop Genetic Resources Centre, Plant Production & Protection Div., FAO, Via delle Terme di Caracalla, 00100, Italy.

1042. Lee, Kyung. 1983. Re: The soymilk industry and market in Korea. Letter to William Shurtleff at Soyfoods Center, Nov. 23–in reply to inquiry. 3 p. Typed, with signature on letterhead.
• ***Summary:*** See next page. "Unfortunately, there is no book or publication either in English or Korean about the history of soybeans or soyfoods in Korea. I am enclosing a book 'Science of soybean, tofu and soybean sprout,' written by Dr. K.H. Kim. This book discusses the technical procedure to make different soy foods such as tofu and soybean sprout. I hope you can make a good use of this book.

"As far as soy milk industry is concerned, it can be said that soy milk industry is one of the fastest growing food industries in Korea.

"The leading soy milk maker is Chung's Food, which markets Vegimil (brand). Chung's Food began soy milk business in 1973 and observed the 1Oth anniversary in October.

"The second largest maker is Dong Bang, which markets Green Milk and Hae Pyo Doo Yoo (brands). Dong Bang entered the soy milk market in September 1979.

"The third largest maker is Seo Ju Industry, which markets Seo Ju Mill. It entered the market in October 1982.

"As of March this year, there were 9 makers, out of which three companies went bankrupt. Later during the year, Lotte Chilsung entered the market in May. Currently there are 7 makers.

"Their status is as shown on the attached paper. On The average, one kg of soybeans produces 6 kg of soy milk. The usage of soybeans as allocated by the National Agricultural Corporation was as follows in 1983;

"Chung's Food 7,500 MT (metric tons)
"Dong Bang 2,000
"Lotte Chilsung 800
"Dong A 700
"Dae Won 200
"Kwang Ju 200
"Seo Ju * Not using soybeans, but rather soy protein concentrate.

On the last page of the letter is a table of Korea's "Soy Milk Status (Nov. 1983)."

All soymilk in Korea is sold in 180 cc cartons.

Dong Bang's sales volume includes soymilk sold to ice cream makers in bulk. Out of the total of 170,000 cartons per day, about 70% is sold in consumer packages and the rest is sold in bulk, which is then converted to consumer package equivalent. Address: Country Director, American Soybean Assoc., P.O. Box 1704, USIS Bldg., 63 Eul Ji Ro 1Ka, Chung Ku, Seoul, Korea. Phone: 722-2601 X-4368.

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Soy Milk Status

Nov. 1983

| Company | Brand | Sales Volume 1/ container/day | Year of Establishment |
|---|---|---|---|
| Chung's Food | Vegimil | 1,000,000 | 1973 |
| Dong Bang | Green Milk<br>Hae Pyo Doo Yoo | 170,000 2/ | 1979 |
| Seo Ju | Seo Ju Mill | 130,000 | 1982 |
| Dong A | Sun Dew | 130,000 | 1983, March |
| Lotte Chilsung | Lotte Doo Yoo | 130,000 | 1983, May |
| Dae Won | Eggmil | 20,000 | 1982, August |
| Kwang Ju | Supermil | 20,000 | 1982, May |

1/ Sales Volume is estimated by ASA/Seoul. There is some seasonal variation. The figure reflect the best month figure in Summer. The size of container is 180 cc.

2/ Dong Bang's sales volume includes soymilk sold to ice cream maker in bulk. Out of 170,000 containers about 70 % is sold in consumer package and the rest of them is sold in bulk, which is converted to consumer package equivalent.

1043. Yasuda, Masaaki. 1983. Tôfuyô to beni kôji [Okinawan fermented tofu (tofuyo) and red koji]. *Nippon Jozo Kyokai Zasshi* (*J. of the Brewing Society of Japan*) 78(11):839-42. Nov.; 78(12):912-15. Dec. [72 ref. Jap; eng+]
• ***Summary:*** How to eat tofuyo (p. 839): In the *Gyozen Honzo* (*Food Herbal*) (1832, a book about food and medicine) the physician TOKASHIKI Tsûkan Peichin wrote: Tofuyo has a delicious flavor and is good for the stomach. It makes eating a pleasure and is good for various types of sickness" (Ref. #9; Note: This book contains the earliest direct reference seen (May 2021) to tofuyo. Peichin refers to a high-ranking officer). It seems that tofuyo was consumed by the upper classes during the Ryukyu Ocho period in Okinawa and it was also used as a food for recovering after a sickness, and as a side dish. According to old people in Okinawa, Tofuyo was popular among upper class people in Shuri or Naha, during the Taisho period (1912-1926) and at the beginning of the Showa period (1926+). It was eaten with tea by ladies or with millet brandy (*awamori*) by men. But it was too expensive for the regular people to afford. The best way to eat tofuyo is to place one cube of it (2-3 cm on a side)

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on a small dish and eat it with chopsticks or a toothpick a little bit at a time.

Note on the geography and history of the Ryukyu Islands (also called Luchu or Loochoo Islands): This chain of islands extends in a 600-mile long arc southward from the southern tip of Kyushu (Japan's southernmost main island) down to Taiwan. It includes Okinawa, Sakishima, and the Amami island groups. The population in 1970 was 945,000. The chief town is Naha on Okinawa. History: In 1372 these islands came under the political influence of China. In 1451 they became a tributary to Japan as well as China, and 1609 a Japanese protectorate (part of Satsuma-Han). Thus the islands have long had cultural ties with both Japan and China. During Japan's Edo period (1600 to 1868) the kingdom of Ryukyu formally belonged to China, but in fact it was more closely tied with the Satsuma Han, a powerful domain in southern Kyushu. Like China and Japan, Ryukyu had its own emperors and dynasties. The imperial palace was on the island of Okinawa, in the southern city of Shuri. Imperial messengers (*sakuho-shi*) were frequently sent to Okinawa from China and there were cultural exchanges between the two countries. In 1871 the Meiji government in Japan made Ryukyu part of Kagoshima prefecture. In 1872 they made it Ryukyu-Han. After this change, Shôtai (lived 1845-1901) became king of the Ryukyu-Han. In 1879 Ryukyu became an integral part of Japan. Under the Japanese, the Amami group belonged to Kagoshima prefecture and the Okinawa and Sakishima groups constituted Okinawa prefecture. In 1945, after World War II, it was placed under a U.S. military government. In 1966 it received local self-government, and in 1972 was returned to Japan.

History of tofuyo in Okinawa (p. 839-40). The earliest document seen concerning soybeans in Okinawa appeared in 1534 in the *Record of the Messengers to Ryukyu* (*Shi Ryukyu Roku;* Ref. #16). Thereafter soybeans became a widely grown crop (Ref. #17). The *History of Ryukyu* by Ryukyu Opu (1713, Ref. #19) noted that it was not clear at the time when and how tofu came to the country. Although this uncertainty still remains, tofu is thought to have arrived in Ryukyu in the mid-1600s. According to the *Various Records of the Messengers to Ryukyu* written by Osho? (Wang-shu?, Ref. #18) in 1683, tofu was widely available at that time in Okinawan market places, being produced by many companies. It was an important food not only for the local people, but also for the Chinese imperial messengers (Refs. #20-22). Okinawa's tofu was a firm tofu, made in the Chinese way by pressing the soymilk out of the okara before cooking it. This method was also traditionally used in Korea and southern Japan (in Kumamoto–Itsugi-mura, Yamaguchi, Ishikawa, and Koichi prefectures). The method was probably introduced to Okinawa by Chinese imperial messengers or by exchange students, although it could have been brought from Japan by Buddhist monks, who served it in their temple cuisine.

Note: For much more detail about the history of tofu-ru in the Ryukyu islands, please see "History of Fermented Tofu" on Google Books and on the Soyinfo Center website. Address: Dep. of Agricultural Chemistry, University of the Ryukyus.

1044. Widner, Patrick T. 1983. Meals for Millions Foundation (Interview). Conducted by William Shurtleff of Soyfoods Center, Dec. 19. 1 p. transcript.

• ***Summary:*** Mark Sterner left in 1976. He is now in Oregon. Phone: 503-672-2047.

In Davis they have a library and resource center, incl. some old logs of MPF shipments. Their documents on their history are in boxes and closets. They have quite a few statistics and a large log book of shipments. One good history paper is by Patti Butzer Larsen. For more historical information call Mrs. Clinton in Los Angeles at 213-663-3838. Mark Sterner might know the history best. Or try Borsook: 805-682-1006.

MFM / FFHF moved to Davis in Sept. 1982, then moved into a new million dollar building in Feb. 1983. They chose Davis primarily for its university which had an interest in nutrition, food science and technology, and agriculture. They have a mutual exchange with the university. They help foreign students prepare for work overseas; it is an innovative community.

They no longer distribute MPF (multi-purpose food); CSM (Corn-Soy-Milk), introduced in Sept. 1966 by USDA's Food for Peace Program (P.L. 480) made it unnecessary.

They moved away from Santa Monica since they were no longer as heavily involved with food technology. The Santa Monica facility was set up for food processing and teaching–mostly foreign students.

Their main work now is "applied nutrition" abroad–a wholistic program including nutrition education. They started their first applied nutrition program in Honduras in 1978–at one stage they were making foods outside the USA. Much of this work was based on the work of Michael Latham at Cornell and on FAO; in the 1960s they defined "applied nutrition." They do integrated rural development programs, community development, etc. Nutrition is their primary interest and focus, and they have applied this to Honduras.

They are no longer doing much work with soy, although they planted a little in Ecuador. Lou Ziskin is Latin American director. Talk with him. MFM's push to grow soybeans was in the early 1970s.

Peter Davies, who is now president of the Foundation, came in May 1976. The main countries where they now work are described in the recent MFM annual report. The work with soy is most active in Korea.

The budget is now close to $2 million. Most of it (36%) is from the general public, generated through mailings. 25.7% of their income is from USAID; most of the rest

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(27%) is from foundations and corporations. Churches give 9%. MFM is now also doing radio ads. The New York office does mailings. Address: Director of Public Education, Western Office: 1644 DaVinci Court, P.O. Box 2000, Davis, California 95617. Phone: (916) 758-6200.

1045. Sterner, Mark H. 1983. Work with Meals for Millions Foundation, 1966-1973 (Interview). Conducted by William Shurtleff of Soyfoods Center, Dec. 20. 2 p. typed transcript.
• ***Summary:*** Mark Sterner joined MFM in 1966. He initiated technology transfer, moving away from distribution of MPF. He was executive director in 1972 and 1973. Florence Rose was the executive director of MFM for roughly 20 years, from the inception until just before Sterner arrived–when she retired. In 1965 the Board decided to wind down distribution and to focus on technology transfer.

The first MPF was made by Gentry Foods, a food dehydrating company. General Foods began to make and market multi-purpose food on 1 Dec. 1959; before that it had been made by Gentry Foods in the Los Angeles area. The formula was changed when General Foods started making MPF. The peak year for MPF distribution was about 1965; roughly 60 to 100 tons were made and distributed each year at that time. It was never an impressive amount when measured by weight. 2,000 tons would be 100 tons a year for 20 years. The U.S. government said the amount of MPF distributed was "fairly small." After about 1955, most of it was sent to missionaries and the like who operated soup kitchens, hospitals, etc. They used it properly and it was well accepted as a protein fortifier. Virtually all of it was sent in sealed #10 cans. General Mills continued to make MPF until it stopped being distributed in about 1980.

Florence Rose tried to get USAID to distribute MPF but they were not interested.

Incaparina was the first cereal-soy blend.

Mark's most significant accomplishment was the development of an extruder or extrusion cooker that could be built and used in less developed countries. Most such countries could not afford to purchase one of these from the USA. He made design changes, such as interrupting the flights. Later a number of these changes he made were adopted by other manufacturers of extruders. About six of the MFM extruders designed by Mark went into the field, two in Korea and 1 each in Thailand, Puerto Rico, and Africa. Mark will be with Hank Sterner until about May; he would love to look over the draft manuscript on the history of MFM.

Mark left MFM in a situation he was not happy with; he has not kept track of it afterwards. It's a "heritage room" history.

Before he arrived, MFM had a certain air about it (little credibility) that it was run by "that woman who was in menopause." The same woman was executive director for the first 20 years; she had no endowment funds. Clifford Clinton apparently funded it for the first two years and provided it with office space above one of his restaurants. It was a private foundation, publicly funded. Then the Board disowned Clinton, but amends were made in about 1972.

"Florence Rose was kind of laughed at. She trotted around the world with a carpet bag full of Meals for Millions literature, elbowed her way in to see heads of governments and top officials, and encouraged them to work with her" (and MFM). She had much the same presentation and reputation in Washington, DC. People hated to see her come around. So MPF and MFM, primarily because of her personality, found little favor with the government. She died in 1969.

When Mark Sterner came in to MFM it took on a whole new tone. It became reputable internationally, professional, listened to, welcomed by cereal chemists and with credibility in Washington, DC, as with Rod Crowley's office and with USAID. MFM was getting $1.3 million a year for a few years (1972-1973) before he left. This funding indicated real confidence and it made a big difference in operations. Plus, MFM got additional money to construct a laboratory and classrooms in Santa Monica. Address: Formerly technical advisor and executive director, Meals for Millions Foundation, Norco, California 91760.

1046. *Toyo Shinpo* (*Soyfoods News*). 1983. Kankoku demo tônyû buumu [Soymilk boom in Korea, too]. Dec. 21. p. 1. [Jap]

1047. Shurtleff, William; Aoyagi, Akiko. 1983. History of soy flour, grits, flakes, and cereal-soy blends. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 128 p. Dec. 24. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/flour1.php

A comprehensive history of the subject. See also: History of Roasted Soy Flour. Contents: Part I: What are soy flour, grits, flakes, and cereal-soy blends? Introduction: Developed in the West, difference from roasted soy flour. Soy flour. Soy grits and flakes. Cereal-soy blends = soy-fortified blended foods. Etymology and nomenclature: German, French, U.S. English, U.S. whole soy flour, British English. Overview of world soy flour history.

Part II: History of soy flour, grits, and cereal-soy blends in Europe and Australia. The early years (1767 to 1899). 1900 to 1919. Between two wars (1920-1939). 1940-1959. 1960 to 1983.

Part III: History of soy flour, grits, flakes, and cereal-soy blends in the USA. The early years (1767-1919). 1920 to 1939. The 1940's and World War II. Meals for Millions and multi-purpose food. 1960 to 1980's. Food for Peace Program. Low cost extrusion cookers. Soy flour, grits, and flakes in America.

Part IV: History of soy flour, grits, and cereal-soy blends

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in Canada.

Part V: History of soy flour, grits and cereal-soy blends in Asia. Introduction. Bangladesh. China. India. Indonesia. Japan. Korea. Philippines. Sri Lanka (Thriposha). Taiwan. Thailand. Vietnam.

Part VI: History of soy flour, grits, and cereal-soy blends in Latin America. Introduction. Bolivia. Brazil. Chile. Colombia. Costa Rica. Ecuador. Guatemala. Guyana. Mexico. Paraguay. Peru. Venezuela.

Part VII: History of soy flour, grits, and cereal-soy blends in Africa. Introduction. Ethiopia. Ghana. Kenya. Nigeria. Rwanda and Burundi. South Africa. Tanzania. Uganda. Zimbabwe.

Part VIII: History of soy flour, grits and cereal-soy blends in the Middle East.

Note: This is the earliest English-language document seen (Jan. 2019) with the term "cereal-soy blends" in the title. Address: Lafayette, California. Phone: 415-283-2991.

1048. Rhee, Sook-Hee; Kim, S.K.; Cheigh, H.S. 1983. [Studies on the lipids in Korean soybean fermented foods. I. Changes in lipids composition during Chungkookjang fermentation]. *Korean J. of Food Science and Technology* 15(4):399-403. Dec. [23 ref. Kor; eng]

• ***Summary:*** "Chungkookjang, a traditional Korean fermented soybean food, was prepared by a commercial process. Cooked soybeans were fermented with *Bacillus natto* for 3 days and ripened with addition of 7% salt for 20 days."

Note: This is the earliest document seen (May 2021) that uses the word "Chungkookjang" to refer to Korean-style natto. Address: 1. Dep. of Food and Nutrition, Busan National Univ., Busan; 2-3. Food Chem. & Technol. Lab., Korea Advanced Inst. of Science & Technol., Seoul, South Korea.

1049. Suh, Jeong-Sook; Ryu, M.K.; Hur, Y.H. 1983. [Effect of bacillus strains on Chungkook-jang processing. III. Changes of free amino acid contents and nitrogen compounds during Chungkook-jang koji preparation]. *Korean J. of Food Science and Technology* 15(4):385-91. Dec. [31 ref. Kor; eng]

• ***Summary:*** "The change of free amino acid contents and nitrogen compounds in the course of the *Chungkookjang* fermentation that occurred by utilizing *Bacillus natto* and *Bacillus subtilis* are to the following effects. pH, during the growth period, that is 6.35 in pH at the first stage of fermentation, were turned into 8.2 after 72 hours. Crude protein content increased irregularly from 16.82%-18% and total sugar decreased. Increasing with the progress of fermentation time, protease activity showed the maximum value between 48-60 hours, but *Bacillus natto* activated a little than *Bacillus subtilis.* Amino nitrogen and water soluble nitrogen content increased but difference was found that is, *Bacillus natto* increased more than *Bacillus subtilis.* Glutamic acid content was the highest among the contents of free amino acid between both *Bacillus* sp. and the order of the next contents showed as leucine, phenylalanine, histidine alanine. arginine, but difference was found between *Bacillus* sp., that is, *Bacillus natto* was higher than *Bacillus subtilis.* In view of the results as above, *Bacillus natto* was excellent than *Bacillus subtilis* as *Bacillus strains* of *Chungkookjang koji* production." Address: 1. Dep. of Food Science & Nutrition, Seoul College of Health; 2. Lab. of Sampyo Food Indust. Co., Ltd., Seoul; 2. Dep. of Food Processing Technology, Seoul College of Health.

1050. Wee, Jae-Joon; Lee, Hyong-Joo. 1983. [Characteristics of amino acid fortified tofu manufactured by coprecipitation of whey and soybean proteins]. *J. of the Korean Agricultural Chemical Society* 26(4):205-10. Dec. [11 ref. Kor; eng]

• ***Summary:*** "The contents of total solids and protein of traditional tofu were about 19% and 13%, respectively, while those of the whey-soybean tofus were 17.3%-18.1% and 10.9%-11.3%, respectively. The 5-15% of lactose in whey-soymilk mixture was transferred into the tofus. The content of sulfur-bearing amino acids in the fortified tofu from 3:1 mixture of whey and soymilk was 3.8g/100g protein which indicated about 50% fortification of the amino acids as compared to the traditional tofu which contained 2.54g/100g protein of the sulfur-bearing amino acids." Address: Dep. of Food Science and Technology, College of Agriculture, Seoul National Univ., Suwon, South Korea.

1051. Wee, Jae-Joon; Lee, Hyong-Joo. 1983. [Coprecipitation characteristics of cheese whey and soybean proteins]. *J. of the Korean Agricultural Chemical Society* 26(4):199-204. Dec. [24 ref. Kor; eng]

• ***Summary:*** "As a way of utilizing cheese whey to fortify sulfur-bearing amino acids to soybean protein, whey-soybean coagulum was made from whey-soy milk mixture and optimum conditions for coprecipitation of the two proteins were determined." Address: Dep. of Food Science and Technology, College of Agriculture, Seoul National Univ., Suwon, South Korea.

1052. **Product Name:** [White Snow Lecithin].
**Manufacturer's Name:** Cheil Sugar Co. Ltd.
**Manufacturer's Address:** 23rd Floor, Samsung Main Building 250, 2-KA, Taepyung-Ro, Chung-Ku, Seoul, South Korea.
**Date of Introduction:** 1983.
**New Product–Documentation:** Soya Bluebook. 1983. p. 58.

1053. Cuh, J.O.; Rhee, C.O.; Lee, Y.M. 1983. [Basic studies on the native colored-soybean cultivars. III. Variations and performances in chemical composition and textural property

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in seeds of collected colored-soybean cultivars]. *Korean J. of Crop Science* 28(3):345-50. [21 ref. Kor; eng]
• ***Summary:*** "Collected 38 varieties of colored-soybean seed cultivated under a given cultural conditions were tested in the various chemical compositions and rheological properties in seeds. As it were, protein, fat, carbohydrate, ash and water contents as a chemical contents were studied not only on their statistical variations, but also on interrelationships with their collaborated rheological characteristics; hardness, cohesiveness, elasticity, gumminess and chewiness. For the rheological analysis of the materials, the General Foods Texturometer and typical texturometer curve were used." Address: College of Agriculture, Chonnam National Univ., Chonnam 500, Korea.

1054. Ghu, J.O.; Ha, K.Y.; Hong, E.H. 1983. [Basic studies on the native colored-soybean cultivars. IV. Sensory analysis and interpretation of component in seeds of collected colored-soybean cultivars]. *Korean J. of Crop Science* 28(4):462-68. [12 ref. Kor; eng]
• ***Summary:*** "Collected 38 colored soybeans, which was cultivated under the conventional field conditions, Were investigated about their organoleptic parameters and correlations among factors such as organoleptic score, texturometer parameters and chemical components of seeds. Most of the organoleptic parameters were affected much more by the characteristics of each cultivar than by grain weight, and then showed significant differences with the effect of interaction between grain weight and cultivar, too. Also among contribution degrees of texturometer scores to overall acceptance, cohesiveness was higher in small, medium and super grains, however in large grains, hardness. And among sensory attributes, suitable toughness was contribute most positively to acceptance." Address: College of Agriculture, Chonmam National Univ., Kwangju 300, Korea.

1055. **Product Name:** Soft Tofu, and Firm Tofu.
**Manufacturer's Name:** Obok Foods.
**Manufacturer's Address:** 7215 Garden Grove Blvd. Suite M, Garden Grove, CA 92641. Phone: 714-898-9120.
**Date of Introduction:** 1983.
**New Product–Documentation:** Talk with Shoan Yamauchi. 1988. Oct. 23. This is a small Korean-run company in Orange County. Talk with Mr. Park, the founder, a Korean-American. 1988. Oct. 24. He started the company in 1983 with soft and firm tofu. In 1987 he added Kinugoshi. He also runs Obok Bakery on the same street. As of May 1991 he consumes 27 tons/month of soybeans. He may move to Riverside.

1056. **Product Name:** Silken Tofu (Kinugoshi Style).
**Manufacturer's Name:** Obok Foods.
**Manufacturer's Address:** 7215 Garden Grove Blvd. Suite M, Garden Grove, CA 92641. Phone: 714-898-9120.
**Date of Introduction:** 1983.
**New Product–Documentation:** Talk with Mr. Park, the founder, a Korean. 1988. Oct. 24. He started the company in 1983 with soft and firm tofu. In 1987 he added Kinugoshi. He also runs Obok Bakery on the same street.

1057. Yokotsuka, Tamotsu. 1983. Scale-up of traditional fermentation technology [for shoyu production] (Review). *Korean J. of Applied Microbiology and Bioengineering* 11(4):353-71. [143 ref. Eng]
Address: Kikkoman Corp., Noda-shi, Japan.

1058. American Soybean Assoc. 1983. ASA helps quench Asian thirst for soymilk. *Checkoff Successfile*. Asia #804. 2 p.
• ***Summary:*** Problem: Soymilk has been a staple in China for centuries. "But the 'beany' taste limited its appeal. Also, in many areas soymilk was made and sold by roadside vendors, and production was inefficient or unsanitary.

"Program: ASA promoted soymilk in Japan, Taiwan, Korea and Singapore. ASA staff worked with food companies to stimulate large scale soymilk production. ASA technicians helped develop new, appealing soymilk flavors. ASA participated in food shows, gave demonstrations and sent out educational pamphlets depicting soymilk's health benefits and good taste.

"Results: Asian soymilk consumption has soared. Consumption in Japan is expected to jump over 200 percent from 1981 to 1982, using almost 1 million bushels of soybeans. Korean soymilk consumption has doubled, requiring over 1 million bushels of beans. Taiwan consumers are drinking over 180,000 gallons of soymilk daily, using over 950,000 bushels of soybeans annually."

A bar chart shows "Growth of soy milk sales in Japan" from 1975 to 1981, with 1982 estimated. The growth has been exponential.

1059. Chang, Te-Tzu. 1983. The origins and early cultures of cereal grains and food legumes. In: David N. Keightley, ed. 1983. The Origins of Chinese Civilization. Berkeley, California: Univ. of California Press. xxxi + 617 p. See p. 65-94. [133 ref]
• ***Summary:*** An excellent overview. Prehistoric civilization in China began to bloom and spread when crop production progress was made "in the central plain, in areas bordering the southern banks of the Yangtze Chiang basin, and probably in the adjoining areas. *Shu* (1 Chinese character given) (millet), *chi* (1 Cc) (millet), *tao* (1 Cc) (rice), *mai* (1 Cc) (barley and wheat), and *shu* (1 Cc) (soybeans)–the five cereals mentioned in mythological writings–provided the basic necessities for the eventual expansion and development of Chinese civilization."

A map (p. 67) shows "Geographic distribution of the

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cereals and soybeans in nine *chou* (districts) during the Chou dynasty." A dark broken line shows the western and northern limit of rice cultivation ca. 450 BC, and a lighter broken line shows the western and northern limit of rice cultivation ca. 100 BC; the shifted eastward and southward.

"From the Spring and Autumn to the Warring States periods (722-256 B.C.) millets and soybeans were the staples of the north (Liu 1960 [in Chinese]).

Both millets "are adapted to semi-arid climates and infertile soils." They are also adapted to alkali soils. "The millets require less intensive care than other cereals..." (p. 69).

"From the beginning of the Warring States period, *shu* (the soybean) began to overtake the millets in predominance, as indicated by various writings. Between the Ch'in and Western Han, however, *mai* and *ho* (millets) still dominated *shu* (soybeans) (Liu 1960).

Pages 80 and 81 are about "The soybeans and other legumes," including: The origin and domestication of the soybean. Antiquity of the soybean. Impact of the soybean. "The *shu* pictograph can be traced back to approximately the eleventh century B.C. (Hu Tao-ching 1963). Both *shu* and *jung-shu* (2 Cc) appear in the odes [Book of Odes, Shih-ching] several times (Ho 1975, p. 78).

"The soybean probably emerged as a domesticate during the Chou dynasty (Ho 1969a: 168; Hymowitz 1970: 416). The proto-Tungusic people in the northeast plains could have brought the seeds to the early Chou court. It became widely disseminated in the Chou culture area only after 664 B.C., following the expedition of Lord Huan of Ch'i, who brought seed from the Mountain Jung tribe (Ho 1975: 77-79). As the Ch'in dynasty expanded and trade increased, the legume spread to the south (Li Ch'ang-nien 1958), to Korea, Japan, and southeast China. The northeastern provinces became a center of diversity (Hymowitz 1970). The soybean thrives better in mesophytic regions than in arid zones (see King 1966: 180 for comparative data on efficiency of transpiration).

"Millet and soybeans became important crops grown in rotation in about the fourth century B.C. The long lapse between the first domestication of millet and that of the soybean indicates a prolonged process of trial and error by people who were probably of different tribes (Ho 1975: 80).

"Impact of the Soybean: Soon after domestication and dissemination during the Chou dynasty, the soybean became an important source of plant protein. Because its root nodules fix nitrogen, it entered into the widely practiced millet and soybean rotation system (this is mentioned in the Kuan-tzu {2 Cc} of the fifth to third century B.C.; Li Chang-nien 1958). Within three centuries, millet and soybeans became the major crops in areas north of the Huai river." Address: Geneticist and Leader, Genetic Resources Program, The International Rice Research Inst., P.O. Box 933, Manila, Philippines.

1060. Fruin, W. Mark. 1983. Kikkoman: Company, clan and community. Cambridge, Massachusetts: Harvard University Press. xiv + 358 p. Illust. Index. 24 cm. [230 ref. Eng]
• ***Summary:*** A superb business history and No. 35 in the series Harvard Studies on Business History. Contains 8 illustrations, 16 figures. and 30 tables. All Japanese names are written, Japanese style, with the family name first, followed by the given name.

Contents: Editor's introduction, by Alfred D. Chandler, Jr. Acknowledgments. Introduction (author's. The company began brewing shoyu in 1661 in the town of Noda, 90 minutes by modern train northwest of Tokyo. Phase I: 17th century to 1887. Phase II: 1887 to 1917. Phase III: 1918 to 1946. Phase IV: Postwar democracy.

1. Factories in the fields: Rural-centered industrialization, the origins of shoyu, Noda soy sauce (In 1661 Takanashi Hyozaemon XIX began brewing shoyu in Noda), Mogi domination of the market, fermentation technology (preparation of wheat for koji, preparation of brine solution, culturing of the wheat and soybeans to make koji, process of fermentation), extraction or pressing (At the end of the Tokugawa period {1867} the standard wooden keg held 9 *shô*, 4.33 gallons, which was said to be the amount of shoyu consumed in one year), production and scheduling, the dual employment system (organization of work, work rules, 1909 wage agreement, hierarchies of work {in front office and factory}), industry and community, farms and factories in 19th century Japan.

2. Clan and cartel in Meiji Japan: Clan and cartel in the Meiji period, government-regulated markets, Noda brewers assert themselves (registration and promotion of the brand-name Kikkoman by Mogi Saheiji, in Japan, Amsterdam, Austria and California), the Noda Shoyu Manufacturers' Association (*Noda Shôyu Jôzô Kumiai;* a cartel formed in 1887 to stabilize price, control supply, and guarantee markets, cartel and costs, the challenge of Suzuki Tôsaburô / Tosaburo), research and development, distribution: the railroad (opened in late April 1911), social change and the cartel (the cost of charity, noneconomic motivation, from philanthropy to paternalism), the transformation of shoyu manufacture in the countryside.

3. From cartel to corporation and beyond ("A corporation requires a nucleus for centralization and coordination"): 1909 to 1918: period of preparation ("in 1914 three shoyu brewers from Choshi in Chiba prefecture had formed the Choshi Shoyu Company." The owners were Hamaguchi Yoshiuemon, Fukai Yoshibei, and Tanaka Genba) (remains of the cartel, the Noda Shoyu Company {began operations on 1 Jan. 1918}), 1918 to 1927: the first decade–process of incorporation (Jinsen Shoyu was a brand brewed in Inchon, Korea) (1918 to 1925: from committees to functional departments {sales committee, research committee}, 1925 to 1927: holding company reorganization),

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the making of a rural zaibatsu (1925 on).

4. A loyal retainer's farewell (translation of a small, privately published eulogy for Mogi Shichirouemon VI, of the Kashia clan, first president of the Noda Shoyu Co, written in 1929): Shinshima's views on Japanese management, the master as seen by the apprentice (preface, introduction, brief biography, the president's principles and policies, the president as businessman, the president's everyday life, an impressive personality, a man of unquestionable character, ancestor worship, a model of love, on being what you are, accepting fate, the president's personality as revealed in a game of go, people rather than things, the president and wine {"A proverb says 'a drinker resembles a cake of tofu: in the beginning it's square and has shape, but it ends up shapeless, formless"}, life as a spiritual exercise, three great men of Kashiwa, is Ito crazy?, called by God, everything is one), editor's postscript.

5. Prelude to turmoil: The murder (of Kimura Junichiro), union activities up to the homicide, traditional wage labor (problems associated with the employment system, "internal contracting"), internal contracting and the Noda Shoyu Company, from homicide to the 1923 strike, reorganization of work design and structure (Jan. 1923).

6. The Noda Strikes: 1923 and 1927-28: Worker discontent rises, the strike of 1923 (negotiation and compromise, memoranda), the 1927-28 dispute (it lasted 218 days; work environment, transportation issues: prelude to the strike, 1927-28: an overview), conclusion: Japanese industrial relations at a crossroad.

7. Corporate maturation: The new paternalism (membership in the new paternalism), paternalism and patriotism, two features of the Japanese employment system, the prewar employment system at the Noda Shoyu Company, the end of an era, the limits of a family firm, a corporate coming of age

8. Democratization and internationalization (In 1964 Noda Shoyu Co. was renamed Kikkoman Shoyu Co., and in 1980 the name was changed again to Kikkoman Corporation): The course of democratization, democratization of the family (the individual replaced the household / family as the locus of legal responsibility. Zaibatsu were dismembered), unionization–within and without the Noda factories (effect of unionization upon the company), company and community after 1962, antitrust and business strategy, background to marketing development), the growth of internationalization (effect of exogenous factors on Kikkoman, development of a new business strategy), internationalization (in June 1957 Kikkoman International Inc. was established), diversification (Manjo brand, Yomohoharu brand, Del Monte brand, Disney brand, Mann's brand, Higeta brand {marketed but not made by Kikkoman}, Ragu brand, Kikko brand, Monet brand). Conclusion. Appendix A. Ie [stem family lineage] and the shoyu industry. B. Scroll from Mogi Fusagoro with preface by Mogi Keizaburo on the founding of a Noda Shoyu brewery, 1872. C. Rules and Regulations of the Noda Shoyu Brewers' Association. D. Noda Shoyu Brewers' Association Income and Expenses, 1888-1918 (yen). E. Property held by Mogi-Takanashi families joining Noda Shoyu Co. Inventory taken November-December 1917. F. New wage and work proposal, Noda Shoyu Company, 1919. Notes. Glossary.

This book was very favorably reviewed by Masaru Udagawa in *Business History Review.* 1986. Spring. p. 169-70.

Concerning the Kikkoman brand (p. 59): In 1838, Mogi Saheji petitioned for and received registration for the brand name Kikkoman by the central government of Japan. Although this Mogi family has produced other shoyu brands, Kikkoman was the pride of the family, its private label. When written longhand in Japanese characters, the brand is composed of three characters: *ki*, for "tortoise," meaning good luck and longevity in Chinese and Japanese folklore; *ko* means "first-rate"; and *man* suggests "ten thousand" or forever. *Kikko* also means octagon, so the brand name is often written as an octagon with the character for "ten thousand" or *man* written inside the octagon.

"In 1872 and 1873, shortly after the Meiji Restoration of 1868, Mogi Saheiji entered Kikkoman in two world's fairs, the first held in Amsterdam and the second in Austria. Kikkoman was awarded a letter of commendation for excellence at the Austrian fair, and following this, Mogi Saheiji redoubled his efforts to promote the brand. In 1877 Kikkoman received a second-place medal at the All-Japan Industry Promotion Fair, and in 1879 it was registered in California as a legally recognized brand name, a move that predated the same legal protection in Japan by six years!"

Prof. Alfred D. Chandler, Jr. of the Harvard Business School worked closely with Fruin as he was researching and writing this book during nearly two years at Harvard. His scholarship, wisdom, friendship, and encouragement contributed greatly. Address: Prof. of History, California State Univ., Hayward.

1061. Hesseltine, C.W. 1983. Microbiology of Oriental fermented foods. *Annual Review of Microbiology* 37:575-601. [50 ref]

• ***Summary:*** Contents: Introduction. Historical account. Importance of mixed cultures. Microorganisms used.

"The Japanese Food Agency, Ministry of Agriculture, Forestry, and Fisheries (1979), gave the following figures for 1979: miso, 567,776 tons; shoyu, 1,252,431 kiloliters; and natto, 158,000 tons. In Korea, 35% of the 442,803 metric tons of soybeans produced is fermented. Indonesia uses about 75,600 tons of soybeans in making tempeh.

"There is considerable ancient writing in Chinese publications about foods made by fermentation, but the first scientific reports are only about 100 years old. From 1878 until the beginning of World War I, there was an explosion

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of papers and reports dealing with fermented foods and drinks... In general, studies between 1881 and 1914 were devoted to the description of the product and the local name and to the isolation and description of the microorganisms associated with the fermentation. A number of organisms new to science were described and illustrated. Additional information was given on the action of the fungus on the substrate, suggested uses of the fungus in processes that could be exploited in European technology, and a description of the substrate preparation, food use, and native methods of food preparation.

"This period of research ended abruptly with the advent of World War I, as the exchange of students and cooperation between Japan and Germany ceased. Food fermentation studies resumed in the 1950s and today considerable interest exists. This renewed interest stems from the concern with nutrition, the great enthusiasm for vegetarian and natural foods, the search for less expensive, high-protein foods, the influence of foreign students studying in the West, the need to expand export markets, the need to add products to convenience foods to add zest and flavor, and the interest in the activities of microorganisms used in fermented foods." Address: Northern Regional Research Center, Peoria, Illinois.

1062. Jaffrey, Madhur. 1983. Eastern vegetarian cookery. London: Jonathan Cape. xii + 531 p. Illust. by Susan Gaber. Index. 24 cm.

• ***Summary:*** This is an expanded version of *Madhur Jaffrey's World-of-the-East vegetarian cookery* (1981, New York). The author of this creative book, a woman, was born in British India on 13 Aug. 1933. She first became known as an actress in India, but later found fame as a food writer. She has lived in America for more than 20 years. She presents 21 recipes for bean curd (tofu), 7 for tempeh, and some for yuba and miso. Soy-related recipes include: Aubergine slices with white miso (Japan, p. 4-5). Green beans with soy sauce (Japan, p. 20), Cabbage with miso (Japan, p. 29). Lotus root with soy-sauce dressing (Korea / Japan / Hong Kong, p. 46-47). Yellow pumpkin cooked with soy sauce (Japan, p. 74-75). Fresh soy beans, steamed (China, p. 76, with "fresh green soy beans in their pods"). Yien Koo's Spinach with fermented bean curd (China, p. 78-79). Pecel (Vegetable salad with spicy peanut sauce, plus tofu and tempeh; Indonesia, p. 87). Tempura (with tofu; Japan, p. 89-92). Soy bean sprouts (how to grow, p. 119). Soy-bean and mung-bean sprouts seasoned with sesame oil (Korea, p. 123-24). Tempeh, Fried tempeh, Fried, pre-seasoned tempeh, Sambal goreng tempeh kering (Sweet and sour tempeh), Tempeh cooked in coconut milk (Indonesia, p. 127-30). Thai fried rice (with red fermented tofu, p. 176).

Chapter 4 (p. 187-221), titled "Soy milk, bean curd, and wheat gluten," contains the following: Introduction to each ingredient. Soy milk (making your own at home). Making your own bean curd. Udofu (Yudofu, simmering bean curd with seasonings, Japan). Bean curd with watercress (Singapore Chinese). Bean curd with fresh coriander (Taiwan). Korean-style bean curd in a hot water bath. *Hiya-yakko* (Chilled bean curd, Japan). Bean curd with broccoli (Hong Kong). Cabbage cooked with bean curd (Japan). Bean curd with a deliciously spicy sauce (China). Carrots and beans with a bean-curd dressing (Japan). Bean curd, mushrooms, and peanuts in hoisin sauce (Chinese style). Sautéed bean curd (Korea). Tofu dengaku (Toasted bean curd with a miso topping, Japan). Fried bean-curd cubes (Most of East Asia). Soy-bean sprouts sautéed with fried bean curd (China). Fried bean curd with a sweet-and-sour sauce (China). Fried bean curd cakes with a mustard surprise (Japan). Inari-zushi ("Bags" of fried bean curd stuffed with sushi rice, Japan). Pressed bean curd with cabbage (China). Salad of pressed bean curd, mung-bean sprouts, and agar-agar (China). How to make fried and baked wheat-gluten balls. Stew of baked wheat gluten, potato, turnip, carrot, and cabbage rolls (Japan, p. 215). Fried wheat gluten with broccoli, carrot, and mushrooms (China). Fried wheat gluten and potato stew (Indian style). Shredded wheat gluten and Cabbage with fennel seeds (Indian style). Buddha's delight (A mixed Chinese stew, Hong Kong; with yuba, fried tofu, and fried wheat gluten balls).

Chawanmushi (Steamed savory custards, with tofu; Japan, p. 223-26). Omelette with bean curd (Japan, p. 230-31). Soy-sauce eggs (Thailand / China, p. 245). Paneer (Fresh cheese from cow's milk; India, p. 277-78). Hot or cold noodles with a soy-sauce dressing (China, p. 288). Noodles with a hot-and-sour bean sauce (China, p. 290). Vegetarian mee krob (Crisp noodles with pressed bean curd and eggs; Thailand, p. 296-97). Noodles with quail eggs, mushrooms, spinach, and yuba (Japan; p. 298-99). Hoppers (yeast pancakes; Sri Lanka, p. 315). Roti (Flat whole-wheat bread; India, p. 320). Delicious stock made with soy-bean sprouts (p. 340). Clear soup with mushrooms, bean curd skins [yuba], and spinach (Japan, p. 346). Clear soup with soft bean curd and Chinese leaves (p. 346). Miso soup with bean curd (Japan, p. 357). Miso soup with carrots and mushrooms (Japan, p. 358). Fried, munchable soy beans [soynuts] (China, p. 373). Potato and tempeh patties (Indonesia, p. 394). Dipping sauces (with soy sauce, p. 414-17, incl. kochu chang–Korean soy sauce). Kombu relish (with soy sauce; Japan, p. 435). Shoyu daikon (White radish pickled in soy sauce; Japan, p. 436). Ginger quick-pickled soy sauce (China, p. 436). Aomidaikon (Quick pickled small white radishes, with slightly sweet yellow miso; Japan, p. 438-39). Chinese-style jellied bean-curd sweetmeat with a peanut topping (Singapore, p. 462-63).

General information [like a glossary] (p. 481-506): See: Bean curd (regular, fried, fermented {*fu-ju, nam-ye, tao-hoo-yee,* red bean curd}, pressed {*doufu kan*}, pressed seasoned {*pai doufu kan*}, dried bean-curd skin or yuba). Beans

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(azuki, soy). Bean sauce (made from fermented soy beans). Chilli paste with soy bean (and garlic). Hoisin sauce. Miso. Nam yee (see Bean curd, fermented). Nigari. Soy beans, fresh. Soy-bean sprouts. Soy milk. Soy sauce (incl. Japanese, Chinese dark and light, Japanese usukuchi, Indonesian ketjap manis). Tao Hoo Yee (see Bean curd, fermented). Tempeh. Yuba. Sources (of ingredients; p. 507-10). Address: New York City, NY.

1063. McNamara, Dennis. 1983. Dependence and the grain trade: Japan and Korea, 1885-1904. Berkeley, California: Center for Korean Studies, Univ. of California. 30 p. [39 ref]
• ***Summary:*** See next page. Pages 1-2: Late 19th century Korea was an agrarian society with 84% of the households involved in agriculture. Korea's total agricultural trade with Japan was always greater than her trade with China. "There was little demand in China for Korean grains. Yet a strong market for Korean grains was developing in Japan in the 1880's, made possible by a network of Japanese merchants in Korea itself, supported by Japanese banks and shipping lines. Rice end soybeans accounted for better than 80% of Korean commodity exports to Japan in the years of strong exports, 1890-1892.

"Victory in the Sino-Japanese War (1894-1895) strengthened Japan's political influence in Seoul at the expense of the Chinese. Though temporarily checked by the Russians in 1896 and 1897, the Japanese were able to consolidate their political position in Korea, eventually establishing a Protectorate in 1905." From 1895 to 1904, the total value of Japanese-Korean trade increased more than 400%. This trade with Japan hastened the development of commercial or "cash cropping" in Korea across these two decades.

Page 7: "With the foreigners restricted to residence areas, the Korean Government had retained some control of foreign trade through the licensed Korean brokers and commission merchants. But from June of 1885, the Chinese and Japanese merchants could deal more directly with Korean producers, eroding government control of the market. With more immediate access to Korean grain markets, Japanese merchants began developing an extensive grain trade."

Page 8: Table 1–"Value of Japan's Grain Imports, 1885-1894." Column 3 is for Korean Soybeans and Column 5 is Total Soybeans imported to Japan. The value of Japan's imports of Korean soybeans grew from 54,000 yen in 1885 to a peak of 1,341,000 yen in 1890, dropping to 629,000 yen in 1894. From 1885 to 1890 these Korean soybeans represented from 58% to 99% of the value Japan's total soybean imports. The value of Japan's total soybean imports rose from 93,000 yen in 1885 to 1,856,000 yen in 1890 to a peak of 2,978,000 yen in 1894. "The Japanese had suddenly become major consumers of Korean grains" [soybeans and rice].

Page 11: "Japanese transport and finance networks in Korea made possible such developments in the grain trade. The Nihon Yubin Kaisha (Japan Mail Steamship Company abbreviated NYK) and the Osaka Shôsen Kaisha (Osaka Commercial Shipping Company, abbreviated OSK) operated lines that brought grains from Inchon and Pusan to Japanese trade centers such as Kobe, Osaka and Nagasaki. Branches of the Dai Ichi (The First National Bank of Japan) provided Japanese merchants in Korea with both credit for grain purchases and insurance for storage and transportation. There was also a strong Japanese consular presence in Korea, and a growing population of Japanese residents, numbering better than 4,500 in 1885, and 9,300 by 1894."

Page 16: "Foreign grains were important for the food supply in the rapid industrialization program of the Meiji Government. The discrepancy between the domestic supply of agricultural products in Japan and the domestic demand began to widen from 1888. Imports from Korea accounted annually for an average of 57% of total Japanese rice imports between 1888 and 1892, and 74% of total Japanese soybean imports."

Page 18: "Seventeen embargoes on the transport and/or sale of grains were imposed by various Korean provincial governors between 1884 and 1901, ostensibly to assure sufficient domestic grains in times of poor harvests, and to prevent excessive speculation and inflationary grain prices. The frequency of such embargoes, vigorous Japanese Government opposition, and the difficult indemnity negotiations suggest both Korean sensitivity to erosion of sovereignty in the grain trade, and Japan's commitment to developing the Korean grain trade."

"Grain Trade: 1895-1904: Table Two (p. 20) shows "Value and volume of Japan's grain imports, 1895-1904." Column 3 shows: Export of Korean soybeans grew from 36,000 tons in 1895 to a peak of 58,000 tons in 1900, decreasing slightly to 51,000 tons in 1904. Column 5 shows that imports of soybeans to Japan rose from 2.55 million yen in 1895 to 7.11 million yen in 1904.

Page 22: "As in the earlier decade, Japan continued as Korea's major export market, absorbing annually 85% of Korean imports between 1895 and 1904.

Page 23: "The Japanese had also begun extensive investment in Korean farmland by the end of this decade. Such direct control of Korean farmland provided an alternative to earlier methods of grain transactions."

Page 24: "Japan needed rice and soybeans to feed the growing population involved in industry." Address: Center for Korean Studies, Univ. of California, Berkeley.

1064. Tindall, H.D. 1983. Vegetables in the tropics. Westport, Connecticut: AVI Publishing Co.; London: Macmillan Press. xi + 533 p. Illust. 25 cm.
• ***Summary:*** In the section on Leguminosae (p. 253-300) is a subsection on "Glycine max (L.) Merrill–Soya-bean" (p.

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Table Two

Value and Volume of Japan's Grain Imports, 1895 - 1904

(in thousands of yen and thousands of tons)

| Year/ | Korean Rice | Korean Soybeans | Total Rice | Total Soybeans Imported to Japan |
|---|---|---|---|---|
| 1895 yen | 888(.18)* | 1,172(.46) | 4,357 | 2,554 |
| ton | 20 | 36 | | |
| 1896 yen | 2,852(.50) | 1,534(.44) | 5,662 | 3,475 |
| ton | 62 | 45 | | |
| 1897 yen | 6,009(.28) | 1,817(.31) | 21,528 | 5,899 |
| ton | 118 | 49 | | |
| 1898 yen | 2,704(.06) | 1,172(.17) | 48,219 | 7,101 |
| ton | 43 | 27 | | |
| 1899 yen | 1,689(.28) | 2,110(.24) | 5,960 | 8,822 |
| ton | 29 | 46 | | |
| 1900 yen | 4,694(.52) | 2,615(.54) | 9,021 | 4,817 |
| ton | 75 | 58 peak | | |
| 1901 yen | 6,009(.51) | 2,515(.47) | 11,878 | 5,328 |
| ton | 96 | 58 | | |
| 1902 yen | 3,961(.22) | 2,254(.39) | 17,750 | 5,786 |
| ton | 57 | 51 | | |
| 1903 yen | 4,781(.09) | 2,116(.33) | 51,960 | 6,369 |
| ton | 69 | 47 | | |
| 1904 yen | 1,578(.03) | 2,592(.36) | 59,791 | 7,116 |
| ton | 22 | 51 | | |

265-67) with these contents: Synonyms. Common names. Cultivars (determinate {"with terminal bud developing into an inflorescence"} and indeterminate). Centre of origin and distribution (probably in north-east China earlier than 1000 BC). Areas of cultivation (tropical Asia, East and West Africa, the Caribbean, Central and South America, Japan, North and South Korea, the south and mid-western states of the USA). Botanical description. Environmental response. Cultural requirements. Growth period and harvesting. Use and nutritional composition ("Young pods and seeds are

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cooked; the seedlings and leaves are occasionally eaten as a vegetable"). Pests and diseases.

Other legumes discussed include the groundnut, Jack bean, hyacinth bean, rice bean, lima bean, winged bean, asparagus bean, and bambara groundnut. Address: National College of Agricultural Engineering, Silsoe, Bedford, England.

1065. *USDA Plant Inventory.* 1983. Plant material introduced January 1 to June 30, 1980 (Nos. 436991 to 443013). No. 188, Part I. 529 p.

• ***Summary:*** Soybean introductions: *Glycine max* (L.) Merrill. Fabaceae.

"Donated by Dr. N.I. Korsakov, Division of Grain Legume Crops, N.I. Vavilov Institute of Plant Industry, Leningrad, Soviet Union." All these varieties are designated "VIR" (Vavilov Inst.).

437069-437085. Amur Region and Far East

437124-437128. Gurijscaja and Imeretinscaja, Georgian SSR.

437129A-B. Irkutsk Region (Oblast) of Russia.

437130-437134. Gibrid ASS, Kazakh SSR.

437135-437148. Khabarovsk Province, USSR [on right bank of Amur River]

47149-437171. Krasnodar Province, USSR.

437172-437175. Kuybyshev Region, USSR.

437176-437178. Latvian SSR.

437179-437188. Lithuanian SSR.

437189-437303. Bel'tscaja, Bessarabea, Biruintsa, Brynzenscaja, Corichevava, CSchi, Dobruzanca, Errj, Moldavscaja, Rajner, Scorospelca, Staroucrainea, Vengerca nizcaja, Vysocoroslaja, Moldavian SSR.

437304. Moscow Region. 437305-437312. North Osetian [Ossetian] ASSR (An autonomous republic in the southeastern Russian SFSR on the north slopes of the Central Caucasus Mountains, bounded on the north by Stavropol Kray; Renamed Alania in 1991; capital Vladikavkaz).

437313-437315. Novosibirsk Region, USSR.

437316-437520. Primorsky Province, USSR [Maritime Province in Russian Far East, bordering on Sea of Japan, China and North Korea. Administrative center and soybean port: Vladivostok].

437521. Stavropol Province, USSR.

437522. Tshuvashskaja ASSR.

437523-437524. Turkmen SSR.

437525-437549. Ukranian SSR.

437550. Uzbek SSR (later Uzbekistan).

437551-437552. Voranezh Region, USSR.

437553-437813. Peoples Republic of China.

437814-438273. China, Northeast [formerly Manchuria] incl. Charbin [Harbin], Elita, Manczurscaja.

438274-438295. Japan (many named varieties).

438296-438309. South Korea (Republic of Korea).

438310-438312. North Korea.

438312-438341. Algeria.

438342. Argentina.

438343-438513. Australia, Bulgaria, Canada, Czechoslovakia, France, West Germany, East Germany, Hungary, India, Indonesia, Israel, Italy, Morocco, Nepal, Netherlands, Poland, Portugal, Romania, Sweden (13 Fiskeby varieties), United States (26 named varieties), Yugoslavia.

440913. Wild soybean from China. "Donated by Kirin Academy of Agricultural Sciences, Kungchuling, Kirin Province. Received through W.O. Scott, Dep. of Agronomy, Univ. of Illinois, Urbana. Received March 1980. Collected 1979.

440927-440943. *Glycine canescens* F.J. Herman. From Australia. "Donated (but not collected) by T. Hymowitz, Dep. of Agronomy, Univ. of Illinois, Urbana. Received Aug. 1979.

440944-440974. *Glycine clandestina* Wendl. From Australia. Donated by T. Hymowitz.

440975. *Glycine falcata* Benth. From Australia. Donated by T. Hymowitz.

440976-440977. *Glycine latrobeana* (Meissn.) Benth. From Australia. Donated by T. Hymowitz.

440978-440980. *Glycine latifolia* (Benth.) Newell & Hymowitz. From Australia. Donated by T. Hymowitz.

440981. *Glycine tabacina* (Labill.) Benth. From Fiji. Donated by T. Hymowitz. Collected 1930. Sigatoka, Viti Levu, Fiji. Collected by Greenwood. Wild.

440982-440997. *Glycine tabacina* (Labill.) Benth. From Australia. Donated by T. Hymowitz.

440998-441011. *Glycine tomentella* Hayata. From Australia. Donated by T. Hymowitz.

441012-441013. *Glycine tomentella* Hayata. From China. Donated by T. Hymowitz.

441339-441383. *Glycine max* (L.) Merr. Soybean. From Indonesia (East Java, Central Java, West Nuca Tanggara [West Nusa Tenggara, incl. Lombok and Sumbawa islands, in eastern Indonesia]). Donated by S. Djojoderdjo and Soebekti, Univ. of Gadjah Mada, Jogjakarta [Yogyakarta].

442003-442004. From China, Peoples Republic of. Donated by Institute of Crop Breeding and Cultivation, Chinese Academy of Agricultural Science, Beijing. Received through G. Liang, Dep. of Agronomy, Kansas State Univ. [Manhattan, Kansas], March 1980.

442005-442021. From South Korea. "Donated by Applied Genetics Laboratory, Korea Atomic Energy Research Inst., Seoul Received through R. Loiselle, Plant Gene Resources of Canada, Ottawa.

442022-442045. *Glycine max* (L.) Merr. Soybean. From Poland. "Donated by Plant Breeding and Acclimatization Inst., Radzikow / Warszawy. Some also from the Soviet Union and Yugoslavia.

442834. *Glycine max* (L.) Merr. Soybean. From China, Peoples Republic of. "Donated by T.C. Tso, Tobacco

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Laboratory, USDA, Beltsville, Maryland." Collected from a market near Quilin, Kwansi Province.

Note: In Part II: 445842-445849. From. Thomas A. Lumpkin, Zhejiang Academy of Agricultural Sciences, Hangzhoe, Zhejiang, China. Address: Washington, DC.

1066. Lee, Kyung. 1984. Re: Names of soyfoods in Korean. Letter to William Shurtleff at Soyfoods Center, Jan. 13–in reply to inquiry. 1 p.

• ***Summary:*** The following are from an untitled, unpublished, undated document:

"Soybeans whole (2Kc = 2 Korean characters): hin kong or (3Kc) mae-chu-kong; contains all amino acids; protein powerhouse among foods; boil and eat whole, chopped, ground in casseroles, soups, stews, sauces; deep fry for soy nuts; make soy milk [kong-kuk].

"Soybean flour (3Kc), kong ka-roo, enrich all baking with 2 Tablespoons per cup of [wheat] flour; use special recipes for higher amounts; cheapest protein.

"Soybean sauce [soy sauce], 2Kc, kan-chang, seasoning, complementarity.

"Soybean paste, 2Kc, dwen-chang, season stews, soups, main dishes, complementarity.

"Soybean sprouts, 3Kc, kong na-mul, soups.

"Soybean curd, 2Kc, doo-boo, fry, soups, mash in with meat loaves or balls, the 'cheese' made from soy milk, use chunks in vegetable stews.

"Brown soybean, whole, 2Kc, bam kong, literally chestnut bean; cook with rice or use in casseroles, soups; available deep-fried at market for snack food.

"Black soybean, whole, 2Kc, nuk kong, season after cooking as side dish, soup.

"Fresh soybeans [no name given]: available in the fall before the pods have dried and seeds matured. Delicious cooked for use in salads, soups, or as vegetable side dish." Address: Country Director, American Soybean Assoc., P.O. Box 1704, USIS Bldg., 63 Eul Ji Ro 1Ka, Chung Ku, Seoul, Korea. Phone: 722-2601 X-4368.

1067. *SoyaScan Notes.* 1984. Korean names of soyfoods–non-fermented and fermented (Overview). Jan. 13. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** Unfermented:

Tubu: tofu

Suntubu: curds

Yubu: fried tofu

Kongkuk: soymilk

Kongnamul: soy sprouts

Doebiji: gô = fresh soy puree, used to make tofu. cook with vegetables, kimchi or meat.

Koggomul: roasted soy flour

Fermented:

Kanjang: soy sauce.

Doenjang: soybean paste

Kochujang: hot chili and soy paste = meju + chili powder + cooked glutinous rice.

Jeonkukjang (or cheonkukjang): Korean-style natto. The only Korean fermented food not made from meju. Diced with salt

Damsuejang (makjang): powdered meju. Add brine, ferment and ripen. A quick fermentation

Meju: Korean soybean koji

Per capita consumption in Korea:

Kanjang (soy sauce) 20 ml/day, 64% made at home

Doenjang (soy paste) 15 gm/day, 82% made at home

Kochujang (natto) 10 gm/day, 76% made at home.

All meju prepared at home.

1068. Shurtleff, William; Aoyagi, Akiko. 1984. The Meals for Millions Foundation and Multi-Purpose Food: History of work with soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 7 p. Jan. 15. Unpublished typescript. Available online at www.soyinfocenter.com.

• ***Summary:*** www.soyinfocenter.com/HSS/meals_for_millions.php

A comprehensive history of the subject. Contents: Early years (1900-39): Clifford Clinton's years in China, Clifton's Cafeteria in Los Angeles, California, to feed the needy during the Depression. A way to feed the world (1940-1965): Grant from Clintons to Dr. Henry Borsook to find food for postwar Europe, Mme. Berzceller's / Berczeller's Multi-Purpose Meal (primarily defatted soy flour) ready in late 1944, the initial formula, first use in Los Angeles, Clintons founded Meals for Millions Foundation in Los Angeles 1946, all-soy formula in 1950's (now called Multi-Purpose Food, MPF) made by General Mills until 1980, celebrities praise MPF (Eleanor Roosevelt, Albert Schweitzer, Pearl Buck–a director), Executive Director Florence Rose creates poor professional image, amount distributed, historical significance. 1966-76: From distribution to technology transfer, Mark Sterner new program head 1966, move to Santa Monica 1967, overseas manufacturers, early 1970's new self-help philosophy, phrase, and logo, USAID (U.S. Agency for International Development) funding in 1973 launched a new era, training center and classrooms in Santa Monica headquarters, developed own low-cost extrusion cookers, major work with soy done in Korea and Ecuador. 1976-1980's: Peter Davies replaced Sterner 1976, last MPF distributed 1980, first training overseas, applied nutrition programs, 1982 move to Davis, CA, 1982 budget of $2 million. Address: Lafayette, California. Phone: 415-283-2991.

1069. Bernard, R.L. 1984. The past and the future in soybean breeding. *Soybean News* (*NSCIC*) 35(1):2, 6. Jan.

• ***Summary:*** "As a commercially significant crop in this country, soybeans have a short history and have been important in the north-central states only since 1922.

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They were grown earlier in the southeast, especially North Carolina, as a forage crop. Breeding in those early years consisted of field trials of cultivars introduced from Asia and choosing those best adapted and most productive for the local farmers.

"Soybeans were experimented with in small plantings and occasionally grown on a commercial scale during the 1800's. According to Piper and Morse (1923) no more than eight cultivars were grown in the U.S. prior to 1898. In that year the U.S. Department of Agriculture (USDA) began a program of recording introduced cultivars of crop plants under "PI" designations. Through this system, large numbers of soybeans were introduced and grown in experimental plots. The better ones were sent out to various state experiment stations for further testing.

"From 1898 to 1923 more than 1,000 cultivars were introduced, most sent by research stations or grain merchants in Asia, or brought in by agricultural explorers, diplomats, missionaries, or other travelers to Asia (Table 1). Some of the most successful cultivars were introduced into the U.S. during this period. As a result of the increasing success of soybeans, the USDA sent plant explorers to Asia (notably P.H. Dorsett and later W.J. Morse) and from 1924 to 1932, 6,651 soybean accessions were introduced. During the next 40 years little effort was made and only a few soybeans were introduced each year. With renewed interest since 1975, more than 5,000 strains have been introduced.

"During the early periods of introduction no attempt was made to save all the strains introduced and a majority of them were discarded. Only the best were kept along with some of the unusual types. In 1949, in recognition of the need to preserve the germplasm of this important crop and make it readily available, the USDA established a soybean germplasm collection. The early strains (Group IV and earlier) are maintained at the University of Illinois at Urbana-Champaign and the later ones (Group V and later) at the Delta Branch Experiment Station, Stoneville, Mississippi. The collection was initiated by M.G. Weiss, head of USDA's soybean production research, and J.L. Cartter, head of the U.S. Regional Soybean Laboratory at Urbana. The original curators were E.E. Hartwig at Stoneville and L.F. Williams at Urbana. Hartwig is still curator of the southern collection. R.D. Osler succeeded Williams in 1951, and I became curator of the northern collection in 1954.

"The guiding principle has been to maintain the basic genetic diversity of the soybean and its wild relatives by maintaining all cultivars and introductions representing different germplasm, regardless of their apparent economic worth, and to make them readily available for research purposes.

"In 1949 and 1950, the USDA and state agricultural experiment stations were requested to submit samples of all introduced strains and old U.S. cultivars. From the 7,873 PI strains introduced before 1945, 1,659 strains were obtained, including 138 old U.S. cultivars that originated from introductions (Table 1).

"Introduced strains plus American-developed cultivars have been added to the collection since then, until today the number of soybean entries totals over 9,500 about 70% are in the northern collection and 30% in the southern one. They were drawn from 60 countries, but the majority came from eastern Asia and especially from China (1,202 strains), Japan (1,721), Korea (3,041), and the Soviet Union (1,847). Soybeans from these four countries comprise 83% of the collection and many of the strains received from other countries originated from these four. At Urbana, in addition, there is a genetic collection (mutations, oddities, isolines, etc.) of several hundred lines of interest in qualitative genetic studies. We maintain also a collection of wild soybeans, *Glycine soja.* The wild soybean accessions range in maturity from Group 00 to X and were obtained in the USSR (34 accessions), China (28), China (Taiwan, 2), Korea (313), and Japan (183). Because they can be crossed with cultivated soybeans, they are an interesting potential source of useful germplasm. We have also a collection of six perennial species of Glycine. These species are native to Australia and some range into the south Pacific islands and south China. Though not closely enough related for easy crossing with soybeans, these species are of interest in studies on the origin of soybeans and botanical relationships within the genus. If the crossing barrier can be overcome, they may supply the soybean breeder and geneticist with some interesting and diverse material.

"The soybean germplasm collection is used actively by researchers throughout the U.S. and from many other countries. In 1982, from the collection at Urbana, we sent out over 40,000 seed lots.

"We hope to obtain as much of the world's wild soybean germplasm as possible, and to complete our collections from Europe, the USSR, southern Asia, South Korea, and Japan. Our greatest need is for further collections from North Korea and China, especially southern and western China, since most Chinese strains in the present collection have come from northeastern and north-central China.

"Beginning in the late 1930's and 1940's, soybean breeders in the USDA-state experiment station breeding programs, through hybridization and selection, developed improved cultivars with higher yielding ability and resistance to lodging and shattering and to prevalent diseases.

"In the future, soybean pests and diseases will likely be an even more important factor in soybean production. Soybean breeders will be putting more emphasis on increased cultivar resistance and will be selecting for multiple resistance to different races and types of diseases.

"Breeders constantly are looking for the traits that contribute to improve yield. Because of the low heritability of yield, selecting for component traits rather than directly for yield might improve breeding efficiency. Unfortunately,

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except for pest and disease resistance, no helpful physiological or morphological traits have been found.

"Improvement in yield through improved soybean cultivars has been slow but steady over the past 50 years. No slowdown has yet occurred and presumably further improvement is possible working with the rather narrow base of just 20 ancestral cultivars. A major problem for the breeder is how to effectively use the large number of germplasm lines and find sources for further improvement.

"Today over half the acreage in the north central states is planted to varieties developed by private seed companies. However, the varieties trace their pedigrees directly to some of the recently widely grown public varieties. Thus they represent not a change in direction but the latest round in the process of variety improvement. It has continued steadily for the past 50 years.

"Advances in the future will be more difficult than in the past, but with the large number of specialists working on the problem, the prospects are bright." Address: Research Geneticist, ARS-USDA and Agronomy Dep., Univ., of Illinois.

1070. Jackobs, Joseph A.; Smyth, C.A.; Erickson, D.R. 1984. International soybean variety experiment: Eighth report of results, 1980-1981. *INTSOY Series* No. 26. xi + 234 p. Feb. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: (For the years 1980/1981): Algeria, Argentina, Azores, Bangladesh, Bhutan, Bolivia, Brazil, Brunei, Burundi, Cameroon, Chile, China [actually AVRDC, Shanhua, Taiwan], Colombia, Costa Rica, Czechoslovakia, Ecuador, Egypt, Ethiopia, Fiji Islands, French Guiana, Gabon, Ghana, Guatemala, Guinea-Bissau, India, Indonesia, Iraq, Korea, Lesotho, Liberia, Libya, Madagascar, Malaysia, Mali, Mauritius, Mexico, Morocco, Mozambique, Nepal, New Caledonia, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Rwanda, Saudi Arabia, Somalia, Sri Lanka, Sudan, Surinam, Tanzania, Thailand, Turkey, United States, Upper Volta, Uruguay, Vietnam, Zaire, Zambia, Zimbabwe.

(For the year 1979): Belize, Pakistan, Turkey, Vietnam.

Note 1. This is the earliest document seen (March 2021) concerning soybeans in Guinea-Bissau, or the cultivation of soybeans in Guinea-Bissau.

This document contains the earliest date seen for soybeans in Guinea-Bissau, or the cultivation of soybeans in Guinea-Bissau (21 May 1981). Sixteen varieties were tested at Granja Prabis, Bissau. ICA Tunia gave the highest yield, 1,225 kg/ha.

Note 2. This document contains the 2nd earliest date seen (May 2010) for the cultivation of soybeans in Brunei (19 May 1981). Sixteen varieties were tested at Biray Research Station by cooperator W.T.H. Peregrine. UFV-1 gave the highest yield, 2,577 kg/ha.

Note 3. This is the earliest document seen (Feb. 2006) that describes soybean variety trials in Bhutan. On 30 April 1980 sixteen varieties were planted under the supervision of Mr. Heinz Burgin at the Rural Development Project Demonstration Farm, Bumthang, Bhutan. DeSoto gave the highest yield, 729 kg/ha. The source of all these soybeans was INTSOY for ISVEX trials.

1071. Shim, Chung-shil. 1984. Korean recipes. Seoul, Korea: Seoul International Tourist Publishing Co. 79 p. Feb. Illust. (color photos by Edward B. Adams). Index. 26 cm.
• ***Summary:*** Recipes include: Five grain rice (-*kok pap*, with ½ cup each red [azuki] beans and black [soy] beans). Rice with soy bean sprouts (*Kong namul pap*). Mixed vegetables on rice (*Pibim pap*, with 100 gm soy bean sprouts, soy sauce, and red pepper paste). Dumplings (*Mandu kuk*, with 150 gm beancurd [tofu]). Seaweed soup (*Miyok kuk*, with 50 gm brown seaweed {*Miyok*} and 2 tablespoons soy sauce). Soy bean sprout soup (*Kong namul kuk*). Soy bean paste stew (*Toinchang ch'igye* [*doenjang*], with 2 tablespoons soy bean paste and 200 gm beancurd). Beancurd with beef (*Tubu chorim*, plus 3 tablespoons soy sauce). Curd with vegetables (*T'angp'yong Ch'ae*, with 250 gm mung bean curd, 200 gm soy bean sprouts, and 2 tablespoons soy sauce). Bean pancake (*Pindae tok*, with 50 gm soy bean sprouts and 4 tablespoons soy sauce).

Each recipe is accompanied by a large color photo. About the author: She is a publisher, artist, and wife of Edward B. Adams, Headmaster of Seoul International School. She has developed a keen interest in Korean cooking, and has chosen here the simple dishes that are most popular among foreigners. She was educated in California, where she married. A color photo shows Shim Chung-shil. Address: Founder, Seoul International Publishing House.

1072. Shurtleff, William; Aoyagi, Akiko. 1984. Soymilk industry and market: Worldwide and country-by-country analysis. 2 vols. Lafayette, California: Soyfoods Center. Vol. 1, 199 p. Vol. 2, 100 p. Feb. 28 cm. [165 ref]
• ***Summary:*** A comprehensive overview, worldwide, with extensive historical information. The first study of its type, with many statistics, graphs, and tables. Volume 1 is the market study, and Volume 2 is black-and-white copies of soymilk labels and other graphics.

Contents: 1. Introduction. 2. Directory of soymilk manufacturers and related companies worldwide. 3. Definitions and varieties of soymilk. 4. Overview of world soymilk industry and market, and future outlook. 5. United States soymilk industry and market. 6. Japan. 7. Korea. 8. China. 9. Taiwan. 10. Hong Kong. 11. Singapore and Malaysia. 12. Southeast and South Asia: (13. Vietnam. 14. Thailand. 15. Philippines. 16. Indonesia. 17. India. 18. Sri Lanka). 19. Europe (Incl. Plamil Foods in England, Tetra Pak Group in Sweden, Alfa-Laval and John Wilson in Sweden,

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Danish Turnkey Dairies–DTD and Soya Technology Systems (STS), Alpro / Vandemoortele in Belgium, Nestle, F. de Selliers in Belgium, Dansk Sojakagefabrik in Denmark, Lima Andiran in France, Galactina in Belp, Switzerland, and Semper A.B. in Sweden).

20. Latin America. 21. Africa. 22. History of Vitasoy in Hong Kong. 23. Two modern soymilk manufacturing processes: Marusan and Alfa-Laval. 24. Etymology of the word "soymilk" worldwide. 25. Analysis of ingredients in 49 popular Japanese soymilk products. 26. Bibliography. 27. About the Soyfoods Center. A table on p. 12 gives an overview of world soymilk production in 1983 ranked in descending order of annual per capita consumption. These statistics do not include China (PRC) or soy-based infant formulas, usually made from soy protein isolate. 1. Taiwan, 210 million liters, 11.1 liters / capita, growing at 30% per year. 2. Hong Kong, 39.1 million liters, 7.5 liters / capita, growing at 10% per year. 3. Singapore, 11.2 million liters, 4.7 liters / capita, growing at 15% per year. 4. South Korea, 67.0 million liters, 1.60 liters / capita, growing at 60% per year. 5. Malaysia, 21.4 million liters, 1.53 liters / capita. 6. Japan, 131.8 million liters, 1,10 liters / capita, growing at 101% per year. 7. Thailand, 50.0 million liters, 1.00 liters / capita. 8. USA, 9.6 million liters, 0.04 liters / capita. Total world production: 548.3 million liters.

Page 36 gives an overview of the U.S. market for soy-based infant formulas and adult soymilk. Production of soy-based infant formulas (on a ready to serve basis) in 1983 was as follows: Ross Laboratories made 14,720,000 gallons of Isomil (i). Mead Johnson made 14,080,000 gallons of Prosobee. Loma Linda made 2,240,000 gallons of Soyalac. And Wyeth Labs made 960,000 gallons of Nursoy. Thus 32,000,000 gallons of soy-based infant formula were made in the USA in 1983.

Also in 1983, consumption of soymilk by adults in the USA was as follows: 1,743,000 gallons were made by specialized soymilk manufacturers in the USA (Loma Linda Soyagen 1,000,000 gallons; Worthington Soyamel 670,000 gallons, Miller's Soy (private label) 73,000 gallons). 690,000 gallons were imported (328,000 gallons of Vitasoy by Vitasoy USA, 254,000 gallons of Yeo's by YHS, 50,000 gallons of Edensoy by Eden Foods, 25,000 gallons of President by President, 25,000 gallons of Kibun by Kibun, 8,000 gallons of To-Neu by San-J International). 250,000 gallons were made fresh by tofu companies (45,000 gallons by Mighty Soy, 41,000 gallons by Victor Foods [Scarborough, Ontario, Canada], 39,000 gallons by Quong Hop & Co., 35,000 gallons by Wy Ky, and 90,000 gallons by others).

Yield. 1 ton of raw soybeans yields approximately 4,320 gallons of soymilk. Conversion: 3.785 liters = 1 gallon.

On page 56 is a table of "Large natural food distributors in the US" with the dollar figure being estimated annual sales in millions of dollars."

1. Rainbow Distributing (Denver, Colorado) $13.
2. Arrowhead Mills (Hereford, Texas) $12.
3. Eden Foods (Clinton, Michigan) $10.
4. Rock Island Foods (Ignacio, California) $10.
5. Westbrae Natural Foods (Emeryville, California) $9.
6. Pacific Rim (Seattle, Washington) $7.
7. Cornucopia Natural Foods (Coventry, Rhode Island) $7.

Total estimated sales for the top 7 distributors: $68 million a year.

Note: This book was favorably reviewed by: (1) Andrew C. Peng, Professor, Food Processing and Technology, Dep. of Horticulture, The Ohio State University, Columbus, Ohio, in *Food Technology* Oct. 1984, p. 160. (2) Toyo Shinpo (Soyfoods News, in Japanese). 1984. Aug. 1. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1073. Shurtleff, William; Aoyagi, Akiko. 1984. K.S. Lo and the history of Vitasoy in Hong Kong and North America. (Continued–Document part V). In: Shurtleff and Aoyagi. 1984. Soymilk Industry and Market: Worldwide and Country by Country Analysis. Vol. 1. 177 p. See p. 130-153.

• ***Summary:*** Continued. An overview of HKSBP's market position in the early 1980s showed the following. By 1980 sales (by number of cartons or bottles) of the many and varied non-soy Vita products had passed sales of Vitasoy. Sales of Vitasoy were growing steadily, from 130 million Tetra Brik cartons and bottles (converted to 250-ml equivalents) in 1980 to 150 million in 1983, for a 5% compound annual growth rate in a mature market. In 1983 all products made by HKSBP's accounted for 35% of the Hong Kong Beverage market, second only to the Swire/Coca-Cola Company's products with 42%. Vitasoy, which had had no competition from brand-named soymilks since 1961, suddenly had to worry about competitors again. Nestle's Bonus (launched in 1978), President's soymilk (launched in 1980), and Coca-Cola's Hi-C soymilk (launched June 1982) took away some of Vitasoy's market monopoly. Yet in 1983, according to Hong Kong Beverage Association statistics, Vitasoy had a commanding 96% of the fast-paced Hong Kong soymilk market, versus only 4% for Hi-C. Bonus and President had insignificant shares. Hong Kong had the world's second highest per capita consumption of soymilk (after Taiwan), about 8.2 liters a year. In 1983 Vitasoy was given a new slogan which proclaimed: "Taste the Feeling."

In 1980-81 Vitasoy prices in Hong Kong dollars were as follows: Bottles, 60 cents for 7 oz. and 80 cents for 10 oz. of plain Vitasoy and 80 cents for 8 oz. of malted Vitasoy; Tetra Brik (250 ml or 8.45 oz.), 90 cents for plain and $1.00 for malted. Ingredients in the plain (sweetened) Vitasoy sold in Hong Kong were water, soybean solids, soy oil, cane sugar (5.5%), and salt, plus vitamins A, B-1, B-2, and niacinimide [niacinamide]. The exported Vitasoy contained no added vitamins. A typical 250-ml carton of Vitasoy for export

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contained 100 calories, 16 grams (6.1%) carbohydrates, 5 grams (2.0%) protein, and 3 grams (1.1%) soy oil. In 1981 the company had sold more Vitasoy in bottles than in Tetra Pack, but sales of the latter had increased by 50% a year since 1978. In 1983 sales in Tetra Pak led bottles 6 to 4.

For HKSBP China represented the great untapped market of the future, but also the great unknown. In 1983 HKSBP made two small but important new moves into China, building on experience from the Kwong Ming Dairy Farm. First, the company began to export Vitasoy to China's new Special Economic Zones. And second, they worked with the Chinese on a venture in Shanghai called Jing Jiang United Food Processing Co. Ltd. Initially HKSBP worked as a technical consultant on the project, but negotiations were underway for a joint venture. In August 1983 the plant's first product, Vita orange drink, was produced for a national sports meet. It is hoped that soymilk, perhaps called Vitasoy, will be the company's next product.

Vitasoy in North America. Vitasoy was the first Asian soymilk to be imported to North America. This venture was pioneered by K.S. Lo's two entrepreneurial daughters, Yvonne and Irene. Yvonne, who actually ran the operation, had graduated from a Canadian university then worked for 6 years as a city planner in Toronto, before realizing that her heart was really in business and marketing. In January 1979 Yvonne and Irene incorporated The Soya Bean Products Co., N.A. Inc. (SBPC) as a marketing company for HKSBP's products in North America. They opened headquarters that month on Bush Street in San Francisco, then began immediately to market and distribute plain and malted Vitasoy in Canada, in 8.4-oz. (250-ml) Tetra Brik cartons. In February 1981 they introduced the same products to the USA, immediately after the FDA lifted its ban on Tetra Pak (because of a disproven concern over hydrogen peroxide residues from sterilization). By 1982 some 3.2 million cartons of Vitasoy a year were being sold in the US and Canada.

The venture was so successful that in April 1982, to raise capital and facilitate long-term operations with Hong Kong, Yvonne and Irene sold their company to HKSBP, which renamed the US affiliate Vitasoy USA, Inc. The parent company now took a serious interest in the US market. In 1983 sales of Vitasoy increased to 5 million cartons, up a whopping 60% from the previous year. The 1983 figure equaled 328,125 gallons or 1.24 million liters. An estimated 90% of this soymilk was sold to the Oriental market; of this, 80% was sold to Chinese, and the rest to Vietnamese, Filipinos, and other ethnic groups. Roughly 45% of all Vitasoy was sold in the three western coastal states. Vitasoy distributed its own products in the San Francisco Bay Area (the single area of greatest sales), northern California, Oregon, and Washington [state]. Other companies, appointed by Vitasoy, sold the product in southern California, and elsewhere in the US and Canada, in 10 market areas designated as having a high concentration of Oriental Americans.

In 1983 Vitasoy was by far America's leading imported soymilk, accounting for just under 50% of total soymilk imports. Heady with success, Vitasoy USA announced in late 1983 that it would launch two American-style products in March 1984 at the big natural foods trade show in Anaheim, California. These would be called Vitasoy Original and Vitasoy Coconut. Each would bear the subtitle: "Natural Soy Drink, Sweetened with Maple Syrup." They would be marketed to the natural and health food trades as a healthful and nutritious beverage, under the slogan "Taste the Goodness." Marketing to mainstream consumers was also planned. Prices in the two markets were expected to be $0.65 and $0.55 respectively (maple syrup was a major part of the product cost), as compared with $0.35 for Vitasoy with a higher water content, sweetened with sugar, sold in the Asian-American market.

In developing these products Vitasoy USA did extensive and thorough, original research on American attitudes to and taste preferences for soymilk. Working with American marketing and product development professionals, they ran "focus group" and "intercept" studies. In September 1982 Yvonne Lo and Hilton Tsui issued a 59-page in-house report titled Market Study of Soymilk Beverage, packed with original information, plus an overview of the US beverage industry and a marketing plan.

Most important, the company announced in late 1983 (after an unsuccessful attempt to acquire majority ownership of the New England Soy Dairy) that it had purchased land in Brisbane, California (just south of San Francisco) and had signed a contract to build a large soymilk plant there. This plant, scheduled to open in 1985, would clearly introduce a new stage in the history of soymilk in America, for HKSBP would be the first major Asian soymilk manufacturer to start a plant in the West.

The Present and Future. The year 1984 saw the Hong Kong Soya Bean Products Co., Ltd. as the world's third largest manufacturer of soymilk (after Kibun in Japan and Chung's Food in Korea), and one of the largest exporters. The tiny size of the Hong Kong market (only 5.2 million people, compared with 120 million in Japan and 42 million in Korea) had been a major factor limiting the company's growth. But now HKSBP was poised on the edge of an era of great potential growth in a world market. The challenges of internationalization, diversification, public versus family ownership, exports versus local manufacture, marketing Asian products in the West, company name changes with diversification, etc. all bear striking resemblance to those faced by Kikkoman, as discussed in Chapter 79 of our book *History of Soybeans and Soyfoods.* We expect that HKSBP, though much smaller than Kikkoman, will follow many of the same patterns; hopefully it will be as successful as Kikkoman has been.

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The relatively small Hong Kong market will play a smaller and smaller role in the company's future. The greatest potential for growth may well lie in China. Efforts to introduce Vitasoy into school lunch programs in Third World countries and to help such countries make better use of domestic soybeans for human nutrition could bear great fruit in countries such as Mexico, India, Argentina, Brazil, Paraguay, and Indonesia. In these areas, domestic joint-venture plants probably hold greater promise than imports, since they help rather than hurt foreign exchange balances.

A table shows HKSBP growth pattern from 1941-1983 every 5 years with paid up capital, sales in bottles/packs. and sales in dollars.

A graph shows "Sales of Vitasoy" from 1945-1983 in million bottles and packs sold. Sales fell substantially from 1972-1975 but rose dramatically thereafter. A table shows "Sales of Vitasoy: Millions of bottles or packs (250 ml equivalents), 1970-1983.

Note: Three updates:

1990 Aug. 31–Vitasoy acquires Nasoya Foods (Leominster, Massachusetts).

1990 Sept. 24–Company name changed to Vitasoy International Holdings from Hong Kong Soya Bean Products Co. Ltd.

1993 May 27–Vitasoy acquires Azumaya Inc. (South San Francisco, California). Azumaya (Originally Azumaya Tofu Seizo-sho) had been making tofu in San Francisco since at least 1930. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1074. Shurtleff, William; Aoyagi, Akiko. 1984. South Korea: Soymilk industry and market (Document part). In: Shurtleff and Aoyagi. 1984. Soymilk Industry and Market: Worldwide and Country by Country Analysis. Vol. 1. 177 p. See p. 81-83.

• ***Summary:*** Historical: Like China and Japan, Korea was not traditionally a dairying country, and cow's milk did not begin to be fairly widely consumed until about the 1960s. It is not known when soymilk (*kongkuk*) was introduced to Korea, but it was probably brought from China at least several hundred years ago, and perhaps more than 1,000 years ago. Wang (1978) reported that soymilk is mainly prepared on a household scale during the hot months and consumed directly or with cooked noodles. Sometimes ground roasted sesame seeds may be added to flavor and nutritionally fortify the soymilk.

Large scale production of soymilk in South Korea began in October 1973, when Dr. Chung's Foods Co. Ltd. started to make Vegimil bottled soymilk in Seoul; in 1981 their output was estimated at 432 metric tons. In 1979 Dong Bang Oil and Flour Mills, the biggest oilseed crusher in Korea, established a subsidiary, Green Milk Co., in Seoul, to make Green Milk brand soymilk. In 1981 they made an estimated 3,000 tons of soymilk in four flavors, packaged in cartons. Alfa-Laval provided a UHT soymilk system to Dong bang. In October 1982 Seo Ju Industry, which operates Seo Ju Mill, entered the soymilk market. Other entrance dates are shown in Table 1 below. Most of the soymilk in Korea was sold in Tetra Brik cartons.

As of late 1983, Korea's soymilk industry was growing at an estimated 60% a year, making it one of the country's fastest growing food industries, and one of the world's fastest growing soymilk industries.

Major Soymilk Manufacturers and Their Market Share. As of late 1983 there were seven major soymilk manufacturers in Korea. They were allocated soybeans by the National Agricultural Cooperative Federation. Their 1983 allocation and the amount of soymilk made (1 kg of soybeans yields 6 kg of soymilk) is shown in Table 1 below:

In 1983 South Korea had a population of about 42 million. Therefore that year the per capita consumption of soymilk in Korea was about 1,595 ml a year or 9.4 cartons of 180 ml each. One rough index of the growth of soymilk consumption Korea is found in the number of Tetra Brik cartons used for soymilk, as shown in Table 2 below. We can convert this into an approximate volume figure by assuming that each pack is 180 ml. It is not known what percentage of all soymilk was sold in Tetra Brik cartons, but quite a lot was. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1075. Tsumura, Takashi; Tsuruta, Shizuka; Inoue, Mamehiko. 1984. Kenko-shoku tôfu [Tofu, the health food]. Tokyo: Nobunkyo (Nosan Gyoson Bunka Kyokai). 236 p. Illust. No index. 19 cm. Tezukuri Nihonshoku Shirizu (Handmade Japanese Foods Series). [27 ref. Jap]

• ***Summary:*** The third author, Mr. Inoue, opened his tofu shop in 1981 and is making tofu coagulated with natural nigari. The second author, Ms. Tsuruta, translated *The Farm Vegetarian Cookbook* into Japanese. This book is not vegetarian.

Contents: Part I. Japanese tofu cookery. Chinese and Korean tofu cookery. Futuristic tofu cookery. Part II. The real face of tofu. How tofu is made. How to make tofu by yourself. History of Japanese and Chinese tofu. Part III. One statement from a tofu maker. Aiming for traditional tofu production.

This book contains numerous old illustrations (line drawings) of tofu in Japan. Page 208 shows a tofu vendor carrying two tubs of tofu at the ends of a shoulder pole (*tenbin*). He is wearing a straw hat, Japanese kimono, and high wooden clogs (*geta*). It is from the book "Illustrated Edo Period Food Life Dictionary" (*Zusetsu Edo Jidai Shoku Seikatsu Jiten*), compiled by the Society for the Study of the History of Japanese Customs (*Nihon Fuzoku Shigaku-kai*).

Page 209 shows the interior of a tofu shop from the Edo period. It adjoins the family home. A woman with a child on her back is grinding the soybeans in a hand-turned stone

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| Company | Year Started | Soybean Allocation Metric Tons | Soymilk Production Metric Tons | Peak* Sales | Market Share | Brand |
|---|---|---|---|---|---|---|
| Chung's Food | 1973 | 8,400 | 46,373 | 1,000 | 69.2% | Vegimil |
| Dong Bang | 1979 | 3,000 | 5,253 | 170 | 7.8% | Green Milk Hae Pyo DooYoo |
| Seo Ju | 1982 | ** | 4,800est | 130 | 7.2% | Seo Ju Mill |
| Lotte Chilsung | 1983 May | 1,400 | 3,830 | 130 | 5.7% | Lotte Doo Yoo |
| Dong A | 1983 March | 1,000 | 4,067 | 130 | 6.1% | Sun Dew |
| Dae Won | 1982 Aug. | 200 | 1,400 | 20 | 2.1% | Eggmil |
| Kwang Ju | 1982 May | 170 | 1,272 | 20 | 1.9% | Supermil |
| | Total | 14,270 | 66,995 | 1,600 | 100% | |

* Thousands of 180 ml containers sold during the peak summer month. Estimated by American Soybean Association (ASA), Seoul

** Seo Ju uses soy protein concentrate to make their soymilk. Amount used and amount of soymilk produced are unknown.

Note: Dong Bang's peak sales' column includes soymilk sold in bulk for soymilk ice cream manufacture. This represents about 30% of the total, but has been converted to 180-ml containers equivalent.

Source. Kyung Lee, Director ASA/Korea, personal communication 23 Nov. 1983.

| Year | Million Cartons | Million Liters | Metric Tons |
|---|---|---|---|
| 1979 | 5.2 | 0.94 | 940 |
| 1980 | 16.8 | 3.02 | 3,020 |
| 1981 | 36.2 | 6.52 | 6,520 |
| 1982 | 33.0 | 5.94 | 5,940 |

Source: Brik Pak, Personal Communications, 1983, 1984

It is not clear why these figure are about 1/10 of what we would expect them to be, nor why the small downturn in 1982.

mill. A man is sitting on the end of a lever press, pressing the soymilk out of the okara. It is from the book "Illustrations of Edo Period Occupations" (*Edo Shobai Zue*), illustrated by Kazuma MITANI.

Page 210 shows a tofu makers wife cutting tofu above a cooling tank. It is from a book on Japanese occupations (*Shokunin Zokushi Hokkugo*), with illustrations by Yui Nashimoto. Address: 1. Freelance writer; 2. Author, vegetarian cooking specialist, co-owner of a natural foods restaurant, and translator of the Farm Vegetarian Cookbook; 3. Owner of tofu shop Shonan Mamehiko in Shonan, Kanagawa-ken.

1076. Sterner, Mark H. 1984. More on work with Meals for Millions Foundation, 1966-1973 (Interview). Conducted by William Shurtleff of Soyfoods Center, March 13. 2 p. typed transcript.

• ***Summary:*** A major change in Meals for Millions took place on 14 Sept. 1964 when Florence Rose was replaced by Jerry Miller as executive director. In about 1965 the

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new officers at MFM began to lay plans for a new building. Clifford Clinton provided moral support from the wings. Funds for the Santa Monica building came from Morris Asimow, PhD (who was president of MFM at the time) and Jerry Miller; they co-signed a note with a Santa Monica bank, which was later converted to a mortgage. The mortgage was paid off over the years by contributions to MFM during Sterner's period there. There were no land grants. Construction started in 1965 and MFM moved into the new building in April 1966. They wanted a building of their own located outside of Los Angeles where they could have a pilot plant and offices.

In India, the original MPF-type food was developed at Mysore based on peanut meal and Bengal gram. It was later manufactured by Gopi Agarwal and his brothers in J.B. Protein Food Industries. They had a peanut pressing operation in northeast India. They started making it in about 1965 and called it Multi-Purpose Food; it did not contain soy. MFM, instead of sending MPF from the United States, sent money to India to help pay for distribution.

Bob Nave and SPRA of the Methodist Mission, sometime after that, put in a soy extrusion operation. At a later date, just before Mark left MFM, there was an effort with Nave to produce second generation foods. Nave's mission had received MPF from the USA then bought it from the Agarwals. Then Nave got an extruder and started to make a similar product. So MPF sparked Nave's interest; eventually he went into second generation foods. Also, someone in the south of India made a little MPF using peanut meal, but no soy. Lots of peanuts were available, but aflatoxins were a problem.

MFM was more involved in image building than in truth; it was a big problem in the early days. Everyone wanted to embellish the story to help raise funds. For example, the early newsletters said that one meal of MPF cost only 3 cents. No! That was the cost to manufacture it in Los Angeles, not the cost when it arrived for a hungry person in Europe.

Adine Laugh was a promotion person, employed by MFM to promote the organization. When Mark arrived he worked a lot to bring truth back into the picture. Clifford Clinton was a very dedicated man, but there were several years in about 1963-64 when he was alienated from MFM. He got involved with a chiropractic doctor or healer [Dr. Omar Fareed] who sort of mesmerized him. That doctor was flamboyant and lived in Beverly Hills. He threatened to take over MFM but the board would not allow it. Clinton resigned, but soon returned. After Clifford Clinton died, his wife and son were on the board.

The original MPF was based on uncooked soy grits, but early on it became available in both soy flour and soy grit form. This lasted until the 1970s, whereafter it was based entirely on toasted soy grits. Note: General Mills, Inc. began to make Multi-Purpose Food in Dec. 1959; it was based on toasted soy grits.

Mark visited the United Rescue Mission (URM) in Taiwan; they helped care for refugees from mainland China. They may well have received MPF.

In 1966 Mark was hired by MFM (not as new program head) to develop the protein food technologies that would use indigenous third world ingredients and to develop a technology transfer curriculum. That led to a more professional reputation for MFM. Mark worked in that position from 1966 to 1972, when he went to Korea. During that time, Jerry Miller was executive director, followed by Irvin Saunders, a retired colonel, followed by Mark.

In about 1973 USAID in Washington, DC, began to give MFM $1.3 million a year. Some of this money was earmarked for building a workshop, and for enlarging labs and classroom facilities and the program itself.

This month the Korean MFM project [based on extrusion cooking] is being turned over to a Korean MFM foundation to be funded by Koreans for work in Korea. When Mark was director of technology transfer, soymilk equipment was donated by Sam Tubin. A Chinese banker in Los Angeles wanted to set up a soymilk plant there. In 1967-68 he set it up to make soymilk to be bottled in soda pop bottles. He never got it off the ground, although he had all the equipment–which lay around unused for a year or so. Sam Tubin bought the equipment to produce a beverage from fish meal using the Viobin process for making fish meal. That didn't work out, so Sam donated the equipment, worth $250,000 to MFM.

While Mark was in Korea he made connections with the Sam Young Co., a large manufacturer or ramen (instant noodles). They wanted to start making soymilk, so Mark installed MFM's soymilk equipment at their plant outside Seoul and they paid MFM for it in installments in Korean money. Using that money, MFM set up a program in Korea with an in-country director. And they set up an extruder and project in Wanju funded by payments from the soymilk plant.

The soymilk plant began operating in about 1973. They did it in a big way, made 5,000 bottles a day, and soon expanded the plant. Mark thinks the soymilk product was named Super-D; it came in plain (sweetened) and chocolate flavors. MFM's Korean project became self-supporting when one province took on the program to provide infant and weaning foods, as well as commercial foods that were sold. On 20 March 1984 (in about a week) the project will be officially turned over to the Koreans. MFM has been putting a little money into the project. The extrusion project is also very alive. Now the provincial government is trying to persuade other provincial governments to build their own LEC (low cost extrusion cooker) plants.

Starting in about 1966, at the Santa Monica center they used to demonstrate all the state of the art methods of making soymilk including hot grind, whole raw bean, using soy protein isolates, etc. Mark does not know if any of that

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work took hold and was applied anywhere. It was all pretty academic. The tuition of most students was paid by MFM or by a commercial company.

MPF was an important, pioneering idea and food. History is partly the result of huge, impersonal forces, and partly the work of particular remarkable men and women, who are often pioneers. They have a vision and an idea and are willing to take a risk and to work hard to manifest that idea.

A good historian should be able to trace great movements and ideas back to the men and women whose ideas and vision started them, and then to give them life and to give them credit for what they have seen and done. Clifford Clinton was clearly one such man. Address: Former director, Meals for Millions Foundation.

1077. Gotoh, K. 1984. Historical review of soybean cultivation in Japan. *Tropical Agriculture Research Series* No. 17. p. 135-42. March. International Symposium on Soybean in the Tropics and Subtropics. [24 ref. Eng]

• ***Summary:*** Contents: Abstract. Before the Meiji era (-1866): Dissemination, instructions to farmers. Traditional cultivation (1867-1945): Characteristics of this period, special methods of cultivation. Scientific approaches (1946-1977): Characteristics of this period, genetic resources, cultivation practices recommended, physiological studies, planting density, differences between record yields and average yields. Recent situation (1978-): Take-off in yields, problems in the near future.

"The time when the soybean was introduced from the northern part of China to Japan is not precisely known. The earliest reference to soybean appeared in the Kojiki (completed in 712 AD) and Nihonsyoki [Nihonshoki] (in 720 AD). They referred also to rice, barley, Italian millet (*Setaria italica* Beauv.), Japanese millet (*Echinochloa frumentacea* Link), and adzuki beans (*Vigna angularis* (Willd.) Ohwi and Ohasi). Thus, it appears that soybeans were grown as one of the important crops in olden times."

Nagata (1959) proposed that soybeans first entered Japan in the northern part of the country, having been disseminated from Korea. Prior to that they had arrived in Korea from north China. "Nagata's assumption that soybean may have been introduced to the northern part of Japan seems plausible. In 1932 and 1933 at the Komoriyama ruins located in Senhata, Akita Prefecture, which date back to the Jyômon (Jômon) era (see Note) carbonized soybeans and hulled rice were found in an old house. The dating of this specimen of soybean was not performed since radio-carbon was not available at that time. As will be mentioned later, a large number of land races have been found in Tohoku, as a result of extensive surveys conducted in the early 1950s. Apart from the Nagata's hypothesis it is probable that soybeans may have been first introduced as an important medicinal herb and later as a food crop into the ports along the Japan Sea.

"Instructions to farmers: *Engishiki* (completed 927 AD) which described in detail the regulations on crop products (for example, exchange rates of soybeans with bundles of rice and barley for yearly tribute), stated that the Kinki, Chugoku, and Shikoku districts [all located in southwest Japan, from Kyoto in the northeast to just above Kyushu in the southwest] were the main soybean production areas, as shown in Fig. 1.

"*Seiryôki* (published around 1560) which is the oldest Japanese book of agronomy, identified two types of soybeans, namely summer and autumn types. *Aizu-nôsyo* (1684) and *Hyakusyô-denki* (around 1688) described in detail the characteristics of many cultivars, and various cultivation practices, namely ridging and intercropping with barley. *Nôgaku-zensyo* (1697) outlined the principles and practices of soybean management already widely applied, and mention was made of vegetable beans (Edamame) [green vegetable soybeans]. *Kôka-shunjyû* (1707) described special types of soybeans, such as boiled soybeans (Nimame). This book also described how to grow soybeans on dikes or levees between paddy fields. *Seikei-zusetsu* (1804) outlined the methods of soybean production as recent practices."

Note: According to Fairbank, Reischauer, and Craig's *East Asia: Tradition and Transformation* (1973, p. 327): "The earliest neolithic culture, named Jômon for its characteristic "cord-pattern" pottery, spread throughout Japan about 6,000 years ago. The Jômon people lived in sunken pit dwellings and subsisted by hunting, fishing, and gathering nuts, roots, and shellfish. They left behind extensive shell mounds and a wealth of pottery, unsurpassed in richness and imaginativeness of design by any other stone-age culture in the world." Note that they did not practice agriculture. In the third century B.C. Jômon culture was replaced by Yayoi culture in western Japan and by the end of the first century B.C. it had spread as far east as the Kantô plain. Address: Faculty of Agriculture, Hokkaido Univ., Nishi 9, Kita-ku, Sapporo, Japan.

1078. Hong, E.H.; Kim, S.D.; Hwang, Y.H. 1984. Production and use and research on soybeans in Korea. *Tropical Agriculture Research Series* No. 17. p. 81-93. March. International Symposium on Soybean in the Tropics and Subtropics.

• ***Summary:*** Abstract. Trends in soybean production: importance of soybeans, area planted, yield, production and import, regional distribution. Trends in supply and consumption: demand and supply, utilization. Methods of cultivation currently applied: cultural practices (planting time, land preparation and planting, fertilizer application, management, harvesting and processing, marketing and procurement, cropping patterns, competitive power), varieties and their distribution, major diseases and pests, problems in farm cultivation. Soybean research and

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extension service. Government participation in and support for soybean production. Future prospects of soybean production and main constraints. Discussion.

In Korea, soybeans rank third among all food grain crops, in both the area planted and in production, after rice and barley. Soybean "products such as soy paste [doenjang], soy sauce [kanjang], beancurd [tofu] and beansprouts are the primary side dishes in conventional daily Korean meals." The area planted to soybeans has steadily decreased from about 300,000 acres average in 1967-1971 to only 183,000 acres in 1982.

Tables: (1) Area planted and production of major food crops in Korea. (2) Production, yield and import of soybeans by year in Korea. (3) Regional distribution of soybean production in Korea. (4) Demand and supply of soybeans in Korea. (5) Utilization of soybean in Korea. (6) Regional distribution of soybean planting times in Korea. (7) Results of sample investigation for the application of herbicides on soybean in Korea. (8) change of cropping systems in the central part of Korea. (9) Farm income derived from major summer crops in Korea. (10) Characteristics of main soybean varieties currently recommended and their geographical distribution in Korea. (11) Research institutions, location and number researchers related to soybeans in Korea. (12) Amounts, area planted, and production for every class of soybean seeds in Korea in 1982. (11) research institutions, location and number of researchers related to soybeans in Korea. (12) Amounts, area planted, and production for every class of soybean seeds in Korea in 1982. (13) The amount and purchasing prices of soybean by the government and the prices of imported soybeans by year in Korea. Figures: (1) Marketing channels for soybean in Korea. (2) Flow chart of soybean research and extension services in Korea. Address: Crop Exp. Station, Office of Rural Development, Suwon 170, South Korea.

1079. Lee, Jung-Sook; Ko, Y.T.; Paik, J.K. 1984. [Studies on production of soy yogurt: Effects of defatted soy milk on the growth of *Lactobacillus acidophilus*]. *J. of the Korean Agricultural Chemical Society* 27(1):7-13. March. [20 ref. Kor; eng]

• ***Summary:*** Soymilk was made with soy flour, then fermented with *Lactobacillus acidophilus* to make a soy yoghurt. Addition of glucose and fructose greatly enhanced acid production by *L. acidophilus*, the optimum concentration of the 2 sugars in the medium being about 3% each. Among the growth stimulating agents tested, yeast extract stimulated acid production, the optimum concentration being about 0.5%. L-Methionine reduced acid production by *L. acidophilus*, while dried whey, and nonfat dried milk, and protein concentration had no significant effect on its growth or acid production. Address: Dep. of Foods and Nutrition, Duksung Women's College and Lotte-Chil Sung Beverage Co., Ltd. Both: Seoul, South Korea.

1080. Meals for Millions / Freedom from Hunger Foundation. 1984. Annual report 1983: Self-help for a hungry world. Davis, California: MFM / FFH Foundation. 16 p. 21.5 x 9.5 cm.

• ***Summary:*** Peter J. Davies is President. Philip E. Barton is chairperson, board of trustees. On the brownish-red, black and white cover is a photo of a mother smiling at her child. MFM's logo of a plant growing in an upturned bowl is on the front cover.

There is a 1-page message from Barton and a 2-page message from Davies. The latter notes: "In 1983 your foundation started two new Applied Nutrition Programs in Sierra Leone and Kenya."

"A milestone was achieved when our staff moved into our new International Center at Davis last March. And we were especially excited to receive a magnificent check for $225,000 from the Kresge Foundation in April; full payment of their challenge grant." Meals for Millions philosophy. MFM has "Applied Nutrition Programs" (ANPs) in Ecuador, Honduras, Sierra Leone, Kenya, Korea, Thailand, Antigua, U.S. Southwest, Papago Applied Nutrition Program (on the Papago Indian Reservation near Tucson, Arizona). Solutions through appropriate technology.

"Korea: At the end of 1983 MFM phased out its direct participation, turning over its programs to an independent local body;... MFM began to work in Korea just after the Korean War, helping a company to produce a high protein soy beverage for schoolchildren. In 1976 we began an Applied Nutrition Program in Wonseong County, which has grown tremendously."

Thailand: "Last July the men, women and children in 53 villages and 29 schools began planting the 753 kilograms of soybeans distributed by MFM. Villages which were previously quiet and listless, 'seem to have come alive.'"

Total income: $1.894 million. Address: P.O. Box 2000, Davis, California 95617. Phone: (916) 758-6200.

1081. Mogi, Ken. 1984. The history of shoyu (soy sauce) brewing in the United States. The story of the Oriental Show-You Company. San Francisco, California: Kikkoman. 3 p. March. Unpublished manuscript. Combined with a subsequent interview of Ken Mogi by W. Shurtleff on 20 April 1984.

• ***Summary:*** "Early in this century, Mr. Shinzaburo Mogi, one of the Mogi family's ancestors, tried to make shoyu in America. Mr. Mogi was born in 1872 and later came to America in about 1892. He studied at college in Maryland but had an eye problem so he gave up studying and returned to Japan. In 1904, the year his daughter Katsuko was born, he was in Toronto selling Japanese bicycles, involved in a trading business unconnected to Kikkoman. According to the memory of Mr. Tsuneo Tanba, who worked with Mr. Mogi very closely (and later told his story to Morio Ichiyama,

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Kikkoman historian), Mr. Mogi managed a shoyu plant in Denver, Colorado, in 1907; it was not successful. Later, he had some contact with a shoyu project in Toronto, Ontario, Canada. Though I traveled to Denver, I could not get any information on this."

Note: On 7 Feb. 2005 Ken Mogi wrote William Shurtleff at Soyfoods Center (in response to some questions about the existence of the Denver soy sauce plant): "I talked with Komiya. Mr. Shinzaburo Mogi had the New Testament reading meeting with 5-6 people during lunch break when Mr. S. Mogi was living in Noda [Japan] during World War II. Mr. Komiya told me that he remembered that Mr. S. Mogi mentioned the Denver story." However Ken Mogi is does not know (1) if S. Mogi ever wrote anything about a soy sauce plant in Denver, (2) when and where S. Mogi told this story to Mr. Tanba, and (3) when and where Mr. Tanba told Mr. Ichiyama about S. Mogi's supposed soy sauce plant in Denver. Ken Mogi encloses a photo of Mr. Shinzaburo Mogi at about age 30.

Mr. Mogi's daughter, Mrs. Katsuko Yoshida, who is living in Tokyo, does not remember anything about Denver or her father starting a soy sauce plant in Denver. However she did tell me the story about "Oriental Shoyu" in Indiana.

Katsuko lived in Chicago with her parents in the 1920's (maybe 1920-1926). Mr. Mogi worked for Yamato Shokai, selling Japanese silks. They found the product "Oriental Shoyu" in the market and were very much impressed. They visited the plant in Indiana and later Mr. Mogi became a stockholder in that company.

Mr. Esta Keirn started employment with the Oriental Show-You Co. on 28 Oct. 1932 as a [mung] bean sprout washer. He continued until 1 Nov. 1961, when the company was sold to Beatrice Foods Inc. and turned over to La Choy Food Products. Mr. Keirn worked for La Choy for 8 years. He never met Mr. Mogi but he heard several things about him from Mr. Ohki.

Shinzo Ohki, the founder of the company and one of 8 children, was born in 1884 in Kamakura, Japan. He immigrated to the USA in 1901, landing in Seattle, Washington. Eventually he ended up in Columbia City, Indiana, where he graduated from high school. He then graduated from college in New York City. Upon graduation he started in business as a tea merchant in Detroit. To expand his line, he imported soy sauce in small wooden kegs from Japan. This he bottled and sold along with his tea. He could not expand his tea business but the soy sauce business kept growing.

Wishing to expand by adding other products to his line, he returned to Columbia City, took in a partner to gain capital, and set up in a vacant canning plant (Vance Canning Co.). This is when he incorporated and took the name of Oriental Show-You Company, Inc. Then, in 1917, Mr. Ohki went to Japan to obtain the formula (and also a wife) and some instruction in making soy sauce so he could manufacture his own. Upon coming back to Columbia City, Indiana, he enlisted the help of someone from the USDA to work out the koji culture. Fermentation was set up in large wooden beer vats. Equal parts soybeans, wheat, and salt were aged for 24 months, then pressed and bottled. According to Mr. Keirn, the company produced as much as 30,000 gallons of shoyu in one year. The plant in Columbia City was vacant for some time and now most of it has been torn down, but the adjacent adobe and brick buildings are still standing.

Note 1. Much of this story was published in the Japanese-language newspaper *Rocky Mountain Jiho* (Denver, Colorado), 25 Jan. 1984. p. 4.

Kenzaburo's great grandfather was the first president of Noda Shoyu K.K. (today's Kikkoman). Shinzaburo Mogi was the latter's brother.

Note 2. The story was also written by Marilee Kreps in about 1984 under the title "Shoyu pride: Columbia City's soy sauce factory one of many in the United States." The name of the newspaper, which was published in Columbia City, Indiana, is now known–nor is the date or page. It states: "Until 1962 the company, located on Factory Avenue, was a thriving business in this town, and contrary to what some believe, it was [named] the 'Shoyu Company,' not the 'Show-You Company.'" The Oriental Shoyu Company was established in 1917 by Shinzo Ohki in Columbia City. The factory was closed in 1961.

Note 3. On 7 Feb. 2005 Kenzaburo Mogi IV of Kikkoman, Japan, sent William Shurtleff a hand-drawn map showing the location of the four buildings that were part of the Oriental Show-You Company in Columbia City, Indiana. They were located between the railroad track and Factory Avenue, near Line street. These photos show: (1) The office building. (2) The printing and boiler shop building. (3) The remains of the soy sauce plant, with hand-drawn arrows pointing the areas on the cement floor used for the moromi tank, koji making, and pressing. (4) Close-up of the cement base of the moromi tank. (5) Close-up of the space on the cement floor, between the moromi tank and outside wall, where the heater was. (6) Close-up of the area used for pressing (*assaku*) the soy sauce from the moromi. (7) Mr. Esta Keirn standing in a grassy field in front of the chow mein building, which once shared a wall with the soy sauce plant. (8) Granite tombstone of the founder, Shinzo Ohki (1883-1967) and his wife, Taka (1889-1963). (9) Mr. Esta Keirn. Address: Kikkoman Marketing and Planning Inc., P.O. Box 784, San Francisco, California 94101.

1082. Ontario Soya-Bean Growers' Marketing Board. ed. 1984. Ontario Soybean Symposium. Ontario soybeans...a journey into the next century (Proceedings). Chatham, Ontario, Canada: OSGMB. 319 p. Held 18-20 March 1984 at Toronto, Ontario, Canada. No index. 29 cm. [3 ref. Eng]
• ***Summary:*** Contains 30 papers by various authors; most are cited separately. Address: Chatham, ONT, Canada. Phone:

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(519) 352-7730.

1083. Suzuki, Steven. 1984. Pacific Rim potential for edible soybeans. In: Ontario Soya-Bean Growers' Marketing Board. ed. 1984. Ontario Soybean Symposium. Chatham, Ontario, Canada: OSGMB. 319 p. See p. 224-41.
• ***Summary:*** Soybeans were first exported from Canada about 12 years ago when a Japanese house approached the Ontario Soybean Grower's Marketing Board for a trial shipment to Japan. The trial worked out very well and in a short time Ontario's soybean exports became a multi-million dollar business. Ontario soybeans are very clean, the quality is comparable to Japanese and Chinese soybeans, and the supply is consistent. However the price is high in relation to Chinese and U.S. soybeans. As a result, Ontario soybeans are sold in high-priced markets, as for making premium quality miso or soyamilk. The supply of Chinese soybeans is irregular. Address: Manager, Grain Trading Section, Okura & Co. America Ltd., New York, NY.

1084. *Tropical Agriculture Research Series.* 1984. General discussion: H.E. Kauffman, chair. No. 17. p. 162-66. International Symposium on Soybean in the Tropics and Subtropics.
• ***Summary:*** Participants in this discussion include: Bhatnagar, Sumarno, Trikha, Sadikin, Rahman, Galal, Al Jibouri, Lampang, Shanmugasundaram. Gotoh. Address: INTSOY.

1085. Wang, Hwa L. 1984. Tofu and tempeh as potential protein sources in the Western diet. *J. of the American Oil Chemists' Society* 61(3):528-34. March. [22 ref]
• ***Summary:*** Contents: Abstract (uses the word "soybean foods" several times). Introduction. Traditional soybean foods. Trends in market growth for tofu and tempeh (based on statistics gathered by Shurtleff & Aoyagi of The Soyfoods Center in California, 1983). Tofu. Tempeh.

Traditional soybean foods can be classified as either nonfermented or fermented. Tables show: (1) Oriental nonfermented soybean foods (gives food name, local names, description, uses): Fresh green soybeans (local names: mao-tou, edamame). Soybean sprouts (huang-tou-ya, daizu no moyashi). Soybean milk (tou-chiang). Protein-lipid film (tou-fu-pi, yuba). Soybean curd (tofu, tou-fu, tubu, tahoo, touhu, tau-foo, dou-fu, dau-fu). Soybean flour (tou-fen, kinako) (Wang 1983).

(2) Oriental fermented soybean foods (gives food name, local names, microorganisms used, substrate, nature of product): Soy sauce (local names: chiang-yu, shoyu, toyo, kanjang, ketjap, see-iu). Miso (chiang, doenjang, soybean paste). Hamanatto [fermented black soybeans] (tou-shih, tao-si, tao-tjo [sic]). Sufu (fu-ru, fu-ju, tou-fu-ju, bean cake, Chinese cheese). Tempeh (tempe kedelee). Natto.

(3) Tofu industry in the United States (No. of manufacturers and annual production in 1975, 1979, 1981, 1982, and 1983).

(4) Soybean solids and proteins in soybean soak water as affected by soaking conditions (temperature vs. time; Lowry protein / Lowry's protein). (5) Ratio of protein to oil content of tofu and soy milk as affected by protein content of soybeans (for different soybean varieties; the highest ratios come from the varieties Wase-Kogane, Vinton, Toyosuzu, and Coles).

Figures: (1) Flow diagram for the preparation of tofu. (2) Graph: In vitro digestibility of soybean milk as affected by the duration of boiling. Best digestibility is 12-14 minutes. (3) Four graphs: Relationship of concentration and type of coagulant to the yield of tofu. Coagulants are calcium sulfate, calcium chloride, magnesium sulfate, and magnesium chloride. The 4 graphs are: Gross weight of tofu. Moisture content. Total solids recovery. Nitrogen recovery. Calcium sulfate gives the highest values on all four graphs. (4) Four graphs: Relationship of concentration and type of coagulant to the texture characteristics of tofu. Same coagulants. The four graphs are: Hardness. Brittleness. Cohesiveness. Elasticity. (5) Flow diagram for tempeh fermentation. Address: Northern Regional Research Center, ARS, USDA, Peoria, Illinois 61604.

1086. Wernham, Les. 1984. Exports–Problems and opportunities [for Canadian soybeans]. In: Ontario Soya-Bean Growers' Marketing Board. ed. 1984. Ontario Soybean Symposium. Chatham, Ontario, Canada: OSGMB. 319 p. See p. 246-53.
• ***Summary:*** Soybean exports from Ontario have expanded dramatically during the past 10 years; in 1982 they reached a high of 132,000 tonnes worth $44 million. The East Asian market including Japan, Korea, Hong Kong, and Malaysia accounted for 81% of Ontario's export soybean sales in 1983, with an additional 8% going to Europe. The main buyers in 1982 were: Japan 47,414 tonnes, Netherlands 19,545 tonnes, Singapore 18,039 tonnes, Indonesia 16,652 tonnes, Hong Kong 15,234 tonnes.

Most of these soybeans are sold for human consumption. "For example, one of Sweden's foremost pharmaceutical manufacturers has in the past years been that country's largest single importer of Canadian soybeans. Taking about 3,000 tons annually, this company produced a patented intravenous nourishment called Intralipid." Tiny soybeans (5 mm diameter or less) are used to make bean sprouts and natto. For soybean exports, freight constitutes an average 21% of the net delivered cost to the buyer in his country. They are shipped in bagged or bulk (20 or 40 foot) containers. The main focus of breeding should be to develop varieties that do not carry a common bitterness or beany flavor. Address: Grain Manager, King Grain, Chatham, ONT, Canada.

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1087. Simpson, Rita J. 1984. Re: 1982 statistics on production of soybean-based products in Tetra Brik packages. Letter to William Shurtleff at Soyfoods Center, April 18. 1 p. Typed, with signature on letterhead.
• ***Summary:*** The products include plain and flavored soybean milk, plus tofu (million liters):

Japan 51.0
Hong Kong 15.0
Malaysia 11.5
Korea 7.0
Thailand 4.0
Singapore 2.5

"Our international office is aware of your need for the 1983 statistics and I will forward them when received." Address: Vice President, Information, Brik Pak Inc., P.O. Box 802605, Dallas, Texas 75380. Phone: 214 934-0338.

1088. *Soybean Update.* 1984. Korean meal demand strong. But oil needs improvement. May 28.
• ***Summary:*** "Korean imports of U.S. soybeans in 1984 are projected to reach 750,000 tonnes, up from 1983's 658,000 tonnes, says ASA's Kyung Lee, market development director for Korea.

"Meal usage in feed rations in 1983 reached a record level of 12.2 pct, helping to account for 1983's total meal usage of 714,000 tonnes. Feed demand will remain strong this year, says the country director.

"Soybean oil demand is the big problem area in Korea, says Lee. The demand for so oil continues to grow at a good rate–up to over 105,000 tonnes last year from only 29,000 in 1978–but soyoil consumption is still not growing as fast as meal usage." Address: American Soybean Assoc.

1089. Harvey, Gerald W. 1984. Market opportunities for U.S. soybean sales. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). May. p. 19-21.
• ***Summary:*** From $482 million in 1960, the value of U.S. soy exports rose to $7,900 million in calendar 1983 and is expected to surpass $8,000 million this year. Discusses the outlook for Mexico, Venezuela, Ecuador, Peru, Brazil, Argentina, Paraguay, Korea, China, Malaysia, Philippines, Indonesia, Burma, Thailand, Nigeria, USSR, Yugoslavia, Poland, and Romania. Address: Oilseeds and Products Div., Foreign Agricultural Service. Phone: 202-447-8809.

1090. Shurtleff, William; Aoyagi, Akiko. 1984. History of soy sauce, shoyu, and tamari. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 118 p. June 6. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** www.soyinfocenter.com/HSS/soy_sauce1.php

A comprehensive history of the subject. Contents: What is soy sauce? Etymology. World overview. Part I: History of soy sauce in China and Taiwan. Early Chinese soy sauces (shih-you and jiangyou). The 1800's. 1900-1948. 1949-1980's (People's Republic of China). Taiwan. Hong Kong. Part II: History of soy sauce in Southeast Asia and Korea. Dissemination and common characteristics. Association of Southeast Asian Nations (ASEAN)–general. Philippines (1912-). Thailand (1974-). Malaysia (1970-). Singapore. Indonesia. Vietnam. Korea. Part III: History of shoyu in Japan. Hishio (jiang), tamari, and other forerunners of shoyu (700-1600). The development of shoyu (1500-1700). Standardization of the shoyu formula (1716-1867). The rise of shoyu in Japan (1750-1867). Overview of origins. Shoyu during the Meiji period (1868-1911). Shoyu from 1912-1945. The postwar period and modern times (1945-1981). Part IV: History of soy sauce in Europe. Part V: History of soy sauce in Australasia and the Pacific. Part VI: History of soy sauce in the United States. Part VII: History of soy sauce in Latin America, Africa, the Indian Subcontinent, and the Middle East.

The period during World War I was one of consolidation for the shoyu industry. In 1914 three of the larger manufacturers at Choshi (Higeta, Jigamisa, and Kagidai) merged to become Choshi Shoyu Co. Ltd. In 1917 eight (later nine) major manufacturers in Noda, all related by descent or marriage, withdrew from the Noda cartel and joined to form a corporation, the Noda Shoyu Company, Ltd., which later became Kikkoman Inc. The company began operations on 1 January 1918, and quickly modernized its entire organization. In 1925 it restructured itself by amalgamating four related companies under the control of a holding company, thus greatly increasing its capital and scope. In 1918 Choshi Shoyu Co. changed from a limited partnership to a stock corporation and adopted a common trademark, Higeta. The Hamaguchi family, originally from Kishu, which ran Yamasa in Choshi, chose not to join the Choshi Shoyu Co. Rather, in 1928 they incorporated as the Yamasa Shoyu Co., Inc. Address: Lafayette, California. Phone: 415-283-2991.

1091. Yang, Cha-Bum; Park, S.K.; Yoon, S.K.; Park, H. 1984. [Changes of nitrogen compounds and nutritional evaluation of soybean sprout. VI. Changes in electrophoretic pattern of protein]. *J. of the Korean Agricultural Chemical Society* 27(2):129-34. June. [14 ref. Kor; eng]
• ***Summary:*** Changes in the protein composition of soy sprouts grown at 4 temperatures were investigated using polyacrylamide gel electrophoresis. 7S, 11S, and 2S globulins were identified in the cotyledon and the axis. High growing temperature accelerated decrease in protein in the cotyledons and increase in protein in the axis (especially 11S). Address: 1-2. Hanyang Univ.; 3. Dongduck Womans Univ.; 3. Seoul Korea Ginseng and Tobacco Research Inst.

1092. Yoo, Ji Chang; Lim, S.J.; Ko, Y.T. 1984. [Manufacture of yogurt from soy protein concentrate]. *Korean J. of Food Science and Technology* 16(2):143-48. June. [18 ref. Kor;

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eng]
• ***Summary:*** Soy milk (4.2% protein) was prepared from soy protein concentrate and various nutrients, inoculated with *Lactobacillus acidophilus,* and incubated at 37ºC for 24 hours. Growth of *L. acidophilus* was estimated from viable cell counts, titratable acidity, and pH. The growth curve obtained suggested that the log phase of growth (the phase of rapid logarithmic or exponential growth) ended after 6 hours and the stationary phase (when the number of microorganisms remains constant) after 30 hours. Addition of glucose and fructose greatly enhanced acid production by *L. acidophilus.* Optimum concentration of these sugars was approximately 3%. Yeast extract greatly stimulated acid production, optimum concentration being about 0.5%. A higher concentration of soy protein concentrate resulted in a slightly higher acidity in soy yoghurt. Address: Dep. of Foods & Nutrition, Duksung Women's College, Seoul, South Korea.

1093. Freckmann, James K. 1984. Korea: Surge in vegoil use favors U.S. soybean sales. *Foreign Agriculture* (*USDA Foreign Agricultural Service*). July. p. 21.
• ***Summary:*** Korea's vegetable oil consumption has been increasing 10 to 15% a year ever since 1975, largely led by soybean and palm oil. The U.S. supplies virtually all of Korea's imported soybeans. Address: Agricultural Counselor, Seoul.

1094. **Product Name:** Tofu Blend Dressing [Blue Cheese, Creamy Ranch, Creamy Italian, or Thousand Island].
**Manufacturer's Name:** Eastern Foods Corp.
**Manufacturer's Address:** 3225 E. Hennepin Ave., Minneapolis, MN 55413.
**Date of Introduction:** 1984 August.
**Wt/Vol., Packaging, Price:** 12 oz plastic cup.
**How Stored:** Refrigerated.
**New Product–Documentation:** Regulatory Letter from FDA. 1984. Aug. 27. Labels (lids) shown in color brochure titled "Eastern Foods." "Naturally Low Calorie. ½ the calories of regular dressing. Stir before using." Talk with Mr. Lee. 1987. Nov. 11. This product had excellent taste and 6 week shelf life. Discontinued because of shelf life problems. The products were made at his plant.

1095. Finley, David; Goldberg, Ray. 1984. Kikkoman Corporation. Unpublished Harvard Business School Report. 33 p. No. 9-585-102. [10 ref]
• ***Summary:*** A ten year update on the original 1974 Harvard Case Study of Kikkoman and one of the best insights available into Kikkoman's history and operations (although some of the data has been disguised for competitive reasons). Kikkoman sales in 1982 were about $547 million.

Contents: Early diversification–The wine industry. Company history. Soy sauce production. The soy sauce industry. Structural change. Kikkoman strategy. Expanding soy sauce sales in Japan. Diversifying into other food products (Kikko Foods was established in 1961). Development of the U.S. market. New businesses (Restaurant, health food, and leisure). Technological innovation. Final considerations.

Exhibits. 1. 30 top Japanese food companies in FY (Fiscal Year) 1982, with sales. (1) Kirin Brewery, (2) Suntory, (5) Yuki-jirishi / Snow Brand Milk Products, (6) Ajinomoto, (8) Meiji Milk Products, (9) Nisshin Flour Milling, (10) Morinaga Milk, (19) Showa Sangyo, (20) Nisshin Oil, (23) House Food, (25) Kikkoman.

3. Quantity of soy sauce produced and market share of major Japanese manufacturers. 1982 soy sauce market share was Kikkoman 30.4%, Yamasa 8.9%, Higashimaru 4.6%, Higeta 3.0%, and Marukin 2.5%. Thus the top 5 had 49.4% of the market. 5. Change in per capita food intake (1975-79). 6. Kikkoman financial data. 8. List of main products. 9. World per capita wine consumption by country. France is tops with 90 liters/person/year. 11. Growth through diversification. In 1964 soy sauce accounted for 87% of Kikkoman's sales, in 1983 for 59%. 12. 1980 Asian population of the U.S. by state. Total: California 1,253,987. Hawaii 583,660. New York 310,531. Illinois 159,551. Texas 120,306. New Jersey 103,842. Washington state 102,503.

Oriental immigrants to the USA 1972-81. Total. 1,794,682. From Philippines 375,517. Korea 290,322. Vietnam 233,274. China and Taiwan 213,908. Address: 1. Research Associate; Prof., Harvard Business School, Boston, Massachusetts 02163.

1096. Shurtleff, William. 1984. Soybeans and soyfoods in China: 1949-1983. *Soyfoods.* Summer. p. 24-25.
• ***Summary:*** "In mid-1983 I was invited to go to the People's Republic of China for three weeks to give four seminars in various provinces for government officials and technical professionals interested in modern soymilk production. Accepting the invitation enabled me to study soybeans and soyfoods in the land of their origin. I realized that this was a rare opportunity, for not since William Morse studied soybeans and soyfoods extensively in China during his trip to East Asia in 1929-31 and A.K. Smith studied them in 1949, almost 35 years ago, has a Westerner gone there for this express purpose.

"From ancient times to well into the twentieth century, China was by far the world's leading producer of soybeans. In 1910 China proper produced an estimated 71% of the world's soybeans, and Manchuria, then an independent nation, produced another 16%. As late as 1929 the two nations produced 87% of the world's soybeans, and in that year their combined production reached an all-time peak of 11.89 million tonnes (metric tons). The soybean was Manchuria's most important agricultural and export crop, and during the 1910s and 1920s huge amounts of soybeans,

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soy oil, and soybean meal were shipped from Manchurian ports to countries around the world [above all to Japan]. Starting in 1933, however, soybean production began a long decline, caused largely by stiff competition from soybean producers in the U.S., by the revolution, the civil war, and the anti-Japanese war in China.

"Soybean production rose following the founding of the People's Republic in 1949. After collectivization in the winter of 1955-56, Chinese rural management cadres were encouraged to concentrate on grain and cotton production. Area planted to soybeans (considered a grain) expanded dramatically, as did production, reaching 12.75 million hectares and 10.05 million tonnes in 1957, figures which have not been attained since.

"Soybean area fell from its peak of 12.75 million ha in 1957 to 9.55 million ha in 1958, a drop of 25%. It fell even further by 1965, to 8.59 million ha. Yields also fell, so that in 1965 soybean production, a mere 6.14 million tonnes, was at about the same level it had been in 1900. Soybean production, yields, and hectarage increased substantially after 1976. From 1976 to the peak year in 1981, production rose 41%, yields climbed 18%, and hectarage increased by 20%. In 1980 China produced a mere 9.3% of the world's soybeans, down from 44% in 1954 and 38% in 1957. China first imported soybeans from the USA in 1977. Imports peaked at 810,000 tonnes in fiscal year 1980, then decreased to zero after spring 1982.

"Following U.S. diplomatic recognition of China in 1978 and the first large imports of U.S. soybeans, the American Soybean Association began to wonder if China's one billion people and 200 million hogs might not be the next big market for American soybeans. After the ASA's first trip to China in mid-1979, Chief Executive Officer Bader announced that China seemed sincere in wanting to expand and improve its livestock industry (primarily swine and poultry), in part by feeding more soybean meal. In August 1982 the ASA opened an office in Beijing under the direction of Terrence Foley. Many teams of Chinese professionals in soybean crushing, soyfoods manufacturing, and livestock and human nutrition were sponsored by the ASA to visit the U.S. and Asian countries, and U.S. specialists were sent to China to teach. Foley saw great potential in the soyfoods area since there were five times as many people as hogs and most hogs were fed only scraps and waste inedible by people. In late 1983 the ASA hired a nutritionist, Beth Branthaver.

"Since the founding of the People's Republic of China soybean research has been conducted solely by public institutions, largely those under the national Ministry of Agriculture. Perhaps the most active and best-known center is the Soybean Research Institute at the Heilongjiang Academy of Agricultural Science, founded in 1975 near Harbin. By 1983 the Institute, with a staff of 71 professionals (building toward 100) and a yearly budget of $100,000, had developed several new soybean cultivars and created a package of practices that allowed farmers to get yields of up to 3,000 kg/ha. Between 1949 and 1982 Chinese researchers developed more than 200 new soybean cultivars that were used in production.

"To help improve soybean production and utilization in northeast China, the United Nations Food and Agricultural Organization (FAO) established a project to increase the competence of the Institute staff. With $525,000 in funding, the program runs from February 1982 to August 1984.

"By far the most important fact noted by one wishing to study soyfoods in post-revolutionary China is how little information is available, and how difficult it is to get what little exists. There are no official statistics on any aspects of the production of soyfoods, no publications devoted specifically to soyfoods, and few people with an interest in or doing research on the subject.

"Despite China's top-priority goal since 1976 of modernizing its agriculture and industry, no plans have been made to modernize the vast and important traditional soyfoods industry. As of 1983, a major debate was shaping up in China as to whether the country should modernize traditional industries or turn to making Western high-technology soy protein products, largely for export.

"Unlike most countries of the world where soybeans are widely produced or used, China has no soy-related trade associations. This is one major reason for China's shortage of information and slowness in modernizing its soybean production and processing industries. The most closely related trade group is the Chinese Food industry Association.

"In China there is little or no private enterprise or individual ownership of businesses. Soyfoods manufacturers work for the State, and all decisions on which soyfoods will be made, how, by whom, and in what amounts are made by government bureaus. Since 1979 the inertia and listlessness of China's bureaucracy and its lack of concern for the common people have become officially recognized and widely discussed problems. Various Chinese friends who work with soyfoods in America have reported to us, after returning to China, that soyfood production had dropped noticeably in both quantity and quality.

"In 1983 China's most popular soyfoods in terms of the amount produced and consumed (not counting soy oil), in approximate order of importance, were tofu (all nonfermented types), soybean jiang (a sort of miso), soy sauce, and soymilk. Small amounts of modern soy protein products (especially soy flour and textured soy flour) have started to be made experimentally in larger cities. Except for the modern products, this ranking has probably not changed much since 1949, or even since 1900.

"Lepley (*Soybean Update.* April 1981) and Terrence Foley of the ASA, estimated that 93% to 95% of the soybeans produced in China were used to make traditional soyfoods, one of the highest percentages in the world; only 5 to 7% was used for livestock feeds.

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"Despite increases in soybean production and imports since 1965 per capita annual soybean availability (approximately equal to consumption) has dropped sharply from 16.9 kg in 1953 to 7.13 kg (the lowest point) in 1965, then rose a little to 8.3 kg in 1980. Nevertheless, according to FAO food balance sheets. this was probably the highest per capita use of soybeans as food in the world. Following China (in 1971) were Japan (5.1 kg), Korea (5 kg). Singapore (4.3 kg). and Indonesia (2.8 kg).

"Availability of soyfoods in China varies widely by type of food, season. and region. Earlier overemphasis on heavy industry at the expense of agriculture and failure to check population growth led to a steady decline in per capita food production. To cope with potential shortages of basic foods, the Chinese government devised a complex rationing system. In Beijing in 1983. people had to carry as many as seven or eight different types of monthly coupons or ration booklets. Tofu and soy oil (along with all cooking oils) were the main soyfoods rationed. Grains, sugar, and, in some areas, meat were also rationed. Equal weights of wheat flour and tofu were interchangeable.

"On many days, particularly in the warm months due to the lack of refrigeration through the marketing chain, tofu and other foods simply were not available, or they sold out early, or people had to wait in long lines for up to an hour to buy them. Lines for meat and fish were the longest.

"Perishable soyfoods such as tofu become more available during the colder months. Seasonal soyfoods such as fresh green soybeans (*maodou*) in the fall, are enjoyed each season. Since inland transportation systems are rudimentary, soyfoods are most widely available in areas where the beans are grown."

A graph, based on the Statistical Yearbook of China, shows soybean production in China from 1910 to 1983. On this graph, production for Manchuria only from 1910 to 1949 is also shown; it peaked in 1930. Manchuria firmly became part of China in 1949. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1097. Chen, Steve. 1984. Soyfoods in the Far East and USA: Products, markets, trends. In: American Soybean Assoc., ed. 1984. First European Soyfoods Workshop, Proceedings. Brussels, Belgium: ASA. 36 p. See p. C1-C38. Held Sept. 27-28 at Amsterdam, Netherlands. [11 ref]

• ***Summary:*** Contents: Summary. 1. Introduction: Ten reasons why soybeans will be a key protein source for the future. 1. Soyfood products. A. Non-fermented soyfoods: Fresh green soybeans, soybean sprouts, soynuts, soymilk, soy flour, yuba or soy protein film, tofu. B. Fermented soyfoods: Soy sauce, miso, tempeh, natto, fermented tofu, fermented black soybeans (tou-shih, hamanatto). 3. Soyfoods markets and trends in the Far East: Taiwan, China, Japan, South Korea, Indonesia, Malaysia, Singapore, Thailand, Philippines. 4. Soyfoods markets and trends in the U.S. 5. References. Plus 15 tables and 8 figures.

"It is our [American Soybean Association's] strong intention that marketing and consumption of soy protein should not in any way deter the expansion of the production and sale of as much animal protein as the world can be expected to produce in the years ahead. Soy protein foods are being intentionally brought to the market to complement and not necessarily to replace animal protein products."

"Taiwan imported 1.41 million tonnes (metric tons) of soybeans in 1983 and used about 250,000 tonnes as soyfoods for direct human consumption, which made Taiwan one of the highest in per capita consumption of soyfoods (13.2 kg or 29 lb) in the world. In the past 10 years (1974-1983), the consumption of traditional soyfoods showed an average increase of 3% per year as compared to 12% and 8.1% for poultry and soy oil, respectively. The market for packaged soymilk, soy pudding and tofu has also been expanding rapidly in recent years in Taiwan." Table 7 shows the production of soymilk in Taiwan, which grew from 103,600 tonnes in 1974 to 210,000 tonnes in 1983, for an average growth rate of 8.2% a year.

China produces about 9 million tones of soybeans a year, and about half of these are consumed as soyfoods, giving a per capita consumption of 4.5 kg of soyfoods. "An improvement in the general economy and soyfood technology and equipment will bring a sharp increase in soybean demand and more soyfoods consumption."

In South Korea soymilk consumption has increased more than seven-fold in the last 4 years. Currently about 10,000 tonnes of soybeans are used to make 70,000 tonnes of soymilk. "It is projected that soymilk production in Korea will double in 1984 as compared to the previous year."

Indonesia continues to be Southeast Asia's largest consumer of soybeans as food. In 1982/83 soybean consumption was 6.7 kg per capita. Indonesia consumes about 1 million tonnes of soybeans annually, 60-65% of them in the form of tofu and 35 to 40% as tempeh.

Malaysia consumes only about 30,000 tonnes of soybeans per year as food. In Singapore, more than 75% of the population of 2.5 million are Chinese. Therefore tofu, soysauce, and soymilk are the predominant traditional soyfoods consumed.

Thailand consumes about 40,000 tonnes of soybeans a year as food, mainly in the form of tofu. The Philippines uses only 5,000 tonnes of soybeans annually for food, mainly as tofu.

To summarize (Table 6), annual per capita consumption of soybeans in various East Asian countries, in descending order of the amount consumed, is as follows: Taiwan 13.2 kg (population 19 million); Japan 8.3 kg (population 120 million); South Korea 7.5 kg (population 40 million); Indonesia 6.7 kg (population 150 million); Singapore 6.25 kg (population 2.4 million); China 4.5 kg (population 1,000 million); Malaysia 2.1 kg (population 14 million);

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Thailand 0.8 kg (population 50 million); Philippines 0.3 kg (population 15 million). Address: Director, American Soybean Assoc., Room 603, Kwang-Wu Building, No. 386, Tun Hua South Road, Taipei, Taiwan.

1098. Epp, Peter H. 1984. Growers' interest in supplying export markets. In: Ontario Ministry of Agriculture and Food, Market Development Branch. 1984. Workshop on Export Markets for Ontario Soybeans: Edited Proceedings. 45 p. See p. 42-45. Held 5 Sept. 1984 at Wheels Motor Inn, Chatham, ONT, Canada. 28 cm.
• ***Summary:*** In 1954 Ontario soybean growers began to seek export markets when the Ontario Soybean Growers' Marketing Board organized the first export of Canadian soybeans to the United Kingdom.

In the late 1960s, samples of Canadian soybeans were forwarded to Pacific Rim countries to try to determine whether Canadian varieties were acceptable to the tofu and miso markets of those countries.

The replies indicated that Japanese food manufacturers preferred U.S. varieties such as Kanrich, Amsoy, Corsoy, Ohio, and I.O.M. (Indiana, Ohio, Michigan) soybeans.

In 1970 an export promotion booklet titled "Cansoy" was introduced to 52 foreign countries promoting the story of Canadian soybeans.

"Ontario soybean samples continued to be forwarded annually but received no support or interest until the spring of 1972. At that time the C. Itoh people in Toronto indicated the Harwood variety, produced by the Harrow Research Station, possessed qualities favorable to the manufacture of tofu and miso. C. Itoh was willing to purchase a shipment of 750 tons for further testing by some of their customers. The soybean board made several important decisions: (1) To include a letter with the soybeans from the Canadian Grain Commission stating that the shipment consisted of 85-90% Harwood variety soybeans. In other words, the identity of the Harwood variety had been preserved or maintained, and not mixed with other varieties. This marks the start of Canada's identity preserved (IP) program and a strong commitment to providing the soybean characteristics that Asian food products wanted. (2) To pay $6,920 of the total freight and stevedoring costs to Japan.

In Feb. 1982 the OSGMB sponsored its first export mission to Asia–to Japan, South Korea, Hong Kong, Singapore, and Malaysia.

Since the Harwood variety, Dr. Buzzel of the Harrow Research Station has devoted a great deal of time breeding soybean varieties suitable for the edible market. Address: Chairman, Ontario Soya-Bean Growers' Marketing Board, Chatham, ONT, Canada.

1099. Ko, Young-Tae; Kim, Y.B.; Paik, J.K. 1984. [Studies on production of soy yogurt: Keeping quality of yogurt beverage prepared from defatted soy flour]. *J. of the Korean Agricultural Chemical Society* 27(3):163-68. Sept. [22 ref. Kor; eng]
• ***Summary:*** The flavor of this soy yoghurt beverage was rated significantly different from and slightly inferior to that of dairy yoghurt; the addition of flavorings improved the acceptability. There was considerable precipitation of the curd during the first 24 hours of storage, but sedimentation was reduced by addition of stabilizers: by 0.4% carboxymethyl cellulose, or 0.1% propylene glycol. The beverage could be stored for 48 days at 5ºC without significant change in lactic acid bacteria viable cell counts. After 48 days at 25ºC, the pH, titratable acidity, and viable counts of the beverage changed significantly. Some samples were contaminated by yeasts and molds. Address: 1. Dep. of Food & Nutrition, Duksung Women's College; 2. College of Agriculture, Korea Univ.; 3. Lotte-Chil Sung Beverage Co., Ltd. All: Seoul, South Korea.

1100. Lee, Taik-So; Chun, Myoung-Sook; Oh, Kyung-Hwan. 1984. [Effect of kojis on the component of kochujang]. *J. of the Korean Society of Food Science and Nutrition* 13(3):238-46. Sept. [26 ref. Kor; eng]
• ***Summary:*** "The objective of this experiment was to improve the quality of Kochujang and to shorten the aging time of it by using the Kojis of various *Aspergillus* strains. During the autumn season Kochujangs were mashed with koji of *Aspergillus oryzae*, *Aspergillus kawachii* and *Aspergillus shirousamii*... Thus it is presumed that *Aspergillus shirousamii* Koji can be used for the improvement of quality of Kochujang if a suitable method is applied to prevent the pH from decreasing." Address: Dep. of Food Science, Seoul Woman's Univ., Korea.

1101. Loh, Michael. 1984. An overview of export markets for edible soybeans. In: Ontario Ministry of Agriculture and Food, Market Development Branch. 1984. Workshop on Export Markets for Ontario Soybeans: Edited Proceedings. 45 p. See p. 1-9. Held 5 Sept. 1984 at Wheels Motor Inn, Chatham, ONT, Canada. 28 cm.
• ***Summary:*** "Ontario first exported edible soybeans in 1972 and over 12 years have built it into a $40 million business. 1981 was our best year when exports totalled $46 million... The bulk of Ontario's soybean exports are sold to the Far East [East Asia]–Japan ($8 million in 1983), Singapore ($6 million), Hong Kong ($3.5 million), Malaysia ($1 million), Indonesia, and Korea." In these countries soybeans are consumed in the daily diet of the people. In Japan, for example, they are made into miso, tofu, natto, soymilk and shoyu. Korea also makes soy sprouts, Indonesia makes tempeh, and Singapore, Malaysia, and Hong Kong make dried yuba. In addition, sales to the Netherlands, United Kingdom, and France are quite significant.

Concerning Ontario's market share of soybean imports for food use: Japan imports 877,300 tonnes, of which 27,000

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tonnes or 3.1% is from Ontario. Singapore and Malaysia import 36,000 tonnes, of which 20,000 tonnes or 55.0% is from Ontario. Hong Kong imports 20,000 tonnes, of which 10,000 tonnes or 50.0% is from Ontario.

Japan's sources of its 877,300 tonnes of imported soybeans are as follows: USA 570,000 tonnes (65%), China 280,000 (32%), Canada 27,000, South America 300.

Japan uses its 877,300 tonnes of imported soybeans as follows: tofu 485,000 tonnes (55.3%), miso 180,000, natto 185,000, soymilk 25,000, cooked soybeans 10,000, shoyu 6,500, other 85,800. Within these figures, Ontario's soybeans are used as follows: Miso 20,000 tonnes (11.1% of the total), natto 5,000 tonnes (5.9%), and tofu 2,000 tonnes (0.4%). Address: Export Development Specialist, Ontario Ministry of Agriculture and Food, Toronto, Canada.

1102. Sung, Nak-Ju; Ji, Y.A.; Chung, S.Y. 1984. [Changes in nitrogenous compounds of soybean during chungkookjang koji fermentation]. *Journal of the Korean Society of Food and Nutrition* 13(3):275-84. Sept. [19 ref. Kor; eng]
• ***Summary:*** "In order to study the flavor quality of Chungkookjang, the changes in nitrogenous compounds, nucleotides and their related compounds, free amino acids, amino acid composition and fatty acids were analysed during Chungkookjang Koji fermentation. Koji was prepared with *Bacillus natto* isolated from Japanese natto.

"Insoluble nitrogenous was rapidly decreased, whereas PAA (peptide, amino, ammonia) nitrogen were slightly increased during the fermentation of Chungkookjang Koji. The content of extracted nitrogen and free amino acid nitrogen were rapidly increased until 48 hours fermentation of Chungkookjang Koji and then decreased." Address: 1. Dep. of Food and Nutrition, Gyeongsang National Univ.

1103. Sung, Nak-Ju; Ji, Young-Ae; Chung, Seung-Yong. 1984. [Changes in nitrogenous compounds of soybean during chungkookjang koji fermentation]. *J. of the Korean Society of Food Science and Nutrition* 13(3):275-84. Sept. [19 ref. Kor; eng]
• ***Summary:*** "Eight kinds of fatty acids were detected from raw soybeans, but 10 kinds of fatty acids from Chungkookjang Koji. Palmitic, oleic and linoleic acids were identified as the major fatty acids of raw soybeans and Chungkookjang Koji, and amounts of these were estimated above 80% of the total fatty acids." Address: Dep. of Food and Nutrition, Gyeonsang National Univ., Korea.

1104. *Yomiuri Shinbun* (*Yomiuri Daily News, Tokyo*). 1984. Nattô sekai ni [Natto is marching into the world]. Oct. 24. [Jap]
• ***Summary:*** This article is about tempeh in general and about the world conference on Asian non-salted fermented foods in July 1985 in Tsukuba, Ibaragi prefecture, Japan.

Prof. Watanabe Tadao (Kyushu University) is the head of the conference. They are planning to invite specialists from Thailand, Indonesia, Nepal, China, Korea, USA, Holland, and Denmark.

The wife of Mr. Kawashima (of Tsukuba University) has been developing tempeh recipes suited to Japanese tastes. This subject was on HNK TV on the 6:30 p.m. "News Center 630," on Oct. 17, 1984. Mrs. Kawashima got interested in tempeh when she was living in Indonesia with her husband (a food researcher); they lived there for a long time.

Photos show: (1) A traditional Indonesian tempeh maker in his shop. (2) Mrs. Kawashima holding a plate of prepared tempeh.

1105. Schultz, Jack [John M.]. 1984. Re: History of the J.M. Schultz Seed Co. Letter to William Shurtleff at Soyfoods Center, Nov. 27–in reply to inquiry. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "A brief history of our company is as follows: The J.M. Schultz seed company was started in 1903... The company began cleaning and selling soybean seed in the late 1920s and early 1930s. At that time, the principal use for the soybean was as a hay crop. It was in later years that the certified seed business developed and the J.M. Schultz Seed Company was one of the first companies to become involved in the certified seed business in Illinois.

"In the 1970's the company began development and marketing a proprietary soybean under the J.M. Schultz seed brand. Recently the company has returned to selling hay beans and this market has developed in the past two years. In the 1980's the company entered into the development of soybeans for the edible soybean market and has pursued development and production of these soybeans. We recently completed negotiations on a rather large order of soybeans to Korea for sprouting purposes."

Note: In a previous letter, dated 25 Oct. 1984, Jack Schultz sent William Shurtleff and original copy of his thesis about soybeans and Brazil as a competitive force, and also a recent article from a talk he gave on soybean seed production in Brazil. This letter is also typed with signature on letterhead. Address: P.O. Box 211, 105 Pine St., Dieterich, Illinois 62424. Phone: 217-925-5212.

1106. *Soybean Update.* 1984. Developing countries best growth markets for soybeans. Dec. 10.
• ***Summary:*** "The major export growth area for the U.S. bean complex is in the developing countries of Asia and South America," according to Rich McDonnell, Deputy Director of Analysis for the Foreign Agricultural Service (FAS). "McDonnell said the developing countries of Mexico, Taiwan, South Korea, Indonesia, Malaysia, and Venezuela have shown a significantly higher rate of import growth during the last few years than Western Europe, Japan and the Soviet Union.

"Soybean shipments into those 6 countries rose about

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400% in 1983/84 from 1.1 million tonnes imported in 1974/75, reported McDonnell. While the USDA analyst does not foresee a long continuation of this rate of growth, he stresses that 'per capita consumption of meal and oil in these countries is far from saturation levels.'"

1107. Hymowitz, Theodore. 1984. Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective. *Economic Botany* 38(4):378-88. Dec. [38 ref]

• ***Summary:*** Contents: Introduction. The plant explorers–Dorsett and Morse (a biographical sketch of each member of the expedition. Palemon Howard Dorsett, a veteran plant explorer and senior member of the team, was age 67 at the time of the trip to East Asia. Dorsett's son, Jim, who had accompanied him on a plant exploration trip to Asia during 1924-1926, died of tuberculosis on 8 Oct. 1927. Dorsett's daughter-in-law, Ruth B. Dorsett, accompanied him on the Dorsett-Morse expedition. William Joseph Morse was the junior member of the team and the specialist in soybeans–age 45 when the team left for East Asia. He was accompanied by his wife, Edna, and their daughter, Margaret).

Oriental Agricultural Exploration Trip (gives all key dates, places, and events on the trip). Dorsett-Morse collection. Soybean collection (a detailed discussion, including history and varieties): "This paper is devoted to the analysis of the 4,451 soybean (*Glycine max*) accessions collected by P.H. Dorsett and W.J. Morse during their plant exploration trip to east Asia 1929-1931. Until about 1950 the collection was used primarily for the development of vegetable type soybean cultivars. During this period many of the accessions were lost. Today only 945 of the original 4,451 accessions are available in the United States soybean germplasm collection. From the 1950s to the 1980s, as soybean production increased in the United States, so did plant pathogen problems. The Dorsett-Morse soybean accessions have been extremely valuable to plant pathologists and breeders as sources of resistance to certain pathogens. Individual genotypes in the collection have been used for genetic studies on morphological, physiological and biochemical traits. Due to the development and distribution of higher-yielding soybean cultivars, farmers in East Asia are no longer growing lower-yielding landraces. Although these landraces are now extinct in east Asia, many were collected by Dorsett and Morse and are preserved in the United States soybean collection. Over the years, the Dorsett-Morse collection has increased in value and will be as useful to soybean scientists in the future as it has been in its first 50 years of existence."

"According to Piper and Morse (1923) no more than 8 soybean cultivars were grown in the United States prior to 1898. In 1898, the Office of Foreign Seed and Plant Introduction was established within the United States Department of Agriculture (USDA) to centralize introduction activities. Introduced plants were assigned permanent numbers under the Plant Introduction (P.I.) designation system. The first soybean listed in the P.I. system was P.I. 480 from South Ussurie, Siberia. The seeds were received from Professor N.E. Hansen in March, 1898 (Cook, 1898).

"Between 1898 and 1928, approximately 3,000 accessions of soybeans were introduced into the United States from China, Japan, Korea and India (Bernard, 1983). The collections were made principally by P.H. Dorsett, F.N. Meyer, and C.V. Piper. In the mid-1920s it was apparent to the USDA that the soybean was becoming a major American crop. Funds were allocated to send 2 plant scientists on a major expedition to Japan, Korea and northeast China, primarily to collect soybean germplasm and also to collect seed and propagating material of other crops of interest."

"Dorsett-Morse Collection: Dorsett and Morse sent back to Washington, DC, approximately 9,000 accessions of seed and propagating material (Ryerson, 1930). About half the accessions collected were soybeans (Table 1); the other half consisted of representatives from 230 genera. Individually or jointly, Dorsett and Morse collected germplasm from fruit and vegetable markets, food and flower shows, experiment stations, botanical gardens, seed companies, farms, factories making soybean and other food products, processing plants, and from the wild. In certain instances they contacted individuals to make collections of specific indigenous plants. In addition, they pressed 814 herbarium specimens, mostly 5 sheets each. They also brought back boxes containing butterfly, moth, wasp, spider and ant specimens.

"The explorers returned with 3,350 black-and-white still pictures, 6,700 ft of standard black-and-white motion picture negative and 2,400 ft of colored motion picture negative. Lastly, they brought back 210 publications, 341 different soybean food products and 236 bamboo-made articles (Dorsett and Morse, 1928-1931)."

"The Dorsett-Morse collection trip cost approximately $25,000. Even with today's inflated dollars the benefits gained by United States soybean farmers, processors, and consumers greatly exceed the original collection cost."

Talk with Ted Hymowitz. 1998. June 15. In fact, the value to American farmers of one soybean introduced by this expedition, P.I. 88788, which is a source of resistance to soybean-cyst nematode (SCN) races 3 and 4, is greater than the cost of the entire expedition–several times over. Interestingly, it was not until the late 1980s and 1990s, some 60 years after the expedition, that the resistance contained in this one soybean began to be utilized by U.S. soybean breeders. This is a good example of the importance of collecting and preserving germplasm, whose value may not be known until many years later.

Tables show: (1) Soybean accessions introduced into U.S. by Dorsett and Morse and currently available in the U.S. soybean collection: 1929–366 in original collection / 126 currently available. 1930–2,261 / 554. 1931–424 / 206. 1932–1,400 / 59. Total–4,451 / 945 (=21.2% currently

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available).

Table 2. 41 of their soybean introductions that by simple selection became cultivars in the USA and Canada, with P.I. number, place of origin, and Maturity Group: Cultivar names: Agate, Aoda, Arisoy, Bansei, Bansei (Ames), Cherokee, Chusei, Delsoy, Emperor, Etum, Fuji, Goku, Green and Black, Hakote, Hidatsa, Higan, Hokkaido, Imperial, Jackson, Jefferson, Jogun, Jogun (Ames), Kanro, Kanum, Kura, Magnolia, Mendota, Nanda, Osaya, Rokusun, Sac, Sato, Seminole, Shiro, Sioux, Sousei, Tastee, Toku, Waseda, Willomi, Wolverine.

Table 3. Eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse:" Disoy, Kanrich, Magna, Perry, Prize, Shore, Verde, and Yelnanda.

Table 4. Selected soybean introductions by Dorsett and Morse with resistance to certain pathogens: Column 1, organism (Fungal, bacterial, viral, and nematode pathogens). Col. 2, Disease. Col. 3, Source of resistance (PI numbers).

Table 5. Introductions by Dorsett and Morse listed in the soybean genetic type collection: Column 1, lines (11). Col. 2, P.I. number. Col. Description (Narrow leaflet, dense pubescence, black pod, etc.).

Note 1. This is the earliest English-language document seen (Oct. 2013) that uses the term "landraces" (or "landrace," spelled as one word) to refer to indigenous soybean varieties. Note 2. Before writing this article, Ted read the 17-volume log of the Dorsett-Morse Expedition, first for 2 days at the American Soybean Association headquarters in St. Louis, Missouri, and then using a microfilm of the log sent by ASA. Then he went through the published USDA Plant Inventory volumes compiled by the Office / Division of Foreign Plant Introduction. Finally he compared the latter list with the names and SPI numbers of varieties in the USDA germplasm collection. Address: Crop Evolution Lab., Dep. of Agronomy, Univ. of Illinois at Urbana-Champaign, Urbana, IL 61801.

1108. *J. of the American Oil Chemists' Society.* 1984. Soymilk: New processing, packaging expand markets. 61(12):1784-93. Dec.
• ***Summary:*** An excellent, comprehensive article prompted by a new book, *Soymilk Industry and Market*, by Shurtleff & Aoyagi.

In South Korea, Dr. Kyung Won Lee, ASA's country director says that soymilk is at the take-off stage; in late 1983 it was growing by 60% a year. Korean consumers favor soymilk over cow's milk; being very concerned about good health, Koreans prefer vegetable fat to animal fat. In 1983, Korea's seven major soymilk manufacturers made an estimated 67,000 metric tons of fluid soymilk. In descending order of size: (1) Dr Chung's, maker of Vegemil in 180 ml bottles. (2) Dong Bang Oil and Flour Mills, with its Green Milk.

1109. Jackobs, J.A.; Smyth, C.A.; Erickson, D.R. 1984. International soybean variety experiment: Ninth report of results, 1982. *INTSOY Series* No. 27. xiv + 103 p. Dec. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following countries: (For the year 1982) Afghanistan, Azores, Bangladesh, Burma, Cameroon, Chile, China (Taiwan, ROC), Colombia, Cyprus, Dominican Republic, Ecuador, Egypt, French Guiana, Gabon, Ghana, Guatemala, Indonesia, Ivory Coast, Korea, Madagascar, Mauritius, Mexico, Morocco, Mozambique, Nepal, New Caledonia, New Hebrides, Nicaragua, Pakistan, Paraguay, Portugal, Puerto Rico, Reunion, Rwanda, Saudi Arabia, Senegal, Somalia, Sudan, Swaziland, Thailand, Turkey, United States, Uruguay, Vietnam, Yugoslavia, Zaire, Zambia, Zimbabwe.

(For the year 1981) Australia, Rwanda.

1110. Yoon, Tai Heon; Im, K.J.; Kim, D.H. 1984. [Fatty acid composition of lipids obtained from Korean soybean varieties]. *Korean Journal of Food Science and Technology* 16(4):375-82. Dec. [31 ref. Kor; eng]
• ***Summary:*** "The fatty acid compositions of lipids from five local varieties and three imported varieties of soybean were determined. Total and free lipids of the samples were extracted with chloroform-methanol mixture (2:1, v/v) and ethyl ether, respectively. The ether-extracted samples were extracted again with water saturated n-butanol to obtain bound lipids." Address: Clinical Nutrition Research Center, Hallym College, Seoul.

1111. Cheigh, H.S. 1984. Production system of low-cost nutritious food. Basan, Korea: Department of Food and Nutrition, Basan National Univ., No. 77-72. *
• ***Summary:*** The LEC project in Korea uses a lower capacity extruder (less than 100 kg/hour) designed by the Meals for Millions Foundation (MFM) and constructed by the Korean Institute of Science and Technology (KIST) using readily available parts. Address: Onchon-Dong, Dongrae-Ku, Basan, Korea.

1112. **Product Name:** [Woorean {Soymilk} (Apple, or Choco)].
**Manufacturer's Name:** Dr. Chung's Foods Company, Ltd.
**Manufacturer's Address:** Insong Building 18A, 194-15, 1-Ka, Hoehyun-Dong, Choon-Ku, Seoul, South Korea.
**Date of Introduction:** 1984.
**New Product–Documentation:** Soya Bluebook. 1984. p. 79; 1985. p. 100; 1986. p. 103; Dr. Chung's Foods Co. Ltd. 1985. These products are a mixture of undiluted Vegemil soymilk and either apple juice or chocolate powder.

Photocopy of Label for chocolate. Sent by Anders Lindner. 1989. The front panel shows a glass with a wave leaping out of it, surrounded by pieces of chocolate.

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1113. **Product Name:** Tofu.
**Manufacturer's Name:** Jeon's Natural Foods.
**Manufacturer's Address:** Springfield, Missouri. Phone: 417-NL.
**Date of Introduction:** 1984.
**New Product–Documentation:** Talk with John Kaiser. 1989. March 2. John has been making tofu for 7 years, starting at The Farm in Tennessee, and then in Cleveland. A company named Jeon's Natural Foods in Springfield, Missouri, has made tofu for 5 years and sprouts for 13 years but stopped 2 months ago. They have a pressure cooker system. The founder came from Korea and is now running a restaurant and leasing out the sprout operation. John wants to lease his tofu business.

1114. **Product Name:** Tofu.
**Manufacturer's Name:** Jeon's Natural Foods.
**Manufacturer's Address:** Route 1, Box 139, Republic, MO 65738. Phone: 417-732-2507.
**Date of Introduction:** 1984.
**New Product–Documentation:** Talk with John Kaiser. 1989. June 30. A Korean man named B.K. Jeon started this company near Springfield, and started making tofu and mung bean sprouts about 5 years ago. He sold it to a lady named Sadie. She is too busy with the sprouts to do tofu, so she wants John to come and make the tofu on a profit sharing arrangement.

1115. Keum, J.H.; Oh, M.J. 1984. [Changes in chemical composition during lactic acid fermentation of soymilk]. *Research Reports of Agricultural Science and Technology* 11(1):34-44. [33 ref. Kor; eng]*
• ***Summary:*** Soy yogurt was prepared from soybeans, defatted soybeans and sprouted soybeans inoculated with *Lactobacillus acidophilus* and *Bifidobacterium bifidum* as a starter. Soymilk made from sprouted soybeans showed the greatest growth of *L. acidophilus*, decreased levels of raffinose and stachyose, and when 10% nonfat dry milk was added, it was rated by a taste panel as having the best flavor. Address: Graduate School, Chungnam National Univ., Daejeon, South Korea.

1116. Kubo, Yuji; et al. 1984. Multisector models and the analysis of alternative development strategies: An application to Korea. *World Bank Staff Working Papers* No. 563. 52 p. *

1117. Lee, S.W. 1984. [Korean dietary culture]. Seoul, Korea: Kyomunsa. 313 p. [30 ref. Kor]*
• ***Summary:*** Cherl-Ho Lee (2016, p. 5) states: This long paper suggests that the Maek tribes, which settled broadly in Manchuria and the Korean Peninsula, were the first people in history to use soybeans as food.

Lee further states (p. 9): "Archaeologists generally agree that the history of soybean cultivation is about 4000 years long, as the traces of soybean use are found in the Bronze Age (ca. 1500 B.C.) in remains in the Korean Peninsula."

Note: C.H. Lee (July 2017) says that this is a scholarly work, but it was not the first to suggest the two ideas summarized above. Address: Professor, Hanyang Univ., Seoul, Korea.

1118. Yang, C.B.; Park, S.K.; Yoon, S.K. 1984. [Changes of protein during growth of soybean sprout]. *Korean J. of Food Science and Technology* 16(4):472-74. [10 ref. Kor; eng]*
• ***Summary:*** Water soluble protein (WSP) profile was studied using gel filtration and disc gel electrophoresis while sprouting soybeans for 0-8 days. Five WSP fractions were isolated, 3 of which were 11S, 7S, and 2S proteins. Two were unidentified. Address: Dep. of Food & Nutrition, Hanyang Univ., Seoul, South Korea.

1119. Bray, Francesca. 1984. Legumes (Document part). In: F. Bray. 1984. Science and Civilisation in China. Vol. 6, Biology and Biological Technology. Part II: Agriculture. Joseph Needham series. Cambridge, England: Cambridge University Press. xxvii + 724 p. See p. 510-14. [49 ref]
• ***Summary:*** Note: Chinese characters are given for all romanized Chinese words or terms. Although legumes were among the earliest plants to be domesticated in West Asia and the Americas*, there is no solid evidence that legumes were cultivated in China in prehistoric times, even though several species were native to China, and even though legumes played a very important role in Chinese agriculture from the late Chou [ca. 722 B.C.] onwards.

* Footnote: In the Near East and Europe carbonised peas and lentils, assumed to be domesticated, have been identified at farming sites dating as far back as 7000 B.C. Various species of *Phaseolus* beans seem to have been domesticated in Peru and Mexico by the 6th millennium B.C. And groundnuts are believed to have been domesticated in the upper Amazon regions, in South Bolivia and North Argentina well before 3000 B.C.

"Though remains of leguminous species have been found in one or two Chinese Neolithic sites, they have been identified as broad beans (*Vicia faba*) and groundnuts (*Arachis hypogaea*); since the former is believed to have been introduced to China from Western Asia in Han times [220 B.C.–220 A.D.] and the latter is a native American species, the authenticity of these identifications is doubtful, to say the least" (Footnote: K.C. Chang. 1977. *The Archaeology of Ancient China*, 3rd revised ed.).

"There are apparently no references to legumes in the Shang oracle records, and the earliest uncontested evidence for the cultivation of leguminous plants in China is found in Chou bronze inscriptions and in the *Shih Ching*. Both these sources refer to a crop called *shu* (Chinese characters given), and the early form of the character clearly depicts the

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nodules on the roots of the plants (Fig. 237). The term *shu*, though also used to refer to legumes in general, is primarily associated with the soybean, *Glycine max* (L.) Merrill, and its presence in these writings is usually taken to signify the domestication of this crop" (Footnote: Hu Tao-Ching {1963} in fact postulates a much earlier domestication [it must have been domesticated and well known long before it appeared in inscriptions on bronze vessels in 1024 B.C.]; Ping-To Ho {1975, p. 70} believes that domestication occurred about 1000 B.C.)

"In later lexicographical texts the term *shu* is usually qualified when soybeans are referred to: *jung shu*, *jen shu*, and *ta shu* are mentioned (Footnote: In the *Erh Ya* and its commentary for example), and this does suggest that even in pre-Han times *shu* was used as a generic term for legumes rather than a specific term for soybeans. The modern term for soybean is *ta tou*, 'greater bean,' a term which first appears in the -1st century *Fan Sheng-Chih Shu.* In classical times the term *tou* was applied only to a type of 'wooden vessel or dish containing flesh sauces at sacrifices or feasts' (Bretschneider 1882, vol. II, p. 162), but by Han times it seems that it was also used as a general term for pulse crops, as it still is today.

"Whether or not the unqualified term *shu* in early texts and inscriptions should be understood to refer to soybeans or to legumes in general, there is no doubt that the soybean was domesticated in China some time around the beginning of the Chou, for texts describing -7th-century events refer to soybeans (*jung shu*) as novel introductions to the Central States, whereas by the time of Mencius [Meng tzu, c. 371-c. 289 B.C.] they had already become a staple food of the common people (Footnote: P.T. Ho 1975, p. 79).

"The presumed wild ancestor of the soybean, *Glycine ussuriensis* Regel & Maack or *G. soja* L. is native to northeast China and the adjacent areas of Manchuria, Korea, and Japan (Footnote: Hymowitz 1970, 1976), and it may be significant that the cultivated soybean was called *jung shu* for Jung was the name commonly given to the Tungusic tribes of Northeast China in Chou times. The *Kuan Tzu* states that in the -7th century Duke Huan of Ch'i (Footnote: Ch'i covered most of modern Shantung) led an expedition to the territory of the Mountain Jung and brought back 'winter onions and soybeans (*jung shu*) for dissemination throughout the various states' (P.T. Ho 1975, p. 78)."

An alternative interpretation of *jung* and of its (then) homophone *jen* is that it simply meant large and luxuriant (Bretschneider 1882, vol. 2, p. 164), for the soybean is a large, bushy plant which grows up to 6 feet tall. Its modern name of *ta tou* can be attributed to its growth habit, and not to the size of its beans which are only about as big as a lentil. Fig. 238 (*Shou Shih T'ung K'ao*, 1742) shows an illustration of a soy bean plant.

"The soybean's rapid conquest of Chou China is a tribute to its superior qualities, qualities so outstanding that they frequently provoke outbursts of surprising lyricism in modern writers: 'that miracle, that noblest of crops, that wondrous plant, the soybean' (Anderson & Anderson 1977, p. 346)."

The ancient Chinese were more moderate in their praise, perhaps because they were unaware of the benefits of modern nutritional analysis. The chief virtues of the soybean for the ancient Chinese "were that it produced good crops even on poor land, that it did not deplete the soil, and that it guaranteed yields even in poor years, so that it made a useful famine crop." (p. 514). It gave 3-4 times the yield of millet. The *Fan Sheng-Chih Shu* says that in former times (presumably the late Chou) it was customary for peasants to plant 5 *mu* per capita of soybeans to guard against famine. Soybeans were widely grown in China from Chou times on, "but they were not held in high esteem for their gastronomic qualities." The Chinese appreciated soybeans most when they were fermented to make sauces (*jiang*) or relishes (*shi*), or transformed into beancurd (*doufu*). These foods were generally made from yellow soybeans, although the *Qimin Yaoshu* (544 CE) recommends black soybeans. The various fermentation processes were discovered in early times; they improved the soybean's palatability and its nutritional properties (p. 514). Address: Research Fellow, East Asian History of Science Library, Cambridge, England.

1120. Brennan, Jennifer. 1984. The cuisines of Asia: nine great oriental cuisines by technique. New York, NY: St. Martin's Press. ix + 542 p. Illust. (line drawings). Index. 24 cm.

• ***Summary:*** The "Nine great Oriental cuisines" are those of "China, India, Indonesia, Japan, Korea, Malaysia, The Philippines, Thailand, Vietnam" (as stated on the book's cover). The book contains many recipes, yet it is largely organized into chapters by cooking techniques: barbecuing, steaming, stir-frying / using a wok, deep-frying, etc.

The chapter on "Japan" discusses soybeans, miso, tofu, and shoyu on pages 44-45. Soyfoods are said to be the 2nd largest source of protein in the Japanese diet.

The section on "Soybeans" (p. 97-104) includes a discussion of the names of various soyfoods in different Asian languages and countries. For example: "The basic bean curd is called *tau-fu* in Cantonese, *tau-hu* in Hokkien, and *tofu* in Japanese." Or consider this (p. 99): "During the basic process of making bean curd, at the stage where the bean and water mixture is boiled, a skin or residue forms on the top. This skin [yuba] is skimmed off and dried. It is commercially available in sheets... and in the form of sticks that bear the picturesque name of 'second bamboo' [dried yuba sticks] in Chinese, meaning that they are the second residue from the curd."

There follows a 3-page table titled "Soybean products" (p. 101-03) which has four columns: Description, Chinese name [Cantonese], Japanese name, comments.

Note: Before proceeding, we believe that the design of

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this table is fundamentally flawed. (1) Why are the names of the basic soyfoods not given in the other languages with which this book is concerned, including Mandarin Chinese, Korean, Indonesian, Vietnamese, Filipino, etc.? (3) Why is no English name given for each basic soyfood product? Sometimes the description is the English name, yet that name is rarely the name a person would use if they were selling the product in an English-speaking country. (3) Why are so many common "soybean products" omitted from this table, such as the various basic other types of Japanese miso and of Japanese shoyu (besides koikuchi shoyu), fermented black soybeans (douchi, dow see), soymilk, soy sprouts, roasted soy flour, whole soy flour, soybean oil, textured vegetable protein, etc. These problems are easily solved with alternate table designs. For example, have one table for each language, with the name of each soyfood product given first in English and then in the language of that country. Put the description and comments in a glossary to avoid repetition. Or, have a glossary entry for each soyfood, with the English name, description, comments.

The table is divided into four basic types of soybean products. After each, we will give the Cantonese name and then the Japanese name, and we will indicate disagreements using [sic]. NL = Not listed.

(1) Bean curd: Tau fu fu [sic] = kinugoshi tofu. Tau fu = momen tofu. NL = yaki tofu [sic, yaki-dofu]. NL = koya tofu or kori tofu [sic, koya-dofu or kori-dofu]. Tau fu pok = abura age. Fu chu = yuba [sic, fu chu is dried yuba sticks. Yuba in Mandarin is doufu pi]. fu joke [sic, fu jook] (bean curd sticks) = NL. Tim joke [sic, tiem jook] (sweet bean curd sticks) = NL. tau fu kon [Mandarin: doufu gan; pressed tofu].

(2) Soy sauce: Light = chan ch'an or sang chu = usu kuchi shoyu [sic, not the same]. Dark, medium = see yu chan yan = shoyu [sic, see yu is soy nugget sauce, not made in Japan. Japanese shoyu is not traditionally made in China]. Dark, heavy, sweet = chu yan = NL.

(3) Fermented bean pastes and cheeses. Black bean paste = dau see tau ch'ih = NL. Sweet, white bean paste = NL = shiro miso. White soy cheese [fermented tofu, should be classified under tofu] = pai doufu-ru or foo yee or foo yu = NL. Red soybean paste = NL = aka miso. Red soy cheese or spiced red bean curd = hung doufu-ru or nom yee or nam yu.

(3) Miscellaneous soybean productions. Soy jam = yun shi jeung = NL. Whole fermented soybeans = NL = nato [sic, natto]. Red bean sauce = saang see jeung = NL. Soybeans and malted rice = NL = moromi miso. Hoisin sauce = hoisin = NL.

In the "Basic recipes" section is a recipe for Indonesian dark sweet soy sauce (*ketjap manis*).

The Glossary (p. 499-515) contains the following soy-related entries: "Bean Curd (*tofu*, Japanese; *tao foo*, Chinese; *tahu*, Indonesian and Thai; *tokwa*, Philippines): A curdled, soft, cheeselike preparation made from soybean milk. Used as a source of protein in Asian cooking. Available loose or in packages."

Bean paste, red sweet [from azuki beans]. "Substitute Chinese sweet red bean paste, p. 132."

Bean paste, yellow (Chinese).

"Beans, black salted fermented. (Called dow see in Chinese) These are very salty soybeans, sold in cans in Chinese markets. Used with garlic as a flavoring for fish and pork dishes. substitute: Soybeans, cooked until soft and seasoned with plenty of soy sauce."

Bean sprouts: Usually refers to mung bean sprouts, "although alfalfa and soybean sprouts are also used."

Hoisin sauce: Soybeans are a major ingredient, along with garlic, chili peppers, and various other spices and ingredients.

Miso. Oyster sauce: "A Chinese sauce, made from oysters cooked in soy sauce and brine." Used as a seasoning with cooked foods and as a table sauce. See recipe p. 146.

Red bean sauce: "A strong table sauce made from mashed soybeans." Available in cans from Chinese stores.

Soy sauce

Also contains entries for: Kombu. Monosodium glutamate (MSG; "I do not use it nor do I recommend its use"). Mung beans.

The index contains 28 entries for soybean, 22 for soy sauce, 14 for miso, 6 for bean paste, oyster sauce, teriyaki, 4 for bean curd–deep fried, hoisin sauce, vegetarian dishes, 2 for ketjap, and 1 each for beans–black salted fermented, bean curd–fermented, jam–soy, jang (see miso), milk–soybean, ragi, shoyu (see soy sauce), soybean oil, sukiyaki, tahu, tau-fu or tau-hu (see bean curd), tempe [tempeh], textured vegetable protein (TVP), tofu (see bean curd), tou shih [fermented black soybeans],

About the author (from the back cover): "Jennifer Brennan grew up in Pakistan and India and has spent many years in Southeast Asia. She is the author of *The Original Thai Cookbook.*" She is "Winner of the IACP [International Association of Culinary Professionals] Award for the Best Literary Food Writing."

1121. *Korea Soybean Digest* (*Hankuk Kong Yeonguhoegi*). 1984--. Serial/periodical. Miryang, Korea: Korean Soybean Society. Vol. 1 Nov. 1940. Annual. Kor.

• ***Summary:*** Letter from Cheryl-Ho Lee (2017 Aug. 1): Concerning the *Hankuk Kong Yeonguhoeji* (Korean Soybean Digest) What organization publishes it? Korea Soybean Society (*Hankuk Kong Yeonguhoe*)

Where is it published? Miryang, Korea.

How often is it published? Once in a year.

How many pages in a typical issue this year? Around 100 pages.

When was the first issue published–year and month if possible? The Society was founded in March 1984. Last year issue was volume 33.

Are ALL of the articles in Korean? Yes, mostly.

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What is the main purpose of the magazine? It covers all areas including history, scientific findings, cultivation technologies and utilization of soybean.

Prof. Moon Gap-soon is representing the Korea Soybean Society. If you have further questions on the Society, please contact her (fdsmoon@inje.ac.kr).

1122. **Product Name:** Hard Tofu: Soy Bean Curd.
**Manufacturer's Name:** Mon Soon Food Products, Inc.
**Manufacturer's Address:** 154 Mott St., New York, NY 10013. Phone: (212) 226-7600.
**Date of Introduction:** 1984?
**Ingredients:** Soybeans, water, calcium sulfate.
**Wt/Vol., Packaging, Price:** 16 oz (1 lb) 454 gm.
**How Stored:** Refrigerated.
**New Product–Documentation:** Label. Undated. 5.25 by 4.25 inches. Printed red on clear film. Chinese and Korean characters also on label.

1123. Kim, Yong Kook; Roh, J.K. 1985. [Detection of aflatoxins in soybean food by HPLC]. *Korean J. of Food Science and Technology.* 17(4):295-303. Jan. [24 ref. Kor; eng]
• ***Summary:*** "HPLC was used in determining amount of aflatoxins in the commercially manufactured soybean food and home-made Meju. Aflatoxin producing abilities of strains used in the industrially fermented soybean food were also studied with the HPLC technique. Although aflatoxin-like substances were detected in a few samples on TLC, they were not identified with the HPLC retention times of standard aflatoxins. The commercial fungal strains used in Korea had no aflatoxin producing abilities." Address: Korea Research Inst. of Bioscience and Biotechnology (KRIBB).

1124. Kwon, S.H. 1985. [Origin of the soybean]. *Korea Soybean Digest* 2(1):4-8. Jan. [17 ref. Kor]
• ***Summary:*** Page 7: So far we have guessed that the history of Korean soybean cultivation was about 200-300 B.C. Also, Dr. Kwon, in 1972 thought the soybean was cultivated in about 5-4 B.C. However, with various other science developments, the history changed. Many historians thought the history of soybean cultivation began about 2000 to 1,500 B.C. At least 1,500 B.C. Dr. Kwon's opinion is that soybean cultivation began about 2000-1,500 B.C. with the beginning of Korean agriculture, which is based on China soybean cultivation history about 2500 B.C.

Note: The Korean name of this periodical is *Han'guk k'ong yon'gu hoeji.* The Univ. of Illinois at Urbana, Funk ACES library has it. Call# 633.3405 HA. Owns v.11(1994) to v.33(2017); some issues missing during 2000-2003. It is not at NAL (USDA's National Agricultural Library; Beltsville, Maryland). Address: Seoul, South Korea.

1125. Sri Lanka Soybean Project. International Soybean Project (INTSOY). 1985. Soybean Utilization Workshop: Summary report. Urbana, Illinois: INTSOY. 15 p. Held 14-16 Jan. 1985 at Soyfoods Research Center, Gannoruwa, Peradeniya, Sri Lanka.
• ***Summary:*** The workshop was organized by the Sri Lanka Dept. of Agriculture, and INTSOY. Contents: Background. Workshop objectives. Highlights. Nutrition. Sociology. Appendix I: Participants (directory of 28 people from 13 countries, including Bangladesh, Egypt, India, Indonesia, Korea, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam, and Zambia). Appendix II: Instructors (all from Sri Lanka or INTSOY). Appendix III: Course schedule. Address: Urbana, Illinois.

1126. Sri Lanka Soybean Project; International Soybean Project (INTSOY). 1985. Sri Lanka Soybean Utilization Training Program and Workshop: Proceedings. 2 vols. Gannoruwa, Peradeniya, Sri Lanka. 525 p. Held 14-25 Jan. 1985 at Gannoruwa, Sri Lanka. No index. 28 cm.
• ***Summary:*** The proceedings of this interesting workshop exist only as an unpublished manuscript. The program was divided into the following segments, each with its own convenor: Introduction and history. Soybean production (C.N. Hittle). Production and marketing (N. Ranaweera). Training and publicity (S. Wijeygoonewareena). Nutrition (P. Soysa). Utilization (A. Nelson). Laboratory practicals–Production of soy-based foods at SFRC. Dry Zone tour to Agriculture Research Station and Rajasoya in Maha Illuppallama, Anuradhapura District farmer's field, Pelwehera seed production farm. Hill country tour. Commercial processing (L.S. Wei, T.D.W. Siriwardena). Home level processing (Ellen Jayawardena). Field tours: CARE Thriposha plant, oils and fats corporation plant (Seeduwa), U.N. Gunasekara plant, Forbes and Walker plant, Glaxo Ltd.

Contains a directory of instructors (25) and participants: 24 students came from 12 countries–Bangladesh, Egypt, India (4), Indonesia, Korea, Nepal (2), Nigeria (3), Pakistan, Philippines, Thailand (3), Vietnam (2), Zambia (4). Address: Sri Lanka.

1127. Young, L. Steven. 1985. Work with soy protein products by ADM and Central Soya, including soy ice creams and soy protein isolates (Three interviews). Conducted by William Shurtleff of Soyfoods Center, Jan. 9 and 16, Feb. 14. 7 p. transcript.
• ***Summary:*** ADM and Ralston Purina have approximately equal shares of the market for isolated soy proteins; there are no other major manufacturers. In 1984 approximate total use of isolates, with Tofutti as a major user, was 200,000 to 400,000 lb as delivered. Since only 2% of the soy ice cream mix is isolates, this translates into 10 to 20 million lb of mix. To convert this to gallons, figure 40-50% overrun, leading to 3 to 3.5 million gallons of nondairy frozen desserts.

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Why did Central Soya get out of the soy protein isolate business at the very time when they were the world leader with their line of Promine products? Probably because it was not profitable. When they got out, they literally handed the market over to Ralston Purina. They told their former customers to buy from Purina, and even which products to buy. This move made Purina's isolate business profitable. Prior to that, Purina was within a year of getting out of isolates. Address: ADM, Manger of Product Applications, Food Research Div., 1825 N. Laramie, Chicago, Illinois, 60639.

1128. Shurtleff, William; Aoyagi, Akiko. 1985. Tofutti & other soy ice creams: Non-dairy frozen dessert industry and market. 2 vols. Lafayette, California: Soyfoods Center. Vol. 1, 144 p. Vol. 2, 214 p. Index. Feb. 28 cm. [129 ref]
• ***Summary:*** The first study of the rapidly emerging soy ice cream market, based on historical principles. Contents: Volume I. 1. Introduction. 2. What are non-dairy frozen desserts? Standards, terminology, and labeling laws. 3. History of non-dairy frozen desserts. United States and Canada (1918–present), History of Tofu Time Inc. and Tofutti, East Asia (1936-), Europe (1946-), Third World countries (1970-), Australasia and the Middle East.

Pages 75-92, titled "The Tofutti Era and Tofutti Clones, contain histories and descriptions of four categories of non-dairy ice cream companies. Within each category, the companies are listed in the sequence that their products appeared: (1) Small soyfoods companies: Penguino's Inc. (New York), Green World (Idaho), Garden of Eatin' (California), Soy City Foods (Ontario, Canada), The Soy Shop (Georgia), Metta Tofu Co. (British Columbia, Canada), Island Spring (Washington state), Evolutionary Foods (Arizona), Midwest Tofu & Sprouts Co. (Nebraska), Cream of the Bean (Illinois). (2) Soyfoods companies that used a mixture of tofu or soymilk and soy protein isolates to make Tofutti-type products: Brightsong Light Foods (California), Farm Foods (Tennessee), White Wave (Colorado). (3) Dairy companies (or non-soyfoods companies) that launched Tofutti-style products: Presto Food Products (California), Colombo, Inc. (Massachusetts), Honey Hill Farms (California), Continental Yogurt (California), Gloria Vanderbilt / Frusen Gladje Ltd. (New York), Barricini Foods Inc. (New York), Parvelle Corp. (New York), Carvel Corp. (New York), Tuscan Dairy Farm (New Jersey), Golden Seal Riviera Ice Cream Co. (New York). (4) Innovative makers of non-dairy frozen desserts that are not soy-based: Olympus Industries (Washington, Yodolo), and Imagine Foods (Arkansas, Rice Dream).

4. The soy ice cream industry and market in the U.S. and worldwide. 5. Nutritional value of soy ice cream. 6. Directory of people, organizations, and publications connected with non-dairy frozen desserts. 7. Tofu standards and soy ice cream. 8. Technical information on soy ice cream production. Ingredients and sample ingredient listings; Formulas and processing techniques. 9. How to calculate the amount of tofu in a tofu ice cream. 10. Bibliography (129 entries). 11. Index. About The Soyfoods Center.

Volume II. Documents and Graphics Related to Soy Ice Cream. This volume contains early historical and current popular articles, product labels, posters, graphics, and corporate brochures. A rich source of information for marketing and product development, these also document the rapid growth of soy ice creams worldwide. The publication is not paginated. Contents: 12. Early history (1918-1969). 13. Farm Foods and Ice Bean (1974-). 14. Tofu Time and Tofutti (1980-). 15. Other Soy Ice Creams and General (1976-). 16. Technical information on soy ice cream production. This last section lists ingredients and recipes, and discusses regulations, labeling, production processes, and quality of soy-based frozen desserts–largely ice cream, but also popsicles, sherbets, custards, etc. Fermented or cultured soymilks are also discussed briefly.

As of Jan. 1998, both volumes are bound as one.

Note 1. This is the earliest document seen (Oct. 2001) that contains industry or market statistics for soy ice cream by geographical region.

Note 2. This is the earliest English-language document seen (Sept. 2013) that discusses the etymology of soy ice creams and non-dairy frozen desserts.

Note: The story of "The man who introduced David Mintz to tofu and soy ice cream: Pesach Lazaroff," does not appear in this book. The story was not uncovered until Oct. 1986. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1129. Byrne, Maureen. 1985. The future for soyfoods. The first European Soyfoods Workshop was held in Amsterdam by the American Soybean Association, and papers covered subjects from marketing to microbiological standards. *Food Manufacture* (*London*) 60(3):49, 51, 53. March.
• ***Summary:*** This workshop was held on 27-28 Sept. 1984 at the Krasnapolski Hotel, Amsterdam, the Netherlands–organized by the American Soybean Association. Gives a brief summary of each paper presented.

Contains an interesting full-page table (p. 51) in which Oriental soyfoods are classified into two types: Non-fermented and fermented. For each non-fermented food is given the local names, description, and uses. The non-fermented soyfoods are: Fresh green soybeans, soybean sprouts (huang tou ya, Chinese), soynuts (hueh huang tou, Chinese; iri-mame, Japanese), soymilk (tou chiang or tounai, Chinese; tonyu, Japanese; kongkuk, Korean), [roasted] soy flour (huang tou fen, Chinese), soy protein-lipid film (yuba, tou-fu-pi), soybean curd (tofu).

For each fermented soyfood is given the local names, organisms used, description, and uses.

The fermented soyfoods are: Soy sauce, miso, tempeh,

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natto, fermented tofu, and fermented black soybeans.

Soy sauce includes chiang-yu from China, shoyu from Japan, ketjap from Indonesia, kanjang from Korea, toyo and see-ieu from Southeast Asia.

Fermented black soybeans include tau-shih from China, tao-si from the Philippines, tau-cheo from Malaysia, tauco from Indonesia, and Hamanatto from Japan.

1130. **Product Name:** [Sahm Yook Soymilk (Plain)].
**Foreign Name:** Sahm Yook Dou Ru.
**Manufacturer's Name:** Sahm Yook Korean Foods.
**Manufacturer's Address:** 320 Panjeong-ri, Jiksan-myun, Chunwon-gun, Choongchungnam-do 333-810, South Korea.
**Date of Introduction:** 1985 April.
**Ingredients:** Soy milk, high fructose corn syrup, corn oil, rapeseed oil, salt.
**Wt/Vol., Packaging, Price:** 200 ml foil retort pouch (Doypack). Retails for 230 Won (6/90).
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Talk with Eric C. Fehlberg. 1990. March 8. The Seventh-day Adventist food company in South Korea, Sahm Yook Foods, now makes soymilk (only plain, no flavors) packaged in Tetra Brik cartons and foil Doypack (Doynpack). The company was established in about 1978, and it began to make soymilk in May 1985. After launching soymilk, the company began to grow dramatically, as that product grew. Last year they built a very large, new soymilk plant (based on Adventist technology) and they are now about the 2nd or 3rd largest soymilk maker in Korea.

Label (Foil retort pouch). Sent by Eric Fehlberg. 1990. May 24. 4 by 6.75 inches Red, yellow, dark green, and light green on silver. Front panel says "Soy Milk" and an illustration shows 3 yellow soybeans in a green pod. The back panel shows the package being immersed in boiling water or heated in a microwave oven. So this package is probably sold during the cold months.

Form filled out and label sent by C.Y. Yoon, General Manager, Sahmyook Korean Foods. 1990. June 23. Note that on the envelope the company name is printed Sahmyook Korean Foods, but the brand name is typed 4 times on the form as Sahm Yook. The address on the envelope is 320 Panjung Jiksan Chunwon Choongnam, Korea. The soy milk in a foil retort pouch was introduced in April 1985. The same product with the same ingredients was launched in a Tetra Brik carton in July 1987. All four of the company's soymilk products contain no sugar (sucrose), chemical flavorings, or preservatives.

A brief company history. In 1981 they purchased a 31,313 square meter plant to make foods using wheat gluten. In 1984 they installed a soymilk processing plant, then began to sell soymilk starting in April 1985. Concerning prices, there are 720 Won to 1 U.S. dollar. Thus the Tetra Brik soymilk (200 ml) retails for the equivalent of US$0.31.

Leaflet for Sahm Yook soymilk products (7.5 by 10 inches, color photo). 1990. Shows 5 packages of soymilk and a glass of soymilk surrounded by fresh green vegetables and mikan oranges.

1131. Park, Kun-Young; Lee, K.B. 1985. [Aflatoxin production by *Aspergillus parasiticus* NRRL 2999 in various varieties of soybeans]. *J. of the Korean Society of Food and Nutrition* 14(2):177-81. May. [18 ref. Kor; eng]
• ***Summary:*** "Aflatoxin production by *Aspergillus parasiticus* NRRL 2999 with two different levels of inoculum sizes ($10^2$ and $10^6$ spores) was studied on such varieties of soybeans produced in Korea as Bongeui, Hwang Keum, Jangbaek, Danyeop, Jangyeop and Namcheon. With the inoculum size of $10^2$ spores per 10 gm of soybeans, there were statistically difference ($p<0.05$) on the production of aflatoxins in the varieties of soybeans. The variety of Namcheon produced 7 times higher amount of aflatoxin B1 than that of Bongeui. The variety of Jangyeop produced the highest level of aflatoxin G1 among the varieties employed." Address: Dep. of Food and Nutrition, Pusan National Univ.

1132. **Product Name:** [Sahm Yook Soyalac (Plain Soymilk)].
**Foreign Name:** Sahm Yook Soyalac.
**Manufacturer's Name:** Sahm Yook Korean Foods.
**Manufacturer's Address:** 320 Panjeong-ri, Jiksan-myun, Chunwon-gun, Choongchungnam-do 333-810, South Korea.
**Date of Introduction:** 1985 June.
**Ingredients:** Soy milk, vegetable oil, glucose, high fructose corn syrup, salt.
**Wt/Vol., Packaging, Price:** 200 ml foil retort pouch (Doypack). Retails for 300 Won (6/90).
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Form filled out and label sent by C.Y. Yoon, General Manager, Sahmyook Korean Foods. 1990. June 23. The product was introduced in June 1985. Ingredients are listed in English.

Label (Foil retort pouch). Sent by C.Y. Yoon. 1990. June 23. 4 by 6.75 inches Red, yellow, dark green, and light green on silver. Front panel says "Soyalac" and an illustration shows 3 yellow soybeans in a green pod. The back panel shows the package being immersed in boiling water or heated in a microwave oven. So this package is probably sold during the cold months.

1133. Staudt, Joe. 1985. La Choy. *Horizons* (*Beatrice Grocery Group*). Summer. p. 1-7.
• ***Summary:*** In 1920 Wally Smith and Ilhan New, two friends from the University of Michigan, founded La Choy Foods in Detroit. Their first product was [mung] bean sprouts. In 1922 the business was incorporated as La Choy Food Products. The first La Choy-owned plant was built in Detroit in 1937. The Archbold, Ohio plant was built on its present site in 1942. The Company's long association with Beatrice started

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in 1943, when La Choy was bought by the Chicago-based company and became Beatrice's first non-dairy operation. The article does not state when La Choy introduced soy sauce. But in 1945 it came off the bottling line at 30 bottles/minutes; today it is 250 bottles/minutes. La Choy, which translates to "good vegetables," is and has been for some time the world's undisputed leader in Oriental foods. Address: Fullerton, California.

1134. Ostman, Eleanor. 1985. Public acquires a taste for tofu. Soybeans give business more than just desserts [Lee L. Lee, Tofulicious, and Eastern Foods Corp.]. *Morning Pioneer News Dispatch* (*St. Paul, Minnesota*). Sept. 15. p. 1G, 3G.
• ***Summary:*** Korean-born Lee L. Lee graduated in physics from Seoul National University and came to the Univ. of Minnesota to study accounting. He stayed to work for 11 years at Control Data Corporation's international accounting division, the last 5 as its manager. "He was clearly ahead of demand in 1978 when he started producing tofu in a tiny rented warehouse in Roseville [Minnesota]." During his years at CDC "he was also making tofu for First Oriental Foods in St. Paul, ultimately buying that company in 1982. His Eastern Foods Corp. began producing tofu part time a year before he left Control Data, with the assistance of venture capital investment from his former employer." CDC owns 30% of Eastern Foods. In 1979 he built his current quarters at 3235 E. Hennepin Ave.

"Though he kept producing tofu over the years while two other local competitors started and folded, Lee says he knew that 'I couldn't live and die with just one product.' His company began manufacturing won ton skins and egg roll wrappers. 'Within 18 months, we dominated the entire Midwest market for the skins,' said Lee.

"'In tofu, we are the leader in Minnesota, Wisconsin, Iowa, Michigan and Illinois. Our sales were growing 10 to 15 percent annually, but the base was so small to being with. The Minnesota market uses 300 cases of tofu a week; that's under $10,000 a month.' Total production weekly of tofu, skins and related products is up to 36,000 pounds weekly...

"Steve Schellhaass, formerly with Safeway Stores, was hired last year as vice president of manufacturing and product development, with a directive to find 'value-added' uses for tofu and the skins. Tofulicious is one result and Tofruit, resembling yogurt with fruit, is another. Available in health food stores, it soon may be released to regular retail channels under a co-packing arrangement. The company also has tofu salad dressing ready...

"Lee plans to make Eastern Foods a national company in 1986 and perhaps to go public in 1987. To speed national distribution, his company has contracted with JFC International, the distribution arm of Kikkoman soy sauce and the largest Oriental specialty distributor in the country."

A photo shows Lee L. Lee, founder and president of Eastern Foods Corp., holding a pint of Tofulicious. Address: Minnesota.

1135. **Product Name:** Tofulicious (Soy Ice Cream) [Dutch Chocolate Almond, Vanilla Almond Supreme, Piña Colada Royale, Triple Berry Delight, or Creamy Peanut Butter].
**Manufacturer's Name:** Eastern Foods Corp.
**Manufacturer's Address:** 3225 E. Hennepin Ave., Minneapolis, MN 55413.
**Date of Introduction:** 1985 September.
**How Stored:** Frozen.
**Nutrition:** Chocolate-Almond. Per 4 fl oz: Calories 160, carbohydrates 24 gm, protein 3 gm, fat 6 gm, sodium 50 mg.
**New Product–Documentation:** Dairy Record. 1985. Nov. p. 43. "A Taste of the Orient." Product development was partially supported by the Minnesota Soybean Growers Association. *Soybean Digest.* 1987. July. p. 4. Leaflet. 1986, undated. Tofulicious. Good taste that's good for you. Haumann. 1987. JAOCS. Oct. p. 1378. The product was developed by research coordinated by Univ. of Minnesota food scientist William Breene and funded by the Minnesota Soybean Research and Promotion Council; Calhoun Herald (Hardin, Illinois). 1988. Sept. 15. "Tofulicious available at Taviners." Midwest Gourmet Ventures, a new distributorship established by John and Caroll Bonn, is the exclusive distributor for Tofulicious, which is a kosher product and has an approved diabetic exchange of one and one half starches and one fat per 4 oz. serving.

1136. Jackobs, Joseph A.; Smyth, C.A.; Erickson, D.R. 1985. International soybean variety experiment: Tenth report of results, 1983. *INTSOY Series* No. 28. xiv + 113 p. Sept. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries (For the year 1983): Algeria, Argentina, Bangladesh, Bolivia, Burma, Cameroon, Chile, Colombia, Costa Rica, Cuba, Dominica, Ecuador, Egypt, El Salvador, Gabon, Gambia, Ghana, Guatemala, Guinea-Bissau, Honduras, Indonesia, Korea, Laos, Madagascar, Mali, Mexico, Morocco, Nepal, Pakistan, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Saint Lucia, Senegal, Somalia, South Africa, Sri Lanka, Sudan, Thailand, Turkey, United States, Upper Volta, Venezuela, Yugoslavia, Zaire, Zambia, Zimbabwe.

(For the year 1982): Brazil, Burma, Cuba, Italy, Peru, Turkey, Zaire.

In Dominica, on 19 Nov. 1983, with Plenty Canada serving as the cooperator, 16 varieties of soybeans were planted at the Royal Botanical Gardens, Roseau. Jupiter gave the highest yield, 676.8 kg/ha.

1137. *Daily Leader* (*Stuttgart, Arkansas*). 1985. Teamwork: Researchers, marketers join forces to make Hartz efforts successful. Oct. 2. p. 4C. Insert.
• ***Summary:*** Genetic research and development of plant

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varieties today requires teamwork. Dan Lamberth, chief operating officer, says that Hartz is involved in a never-ending quest for excellence. The Plant Variety Protection Act of 1971, which protects a breeder's patent on a new variety for 17 years, set the stage for Hartz's current efforts. Until then, a plant breeder had no protection for his work and there was little incentive for private industry to develop research programs. Most plant breeding was done by state and federal government programs.

Since 1971 Hartz has developed nine varieties. "The main emphasis of Hartz Seed Company has been and remains the Southern soybean market... Hartz has also developed a program of food bean production for the Far East, which is an important, but not dominating, percentage of its business. Hartz 936X soybeans, grown in the United States and shipped to Japan and Korea, have been subject to substantial increases in sales during the past six to seven years... Hartz 936X soybeans have captured the best-quality, higher-priced natto market." Hartz is also involved in both farm management and real estate. A photo shows Dan Lamberth seated at his desk.

1138. Kim, J-P; Park, J-G; Lee, M-D; Han, M-D; Park, S-T.; Lee, B.H.; Jung, S.E. 1985. Co-carcinogenic effects of several Korean foods on gastric cancer induced by N-methyl-N'-nitro-N-nitrosoguanidine in rats. *Japanese J. of Surgery* 15(6):427-37. Nov. *

• ***Summary:*** "Thus, gastric carcinogenesis was enhanced by red pepper and a high salt diet, was inhibited by a maejoo [meju = Korean soybean koji] and ginseng diet and was not effected by vitamin A."

1139. Hong, E.H.; Kim, S.D.; Hwang, Y.H.; et al. 1985. [A new high yielding and disease resistant sprouting soybean variety, "Pangsakong"]. *Research Reports of The Rural Development Administration* 27(2):183-86. Dec. [Kor; eng]

• ***Summary:*** A new soybean variety, Pangsakong, was developed at the Crops Experiment Station, Rural Development Administration in Suweon in 1984. This variety was originally selected from gamma-ray treated mutants with CB27 at the Korea Atomic Energy Research Institute. One-hundred seed weight of the variety was about 12 grams which was approximate optimum seed size for bean-sprout purposes. The results of regional yield trials carried out at 13 locations throughout country from 1983 to 1984 indicated that the yield of Pangsakong was lower than currently recommended soybean varieties but 34% higher than that of local indigenous bean-sprout soybean varieties. Address: 1-3. Crops Exp. Station, Suwon, South Korea.

1140. Shanmugasundaram, S.; Toung, T.S.; Chen, Li-Fen. 1985. AVRDC Soybean Evaluation Trial (ASET): 1980-1981 first report of cooperator's results. Shanhua, Tainan, Taiwan: AVRDC. iv + 62 p. Dec. 28 cm.

• ***Summary:*** In 1980 soybean varieties were tested in India, Pakistan, Philippines, Taiwan, Guatemala, and Argentina. In 1981 they were tested in Upper Volta [Burkina Faso], Sudan, India, Indonesia, Korea, Malaysia, Philippines, Thailand, Guatemala, Nicaragua, and Argentina.

Note: This is the earliest document seen giving the results from the international network of AVRDC Soybean Evaluation Trial (ASET) cooperators from 1980-81. Address: Shanhua, Tainan, Taiwan.

1141. **Product Name:** [Lecithin].
**Manufacturer's Name:** Dong Bang Corporation.
**Manufacturer's Address:** 2, 4-Ka, Yangpyung-Dong, Yungdeungpo-ku, C.P.O. Box 3031, Seoul 150, South Korea.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 79.

1142. **Product Name:** Soybean Sprouts.
**Manufacturer's Name:** Jack and the Beanstalk.
**Manufacturer's Address:** 401 Victor Way, Suite 16, Salinas, CA 93907. Phone: 408-422-8028.
**Date of Introduction:** 1985.
**Ingredients:** Soybeans.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Albert Park, owner. 1991. Feb. 1. The company, whose name has not changed, is now located at 401 Victor Way, Suite 16, Salinas, California 93907. The previous owner, Mr. Hun Kim, moved it to that location from Carmel Valley about 5 years ago. Both Mr. Kim and Mr. Park are Korean-Americans, The company now makes tofu, soymilk, and soybean sprouts. Mr. Kim introduced the soybean sprouts 5-6 years ago. It is not clear whether the company was located in Salinas or in the Carmel Valley when Mr. Kim started making soybean sprouts, but he would guess that he started in Salinas.

1143. Kim, Mi-Seong; Koh, M.S.; Kwon, T.Y. 1985. [Changes of nitrosamine-related compounds by salt concentration and nitrate content during the Korean native soysauce fermentation]. *Journal of the Korean Society of Food and Nutrition* 14(4):329-38. [35 ref. Kor; eng]

• ***Summary:*** "This study was undertaken in order to research formation of nitrosamine and its related compounds by salt concentration and nitrate content during Korean native soysauce fermentation. The results from measuring the changes of nitrite and dimethylamine content can be summarized as follows. As the nitrate content in used water was getting higher and the salt concentration was getting lower, the soysauce fermentation was abnormal. As the salt concentration was getting higher, the reduction of nitrate and formation of nitrite were delayed. But whether the nitrate content in used water was-higher or not, the nitrite was continuously remained. An addition of ascorbic acid

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restrained the reduction of nitrate, and simultaneously, it could eliminate the nitrite effectively. As the nitrate content in used water, was getting higher, the content of dimethylamine was getting lower. Nitrosodimethy-lamine was detected from 0 to 261.34 ppb." Address: Dep. of Home Economics, Chonnam Univ., Kwangju, Chollanam-Do, South Korea.

1144. Kim, Soo-Ho; Lee, H.J. 1985. [Characteristics of bitter peptides from a cheese and a soybean paste]. *Korean J. of Food Science and Technology* 17(4):276-82. [27 ref. Kor; eng]
• ***Summary:*** Bitter peptides were isolated from Mozzarella cheese and a soybean paste. Key amino acids were leucine, phenylalanine, proline, and valine. Address: Dep. of Food Science & Technology, Seoul National Univ., Suwon, South Korea.

1145. Lee, Jung-Sook; Kim, Y.B.; Ko, Y.T. 1985. [Flavor and volatile compounds of soy yogurt]. *Korean J. of Food Science and Technology* 17(1):51-53. [11 ref. Kor; eng]
• ***Summary:*** Soymilks were prepared from full fat or defatted soy flour, soy protein concentrate, and soy protein isolate. Each was fermented with *Lactobacillus acidophilus* to make a yogurt-like beverage. The flavor of the soy based products was rated inferior to that of a cow's milk product by a taste panel. The flavor of the product made with soy protein isolate was considered the best. Fermentation improved the flavor of the isolate-based yogurt, and reduced the volatiles n-hexanal and increased diacetyl in the concentrate and isolate yogurts. Address: Dep. of Food and Nutrition, Duksung Women's College, Seoul, South Korea.

1146. **Product Name:** [Won, Charm, and Young Soymilk].
**Manufacturer's Name:** Lotte Chilsung Beverage Co. Ltd.
**Manufacturer's Address:** Seorak Bokji Center, 5th Floor, 433 Shinsa-Dong, Kangnam-ku, Seoul, South Korea.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 84; 1986. p. 103.

1147. Paik, I.S.; Lim, S.J.; Ko, Y.T. 1985. [Keeping quality of yoghurt beverage prepared from soy protein concentrate]. *Korean J. of Food Science and Technology* 17(1):45-50. [21 ref. Kor; eng]*
• ***Summary:*** A soy yogurt beverage was prepared by using *Lactobacillus acidophilus* to ferment a soy protein concentrate solution. The product was stored for up to 66 days at 5ºC and 25ºC. Significant sedimentation occurred during the first hour of storage, but was inhibited by stabilizers: by greater than 0.6% carboxymethyl cellulose, greater than 0.2% propylene glycol alginate, or greater than 0.05% sodium alginate. The beverage could be stored for up to 66 days at 5ºC without significant microbial change. Some samples were contaminated by fungi, which were greatly retarded by 0.005% potassium sorbate preservative. Address: Dep. of Food & Nutrition, Duksung Women's College, Seoul, South Korea.

1148. Park, Yong-Gone; Park, B.D.; Choi, K.S. 1985. [Changes of ultrastructure of tissues, characteristics of protein, and tofu yield with increased soybean soaking time]. *Journal of the Korean Society of Food and Nutrition* 14(4):381-86. [21 ref. Kor; eng]
• ***Summary:*** Tofu yield was increased from 45.0% to 55.4% when soaking time was increased from 5 to 24 hours. Address: Dep. of Food Science & Technology, Yeungnam Univ., Gyongsangbuk-do, South Korea.

1149. Sohn, Jung-Woo; Kim, W.J. 1985. [Some quality changes in soybean curd by addition of dried soymilk residue]. *Korean J. of Food Science and Technology* 17(6):522-25. [14 ref. Kor; eng]
• ***Summary:*** Dried okara (the residue from making soymilk) was added at up to 30% to the soybean water extract used to make tofu. As proportions of okara increased, volume and water holding capacity of the curd were reduced and penetration value increased. Sag value increased up to 20% residue, then decreased drastically to 30%. Overall physical and sensory attributes indicate that 10% residue inclusion would be acceptable. Address: Dep. of Food & Nutrition, Sook-Myung Women's Univ., Seoul, South Korea.

1150. Bhatnagar, P.S. 1985. Soybeans in India–Research and development. In: H.C. Srivastava, et al, eds. 1985. Oilseed Production: Constraints and Opportunities. New Delhi: Oxford & IBH Publishing Co. xix + 700 p. See p. 205-18. [11 ref]
• ***Summary:*** Contents: Introduction. Scope in India. Production potential. Soybean in India. Returns to farmers. Place in cropping systems. Research. Constraints and strategies. Acknowledgements.

Tables show: (1) Increase or decrease in total hectarage, mean yield, and total production of soybean in Asia in 1983 (base year 1974-76). Source: Shanmugasundaram 1984. After each country listed in the table are figures. The 1st is change in hectarage (1,000 ha), the 2nd is change in yield (kg/ha), and the 3rd is change in production (1,000 metric tons). Burma (6, 144, 8). China (900, 153, 2,133), India (610, 235, 623). Indonesia (-25, 64, 24). Iran (-2, 564, 26). Japan (55, 68, 87). Kampuchea [Cambodia] (-3, 0, -3). Korea DPR [north] (19, 227, 90). Korea Rep. [south] (-64, -7, -75). Laos (2, 206, 1). Malaysia (-, 171, -). Philippines (4, 347, 7). Sri Lanka (1, 12, 1). Taiwan (based on 1982 data) (-39, 12, -48). Thailand (22, -76, 13). Turkey (25, 497, 52). Vietnam (65, 526, 88). Asia–total (1,647, 141, 3,080). USA (4,334, -40, 6,659). Brazil (2,342, 125, 4,927). World (11,272, 49, 19,741).

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(2) Oil yields of the mail oilseeds as field crops. Source: FAO Production Yearbook (1972). In total yield worldwide in 1,000 tones the ranking is: 1. Soybean 8,749. 2. Groundnut (in hulls) 5,066. 3. Cotton 4,339. 4. Sunflower 3,308. 5. Rapeseed 2,525. 6. Sesame 965. 7. Flax 964. 8. Castor 385. 9. Safflower (N). Yet in terms of oil yield in kg/ha, the top three are: 1. Sunflower 376. 2. Safflower 280. 3. Castor 278. And... 6. Soybean 216.

3. Estimated area potentially available for soybean in Madhya Pradesh and Uttar Pradesh. Source: Williams 1974.

4. Targetted and actual cultivation (ha) as well as production (tonnes) in India under the centrally sponsored scheme for soybean development, from 1978-79 to 1983-84. The soybean states are Madhya Pradesh, Uttar Pradesh, Karnataka, Bihar, Himchal Pradesh, Rajasthan, Gujarat.

5. Identified / released varieties of soybean for different agro-climatic zones. The four zones are: Northern hill zone. Northern plain zone. Central zone. Southern zone.

6. The salient production technology of soybean for different agro-climatic zones in India.

7. Performance of some promising advanced breeding lines of soybean developed in India. 8. Composition of defatted soy flour. Address: Project Co-ordinator, All India Co-ordinated Research Project on Soybean (ICAR), G.B. Pant Univ. of Agriculture and Technology, Pantnagar (Nainital), Uttar Pradesh, India.

1151. Dr. Chung's Foods Company, Ltd. 1985. Dr. Chung's Foods Company, Ltd. Seoul, South Korea. 8 p. [Eng; Kor]

• ***Summary:*** The title page reads: "Chung's Foods offers health: The nutrition of soymilk and the expertise to produce it. We developed the system for producing nutritious soymilk for the first time in Korea and patented the invention." The company's main soymilk product is Vegemil. Photos show: (1) Chai-Won Chung M.D., Chairman of Dr. Chung's Foods Co., Ltd. (2) Vegemil in 180 ml bottles and 200 ml Tetra Brik cartons. Choco Woorean is a newly developed type of health food made from a mixture of undiluted Vegemil soymilk and chocolate powder. Apple Woorean is a similar product made with apple juice instead of chocolate. The company has two soymilk plants, the first at Singal, and the second at Chung Joo. The latter is one of the largest and most modern in the world. The head office is in Seoul, Korea. Address: Seoul, South Korea.

1152. Harper, Judson M.; Jansen, G. Richard. 1985. Production of nutritious precooked foods in developing countries by low-cost extrusion technology. *Food Reviews International* 1(1):27-97. [53 ref]

• ***Summary:*** Contents: Introduction: Importance of weaning foods, centrally processed weaning foods, transition from imported to locally processed weaning foods. Manufacturing alternatives: Extrusion processing, roller drum drying process, spray drying process, baked products line, milling process, selection of alternative processes, production capacity range, capital costs, operating costs, type of weaning food product, type of packaging, local equipment, energy, skill requirements, sanitation requirements, summary. Capabilities and limitations of LECs: Characteristics of low-cost extrusion cookers, Brady extruder (M&N Distributors, Torrance, California; or CIATECH, Chihuahua, Mexico), Insta-Pro extruder (Div. of Triple "F" Feeds, Des Moines, Iowa), Anderson extruder (Cleveland, Ohio), summary of LEC characteristics. Cost associated with LEC plants: Elements of a LEC plant, plant costs, manufacturing costs, project planning and implementation, preliminary study, project implementation. Cereal/legume blends: Specifications, energy, protein, dietary fiber, vitamins and minerals, ingredients, storage stability, calorie density, protein quality evaluation (corn/soy blends, corn/sorghum blends with cottonseed), metabolic studies in human infants and preschool children (extruded corn/soy blends, extruded sorghum). Full-fat soy flour: Storage studies, protein nutritional value, rat growth evaluation, baking study, potential utility of extrusion processed full-fat soy flour. Applications in developing countries: Sri Lanka (1976, Thriposha). Costa Rica (1976, 1979, Frescorchata). Tanzania (May 1978, Lisha). Guyana (1979, Cerex). Mexico (CIATECH 1978, many products), other commercial applications (Pro-Nutre in San Jose, Costa Rica; Maisoy in Santa Cruz, Bolivia), miscellaneous developments (INCAP in Guatemala, Meals for Millions in Korea, PINFST in the Philippines, Thailand, Leche Arroz in Ecuador {an extruded mixture of ground broken rice and whole soy}). Technology transfer (Colorado State University). Discussion. Summary. Sources of funding for this publication.

Figures: (1) Graph of infant mortality rate vs. duration of breast feeding for 19 countries (mostly developing countries). In general, the longer the breast feeding, the greater the infant mortality. (2) Extruder, showing rotating screw which forces product through a discharge die. (3) Typical extrusion process for food production (from storage bin to packaging). (4) Schematic of roller drum drying process for food production. (5) Typical spray drying process for weaning food production. (6) Systematic of baking line to make biscuits. (7) Systematic of simple missing process. (8) Cross sectional schematic of Brady extruder. (9) Photo of Insta-Pro 500 extruder. (10) Anderson extruder showing braker bolts, water / steam injectors, and face cutter. (11) Diagram of sequential processing operations of a LEC processing plant. (12) PERT chart showing key steps in feasibility study to establish essential process parameters. (13) PERT chart showing steps necessary to complete a central processing facility for weaning foods. (14) Viscosity of uncooked or cooked gruels made from raw dehulled corn or dehulled corn extruded from a Brady extruder at 149ºC. (15) Inside Thriposha LEC plant (in Sri Lanka; LEC started in 1976). (16) Four labels of packaged Thriposha products.

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(17) Outside front of Costa Rica LEC plant. (18) Four packages of Lisha baby food (Tanzania). (19) Four plastic laminated bags used to package Cerex in Guyana.

Also contains 18 tables–many related to soy.

Note 1. The LEC project in Korea (p. 91) uses a lower capacity extruder (less than 100 kg/hour) designed by the Meals for Millions Foundation (MFM) and constructed by the Korean Institute of Science and Technology (KIST). This extruder is made from parts that are easily available and consists of a screw 6.35 cm in diameter and 63.5 cm long driven by 22.3 kW (30 HP) electrical motor. A nutritious snack has been made for the Wonseong County Comprehensive Nutrition Program using the MFM LEC (see Cheigh 1984).

Note 2. This is the earliest and only document seen (Jan. 2011) that mentions "Leche Arroz." It appears to be a beverage resembling a mixture of rice milk and soymilk, made from rice that might otherwise go to waste. Good idea! Address: Colorado State Univ., Fort Collins, Colorado.

1153. Hume, D.J.; Shanmugasundaram, S.; Beversdorf, W.D. 1985. Soyabean (*Glycine max* (L.) Merrill). In: R.J. Summerfield and E.H. Roberts, eds. 1985. Grain Legume Crops. London: Collins. xvi + 859 p. See p. 391-432. Illust. Index. 24 cm. [192 ref]

• ***Summary:*** Contents: Introduction: History, current status and future projections. Principal economic yield and uses of crop products. Principal farming systems. Botanical and agronomic features: Symbiotic nitrogen fixation potential. Principal limitations to production and yield: Developing countries, developed countries. Fertiliser requirements. Quality of seed constituents. Germplasm resources. Principal breeding strategies: Adaptation to new geographic areas, breeding methodology, breeding objectives, seed quality, pest and disease tolerances, current trends in soyabean breeding. Avenues of communication among researchers (INTSOY, AVDRC, IITA, FAO). Prospects for larger and more stable yields.

Tables: (1) Area (1000 ha), yield (kg per ha), and production (1000 tonnes) of soyabeans from 1969-71 to 1982. (2) Maturity durations and productivity potentials of soyabeans in selected countries. (3) *Glycine* species collections around the world. (4) Sources of resistance among soyabeans to selected insect pests. (5) Sources of resistance among soyabeans to selected diseases.

Table 9 shows that there are soybean germplasm collections in 15 countries. This table has 4 columns: Country, location (city), curator, and number of accessions. AVRDC in Taiwan has the largest germplasm collection in one location (10,400 accessions, Tainan), followed by USA (9,648, Illinois and Mississippi), India (4,000, Pantnagar; 1,800 Amravati), Japan (3,541, Tsukuba; 200, Morioka), USSR (3,000, Leningrad), China (3,000 Jilin; 3,000 Hubei; 2,930 Shadong [sic, Shandong {W.-G. Shantung}]; 2,500 Beijing; 960 Heilungjiang [Heilongjiang]). Also: Australia 400, France 500, Nigeria 1,300, Indonesia 600, South Korea 2,833, North Korea 300, South Africa 600, Sweden 1,200, and Thailand 1,686.

Most tropical soybean types are determinate. Address: 1&3. Univ. of Guelph, Dep. of Crop Science, Guelph, Ontario N1G 2W1, Canada; 2. Asian Vegetable Research and Development Centre (AVRDC), PO Box 42, Shanhua, Tainan 741, Taiwan, Republic of China.

1154. Juvik, Gail A.; Bernard, R.L.; Kauffman, H.E. 1985. Directory of germplasm collections. 1. II. Food legumes (Soyabean). Rome, Italy: International Board for Plant Genetic Resources. 53 p. Co-sponsored by INTSOY. [11 ref]

• ***Summary:*** Soybean germplasm collections worldwide are listed (with address and number of accessions) in the following countries: Argentina, Australia, Austria, Bangladesh, Bolivia, Brazil (2 collections), Bulgaria, Canada, China (14 collections), Taiwan (3), Colombia, Czechoslovakia (2), France (4), Germany (East), Germany (West), Greece, Hungary (2), India (8), Indonesia (3), Italy, Japan (5), Korea (South, 2), Malaysia, Nepal, Nigeria, Papua New Guinea, Paraguay, Philippines, Poland, Portugal, Romania, Spain, Sri Lanka, Thailand (2), Turkey, USSR, United Kingdom, USA (5), Uruguay, Venezuela, Vietnam (2), Yugoslavia, Zambia, Zimbabwe.

The world's largest soybean germplasm collections are as follows: AVRDC, Tainan, Taiwan (12,200 accessions), National Seed Storage Laboratory (NSSL), Fort Collins, Colorado, USA (10,880), Univ. of Illinois, Urbana, IL, USA (8,368), Jilin Academy of Agricultural Sciences, Jilin, China (4,800), N.I. Vavilov All-Union Institute of Plant Industry (VIR), Leningrad, Moscow (4,700), All-India Coordinated Research Project on Soybean, G.B. Pant Univ. of Agriculture and Technology, Pantnagar, India (4,022), Suweon, South Korea (4,020), Tsukuba, Japan (3,741). USDA, Stoneville, Mississippi, USA (3,000).

A world map (p. 9-10) shows (1) The sites of all soybean germplasm collections, (2) the range of ancient cultivation of the soyabean (East and Southeast Asia), (3) range of the wild soybean (Glycine soja; in China and Japan), and (4) range of perennial Glycine (Australia, Papua New Guinea, Philippines, Taiwan, Melanesia, and Micronesia).

This document is "Available free to developing countries, but restricted distribution to developed countries." Address: 1&3. INTSOY, Univ. of Illinois at Urbana-Champaign; 2. USDA-ARS, Dep. of Agronomy.

1155. Noh, Chin-hwa. 1985. Traditional Korean cooking: Snacks & basic side dishes. Elizabeth, New Jersey; Seoul Korea: Hollym Corporation. 78 p. Illust. (color). Index (general). Index of Korean recipe titles. 27 cm. [Eng; kor]

• ***Summary:*** This is an excellent cookbook of authentic Korean recipes, each with its Korean name (romanized

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and in Korean characters). Each recipe is accompanied by numerous useful color photos. The front matter contains an Introduction, Preparation tips, and 2 pages about the healthy Korean diet. Soy related recipes include: Soft bean curd soup (*Sundubutchigae,* p. 10). Seasoned fermented soybean soup (*Ch'onggukchangtchigae,* with 1 cake bean curd and 6-8 tablespoons seasoned fermented soybeans, p. 11 [ch'onggukchang is Korean style natto]). Royal soybean paste soup (*Kungjungdoenjangtchigae,* with 2 tablespoons soybean paste [Korean miso], p. 12). Bean curd casserole (*Tubu Chon-gol,* p. 13). Wrapped bean curd (*Tubussamtchim,* p. 15). Stuffed bean curd (*Tubusobagi,* p. 16). Steamed bean curd (*Tubuson,* p. 16-17). Bean curd in soy sauce (*Tubut'wigimjorim,* p. 18). Salted bean curd and beef (*Tubu Soemgogijorim,* p. 18). Salted beans (*K'ongjorim,* with 1 cup black beans plus soy sauce, sugar, sesame seeds, and sesame oil, p. 19). Cold cooked bean curd (*Tubu Naengch'ae,* p. 22). Bean sprout rice (*K'ongnamulpap,* with 2/3 lb. [soy] bean sprouts, p. 24). Dried radish strips in soy sauce (*Muumallaengijangatchi,* p. 54). Cucumbers in soy sauce (*Oijangatchi,* p. 55). Sesame leaves in soy sauce (*Kkaennipchangatchi,* p. 56). Todok in red sauce (*Todokchangatchi,* with 1 cup soy sauce, p. 56). Fermented soybean lumps (*Meju,* with 18 lb. dried yellow soybeans, p. 62-63). Soy sauce (*Kanjang,* homemade, p. 62-63). Soybean paste (*Toenjang,* homemade, p. 63). Red pepper paste (*Koch'ujang,* homemade, with 2 lb. fermented soybean powder, 6 lb glutinous rice powder, p. 64).

Note 1. This is the earliest English-language document seen (Jan. 2012) that uses the word "ch'onggukchang" to refer to Korean-style natto.

Note 2. This is the earliest English-language document seen (March 2009) that uses the word "Toenjang" to refer to Korean-style soybean paste (miso), or the word "Koch'ujang" to refer to Korean-style fermented red pepper and soybean paste (miso).

The useful Glossary (p. 73-75) contains definitions of: Bean curd (*tubu*). Beans, incl. yellow soybeans (*huink'ong*) which are used to make [soybean] sprouts (*k'ongnamul*), bean curd (*tubu*), soft bean curd (*sundubu*), bean paste (*toenjang*), fermented soybeans for making soy sauce (*meju*), seasoned fermented soybeans (*ch'onggukchang* [*Korean natto*]), soybean flour (*k'ongkaru*), soy sauce (*kanjang*).

Brown soybeans (*pamk'ong*–literally "chestnut beans") are a chestnut brown color and have a smooth chestnut-like texture when cooked.

Black soybeans (*komunk'ong*) are served as a side dish.

Mung beans (*noktu*), used to make mung bean sprouts (*sukchu namul*), etc. Red kidney beans [azuki] (*kangnamk'ong*).

Bean sprouts (*k'ongnamul*) may be grown at home or purchased in the vegetable section of most grocery stores. The large sprouts are from the yellow soybean; the smaller, more delicate sprouts are from the green mung bean.

"Soybean paste (*toenjang*) is a thick brown paste made from a mixture of mashed fermented soybean lumps [soybean koji] (left from making the soy sauce), powdered red pepper seeds and salt. It is used as a thickener for soups and stews and will keep well in the refrigerator.

"Soy sauce (*kanjang*) is a brownish-black salty liquid made by cooking fermented soybean cakes with water and salt. Each household in Korea used to make their own soy sauce in the spring; some still do. These are mild and add good flavor to most any food." Soy sauce is used in cooking and at the table. Japanese "soy sauce is less salty but sweeter than Korean soy sauce.

"Sweet red beans (*p'at*) are small and round and used widely in Korean confections. When cooked and mashed they are sweet and soft textured. This sweet bean puree [Japanese *an*] is used as filling in rice cakes [mochi] and also now in donuts and rolls."

The Glossary also mentions laver (*kim*), a sea vegetable called "nori" in Japan, that is widely used in recipes in this book. No other sea vegetables are mentioned. Address: Munhwa Cooking School.

1156. Noh, Chin-hwa. 1985. Practical Korean cooking. Elizabeth, New Jersey; Seoul Korea: Hollym International Corporation. 214 p. Illust. (color). Index. 27 cm.

• ***Summary:*** Although this cookbook of authentic Korean recipes contains more than twice as many pages as the author's *Traditional Korean Cooking* (214 vs. 78), many of the recipes and photos are identical, as is the front matter: Introduction, Preparation tips, and The Korean Diet. This book contains many more meat dishes.

Most of the soy-related recipes are the same, except there are many new recipes in which "soy sauce" is included in the title; many also contain meat. A complete list of these is given in the Index under "soy sauce." For example: Beef and bamboo shoot in soy sauce (p. 42). Chicken in soy sauce (p. 45). Deep-fried chicken in soy sauce (p. 46). Abalones in soy sauce (p. 104).

The following are recipes for basic soyfoods with many color photos–Page 196: Fermented soybean lumps (*meju;* soybean koji). Pages 196-97: Soy sauce (*kanjang*). Page 197: Soybean paste (*toenjang*). Page 198: Red pepper paste (*koch'ujang*).

Here is the recipe (with many photos) for making meju, then using it to make soy sauce (kanjang): Ingredients 18 lb. dried yellow soybeans

Method: 1. Wash the soybeans and soak them in water overnight; drain.

2. Boil the soybeans in water on high heat. When they come to a boil, reduce the heat and simmer until the soybeans are thoroughly cooked. Drain the soybeans and pound them to a fine pulp while still hot, etc. Too complex to follow. Address: Munhwa Cooking School.

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1157. Ontario Soya-Bean Growers' Marketing Board. 1985. Soybeans: Nature's miracle–teaching unit (Portfolio). Chatham, Ontario, Canada: OSGMB. [1] + 33 p. Undated. 28 cm.
• ***Summary:*** This interesting portfolio of materials, with 33 numbered pages of inserts plus an unnumbered first page ("Introduction to teacher's unit"), is designed to teach children in Ontario, Canada, about the growth development of a soybean from seed to mature plant, soybean cultivation, soybean processing and products, the importance of soybeans to Ontario's economy, and the Ontario Soya-Bean Growers' Marketing Board.

Contents: Introduction to teacher's unit. 1. From seed to pod: A brief history of soybeans in Canada, biology of the soybean seed, its germination and seedling growth, soybean nodules and rhizobia bacteria, parts of a young soybean plant, reproductive stages from flowering to maturity, corn heat units, tillage, word scramble.

2. Soybeans–Nature's miracle: A brief history of soybean utilization, ways that soybeans are used, soy oil, meal and soyfoods, recipes, word search. 3. Imports and exports: Importance of soybeans to the economy of Canada and Ontario, how soybeans get to market, The Ontario Soya-Bean Growers' Marketing Board.

A table on page 20 shows "Soymeal consumption by Ontario's livestock and poultry." Hogs consume 45% of the total (the total is 503,000 tonnes), poultry 34%, dairy cattle 20%, and beef cattle 1%. Page 22 notes that the bulk of Ontario's soybean exports (77%) are sold to East Asia–especially Japan, Hong Kong, Singapore, Malaysia, Indonesia, and Korea. Soyfoods are listed and discussed in a positive way, with recipes for: Bran muffins (with soy flour and soy oil). Tofamole (tofu guacamole). Tofu fruit pudding. Tofu shake.

Note: This is the earliest English-language document seen (Dec. 2003) that contains the term "Tofu shake."

The three largest farm crops in Ontario in terms of total area are hay (1,050,000 ha), grain corn (902,000 ha), and soybeans (425,000 ha). Address: Chatham, ONT, Canada.

1158. Patterson, Glenn; Bray, Walter J.; Larson, Patricia Butzer. 1985. The puffing machine for quick cooking of cereals & legumes. Davis, California: Meals for Millions / Freedom from Hunger Foundation. 28 p. Illust. 22 cm.
• ***Summary:*** Contents: Introduction. Nutritional considerations. The puffing machine. Operating the puffing machine. Safety. Heating sources. Maintenance. Producing a good product. A puffed-food business. Conclusion.

Describes a small, hand-operated metal chamber that holds grain or legumes over an open fire, until the contents reach the right temperature to pop–or puff. Many photos and several drawings show the puffing machine.

Note: Single copies are available free of charge by writing the Foundation. Address: 1-2. PhD; 3. Editor. All: P.O. Box 2000, Davis, California 95617. Phone: (916) 758-6200.

1159. Shurtleff, William; Aoyagi, Akiko. 1985. When major soybean producing nations reached "takeoff" of 10,000 metric tons (Document part). In: Shurtleff and Aoyagi. 1985. Soyfoods Industry and Market: Directory and Databook. 5th ed. Lafayette, CA: Soyfoods Center. 202 p. See p. 168.
• ***Summary:*** Pre-1850 China proper, Manchuria, Korea, Japan, Taiwan, Indonesia. 1912 United States. 1925 USSR. 1942 Canada. 1946 Brazil, Thailand. 1955 Nigeria. 1956 Colombia. 1958 Vietnam (North and South combined). 1959 Yugoslavia. 1961 Argentina. 1962 Mexico. 1963 Paraguay. 1966 Romania. 1968 India. 1969 Turkey. 1971 Bulgaria. 1972 Iran, Nepal, Australia. 1974 South Africa, Hungary, Burma. 1975 Uruguay, Bolivia, Zimbabwe. 1976 Egypt. 1979 France. 1980 Philippines. Address: Lafayette, California. Phone: 415-283-2991.

1160. Yokotsuka, Tamotsu. 1985. Fermented protein foods in the Orient, with emphasis on shoyu and miso in Japan. In: B.J.B. Wood, ed. 1985. Microbiology of Fermented Foods. Vol. 1. Essex, England: Elsevier Science Publishing Co. xx + 371 + 14 p. See p. 197-247. [146 ref]
• ***Summary:*** This book chapter is very similar to Yokotsuka (1982), "Industrial application of proteinous fermented foods." However it contains some new, additional, and very interesting information, especially concerning history, on pages 198-209 as follows: Introductory definitions of enzymatic hydrolysis, *Aspergillus* molds, miso (whose per capita consumption in Japan is about half that of shoyu by weight), saké, mirin, amasaké. Table 1 shows "Per capita annual consumption of fermented foods prepared from *Aspergillus* moulds in Japan (1981)." Shoyu 10.1 litres. Miso 4.9 kg, sake 12.3 litres, mirin 0.6 litres, shochu 2.2 litres, rice vinegar 0.25 litres, (vinegar) 2.5 litres. Note: Beer 39.5 litres. Whiskey and other foreign alcoholic beverages 3.7 litres. Japanese population 117.85 million on 1 Oct. 1981.

Introduction (p. 197): There is a basic difference between the saccharification process used in Western countries and that of East Asia. In the West, the amylolytic enzymes that break down / hydrolyze starches into sugars are derived from malt, whereas in East Asia *Aspergillus* and *Rhizopus* molds have long been used as the source of these enzymes.

History: History of fermented proteinous foods in China: Chu (koji), chiang, shi or tou-shi [fermented black soybeans], chiang-yu (soysauce), shi-tche (the extracted juice of fermented black soybeans). History of shoyu and miso in Japan: Hishio, sho, soya or soy, miso or misho, tamari, miso-damari, tare-miso and usudare, shoyu, miso of today.

Shu [Qu; koji] was first mentioned in the *Shu-Ching* [pinyin: *Shujing*] written 3,000 years ago during the Chou [Zhou] dynasty (1121-256 BC), which stated that chu is

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essential for making alcoholic beverages. Two different colors of chu were described: yellow and white. "The most popular one, which had a yellow colour indicating perhaps *Aspergillus oryzae,* was called yellow robe. The white one is presumed to be *Rhizopus* or *Mucor* and was called white robe." Originally, chu was made in granular form and called *san-chu.* But by about AD 947-79 chu was developed in cake form called *ping-chu.*

Page 205: The difference between tamari, miso-damari, tare-miso, and usudare was not always clear, however in early documents they generally refer to the liquid obtained during the fermentation of miso or *sho* [*hishio*]. "Literally, Tamari or Miso-damari, or Tare-miso" means the liquid separated from the top of miso. "or drained off from the bottom of the kegs in which the miso or sho was stored, or filtered into a bamboo cage which is put into miso or sho. But according to such books as the *Honcho-bunsho* (AD 1487), *Shijoryu-hochosho* (AD 1489) and others (AD 1504, 1537), Taremiso or Usudare seems to have been the name for the liquid drained off or press-filtered from the boiled mixture of miso or *sho* [*hishio*] and salt water." But the word *shoyu* (written with the same characters as *chiang-yu* [*jiangyou*] in Chinese) did not appear in any of these books.

Shoyu: The word "shoyu," written with the same Chinese characters with which it is written today [these characters are pronounced chiang-yu / jiangyou, and mean "soy sauce"] in Chinese, first appeared in the *Ekirinbon Setsuyoshu* (AD 1598). The word shoyu literally meant the liquid obtained from *sho / hishio.* However, to confuse matters, the liquid obtained from miso or tamari (soybean koji fermented in salt water) was also called "shoyu" in these early days. Moreover, in the book *Yoshu-fushi* (AD 1686) shoyu was defined as *shi-ju* (*shi-tche* in Chinese), the liquid obtained from salted, fermented black soybeans. In yet another book, shoyu was defined as wheat sho. All these descriptions suggest that the word "shoyu" had a broad meaning in the beginning, and only later acquired the more specific meaning it has today–the liquid obtained from the mash [moromi] in which a moulded mixture of soybeans and wheat or barley was fermented in water in the presence of salt water with a high salt concentration. This gradually became clearly differentiated from tamari or a shi-tche like product made almost entirely from soybeans [plus salt and water].

During Japan's Edo period (1603-1867), great progress was made in the technology of making shoyu, and the scale of its production was enlarged. Many books from this period describe the manufacture of shoyu: *Ryori monogatari yorozu kikigaku* (1643), *Yoshufushi* (1686), *Honcho shokukan* (1692), *Wakan sansaizue* (1715), *Mankin sangyo bukuri* (1731), *Zoshu seiho* (1716), *Sake shoyu denjuki* (1785), and *Koeki Kokusanko* (1844).

The following is a summary of what these books say about how typical Japanese shoyu (*koikuchi shoyu*) was made at that time–about 300 years ago. As basic raw materials use 1 part soybeans and one part wheat kernels or dehulled barley. Gradually it was recognized that wheat gave better quality shoyu than barley. Soak the soybeans, then boil them. Roast the wheat kernels or barley, then crack into pieces. Mix the two main ingredients well, then place them between straw mats or in wooden trays where they will be naturally inoculated and, after 2-3 days, cultured with molds. The mold cultured materials were called *koji,* a word written with the same character as its Chinese counterpart, *chu / qu.* Judge the quality of the finished koji by its color: white, yellow or brown are good, while blue or black are bad. This suggests that *Aspergillus oryzae* or *Aspergillus sojae* were already recognized as the best molds for making shoyu. Set aside a small portion of good koji to use as a starter culture for making the next batch of koji.

To make the moromi mash: Mix the koji made from a mixture of 1 part whole dry soybeans and 1 part wheat kernels with 2.2 parts of water and 1.1 parts of salt. Store this mash for about 70 days in summer or 100 days in winter. Summer was thought to be the best season for making koji and moromi. Amazake was sometimes added to the shoyu mash to add natural sweetness to the salty taste.

The total population of Japan at that time was about 30 million; of these about 1.2 million lived in Edo (today's Tokyo) and these Edo dwellers consumed much more shoyu per person per year than is the case today. One typical wooden keg of shoyu at that time contained 14.4 liters [3.80 gallons or 15.22 quarts] which was said to be enough to last one person one year (*Chohoroku* 1856, from *Shoyu-monogatari,* p. 5, written by N. Matsumoto, published by Kikkoman Shoyu Co. Ltd., 1976).

The two main centers of shoyu production in Japan were in Noda city and Choshi city, both of which were not far from Edo / Tokyo. Shoyu manufacture began in Noda and Choshi in 1561 and 1616, respectively. About 1.6 million kegs of shoyu were consumed in Edo, of which 1.5 million kegs were transported from the above two cities and the 0.1 million from places in Japan southwest of Tokyo, mainly Kishu [Wakayama prefecture], Tatsuno [a city in Hyogo prefecture, where light-colored shoyu {usukuchi shoyu} was invented in 1666], and Shodo-shima [an island in Kagawa prefecture in the Inland Sea of Japan]. Address: Kikkoman Corp., Noda-shi, Chiba-ken, Japan.

1161. **Product Name:** [Hong Kong Meal Vegetable Milk].
**Manufacturer's Address:** South Korea.
**Date of Introduction:** 1985?
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** Color photo sent by Anders Lindner of STS. 1987. Nov. 14. 180 ml bottle with green lettering.

1162. **Product Name:** [Yuhanmil Vegetable Milk].

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**Manufacturer's Address:** South Korea.
**Date of Introduction:** 1985?
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** Color photo sent by Anders Lindner of STS. 1987. Nov. 14. 180 ml bottle with green lettering.

1163. La Choy. 1986. La Choy Kung Food Theatre. Unpublished typescript.
• ***Summary:*** The transcript of 30-second La Choy TV commercial. First aired on Jan. 20. The ugly villain in black is for Kikkoman. The good guy in white is for La Choy. The good guy says: "In a nationwide taste test my La Choy soy sauce beat your Kikkoman more than 2 to 1."

1164. Chung, Mr. 1986. Dr. Chung, Dr. Chung's Foods Company, and Vegemil in Korea (Interview). *SoyaScan Notes.* Feb. 9. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The interviewee is Dr. Chung's nephew. Dr. Chung is a pediatrician (an M.D. in pediatrics) but he never went to high school or college. He originally developed soymilk for babies with allergy problems. Now he has 2 soymilk factories and about 1,000 employees. One plant is near Suwon (south of Seoul) and one is in Chongju (50 miles south of Seoul). He still teaches his employees, "You are the pioneers."

His Vegemil soymilk is by far the best selling brand in Korea. The flavors are plain, dairylike (lightly sweetened), with apple, and chocolate. Roughly 80% of his product is sold in soft drink bottles, 10% in Combibloc (which prints better than Tetra Brik cartons), and 10% in plastic pouches that have a shelf life of 2-3 days. Combibloc does not presently have FDA approval in the USA so these products cannot be exported to America. The second best selling soymilk in Korea is Sun-Dew, a distant second. Address: Seoul, South Korea.

1165. Chung, Won-Chul; Lee, T.S.; Nam, S.H. 1986. [Changes in free sugars of *Kochujangs* during aging]. *Korean J. of the Society for Applied Biological Chemistry* 29(1):16-21. March. [14 ref. Kor; eng]
• ***Summary:*** "Free sugars of Kochujang which were prepared with different starch sources, i.e., glutinous rice, polished barley, wheat flour and sweet potato, were investigated for three months of aging. Glucose was found in all tested samples during aging period and the content increased with time, particularly higher for glutinous rice while lower for sweet potato. Fructose also was found through aging period, its content increased for a month and decreased later. The data showed higher fructose content in the order of sources of sweet potato, wheat flour, polished barley and glutinous rice. Maltose and sucrose were detected only at the beginning of aging period and the content were less than 3.5% for maltose in all of samples and than 0.4% for sucrose with glutinous rice and wheat flour. Trace amount of rhamnose was detected in the Kochujang made from polished barley." Address: 1. Dep. of Food Science, Seoul Woman's Univ., Korea.

1166. Shon, Dong-Hwa; Lee, Hyong-Joo. 1986. [Stability of protein colloids in a mixture of cheese whey and soy milk]. *J. of the Korean Agricultural Chemical Society* 29(1):83-89. March. [23 ref. Kor; eng]
• ***Summary:*** Studies the parameters affecting the colloidal stability of whey and soybean proteins, characteristics of tofu-type gel formation, effects of heat treatment, and salt composition on colloidal stability, and effects of heat treatment on storage stability. In experimental types of tofu made from a mixture of whey and soymilk, calcium in the whey precipitated the soy proteins and disrupted gel formation, resulting in curds of poor texture. Numerous dialysis tests were conducted. Address: Dep. of Food Science & Technology, College of Agriculture, Seoul National Univ., Suwon, South Korea.

1167. St. Anthony, Neal. 1986. Tofulicious helps dish up healthy portion of market. *Star and Tribune* (*Minneapolis, Minnesota*). April 28.
• ***Summary:*** Leonard Lee, head of Eastern Foods, was born on 4 Sept. 1938 in Inchon, Korea. In 1979, armed with nearly $1 million commitment of venture capital from Control Data Corp., he resigned from his $36,000 a year job to devote full time to his tofu business. The company has high hopes for Tofulicious, a non-dairy ice cream, which sells for $1.79/pint, versus more than $2.00 for Tofutti and other competing brands. Lee owns 53% of his Eastern Foods Co., which employs about 40 people. Control Data owns 30%. Gives a history of his career: 1961 graduated from the national university in Seoul with a degree in physics; 1966 earned an accounting degree from Univ. of South Carolina; 1969 began to work for Control Data Corp.; 1971 opened an imported food store in Minneapolis, Minnesota; 1978 started making tofu; 1980 built a 16,000 square foot complex at 3235 E. Hennepin Ave. Address: Minnesota.

1168. Kwon, S.H. 1986. Daizu no hanashi [Talking about soybeans]. *Daizu Geppo* (*Soybean Monthly News*). April. p. 28-32. [11 ref. Jap]
• ***Summary:*** Includes an interesting history of soybean cultivation. Address: Seoul, South Korea.

1169. **Product Name:** [Sahm Yook Soy Cool (Plain Soymilk)].
**Foreign Name:** Sahm Yook Soy Cool.
**Manufacturer's Name:** Sahm Yook Korean Foods.
**Manufacturer's Address:** 320 Panjeong-ri, Jiksan-myun, Chunwon-gun, Choongchungnam-do 333-810, South Korea.

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**Date of Introduction:** 1986 May.
**Ingredients:** Soy milk, high fructose corn syrup, raw cream, salt, vitamin C.
**Wt/Vol., Packaging, Price:** 200 ml foil retort pouch (Doypack). Retails for 200 Won (6/90).
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Form filled out and label sent by C.Y. Yoon, General Manager, Sahmyook Korean Foods. 1990. June 23. The product was introduced in May 1986. Ingredients are listed in English.

Label (Foil retort pouch). Sent by C.Y. Yoon. 1990. June 23. 4 by 6.75 inches Red, yellow, dark green, and light green on silver. Front panel says "Soyalac" and an illustration shows 3 yellow soybeans in a green pod. The back panel shows the package being heated in a microwave oven. So this package is probably sold during the cold months. Note that this product contains dairy cream.

1170. Lynam, Frances. 1986. Happy birthday tofu, happy birthday tofu [David Mintz about to celebrate Tofutti's fifth birthday]. *Register* (*Shrewsbury, New Jersey*). June 25. p. 6B, 7B.
• ***Summary:*** "In 1971 Mintz read about tofu in a health magazine... For the next 10 years he spent all his free time creating Tofutti. 'It was a whole new world. It became an obsession.' Today more than 38,000 outlets in all 50 states carry the product. It is also sold in Canada, Australia, Korea, Hong Kong, and the U.S. Virgin Islands. Recently he developed an 'egg' without cholesterol called 'Eggwatchers' and a coffee whitener without milk."

1171. Kim, Hyung-Soo; Kim, Ze-Uook. 1986. [A study on the manufacturing of soysauce by the use of milled barley]. *J. of the Korean Agricultural Chemical Society* 29(2):107-15. June. [31 ref. Kor; eng]
• ***Summary:*** Investigated changes in and quality of soy sauce made by a new method, using a vinyl tent instead of a koji room and replacing the wheat in the koji with milled barley. Address: Dep. of Food Science & Technology, College of Agriculture, Seoul National Univ., Suwon, South Korea.

1172. **Product Name:** Tofu, Fried Tofu, Soymilk Curds, Soybean Sprouts, and Soymilk.
**Manufacturer's Name:** M.S.B. Food Enterprises, Inc.
**Manufacturer's Address:** 430 Casanova St., Bronx, NY 10474. Phone: (212) 617-6700.
**Date of Introduction:** 1986 June.
**How Stored:** Refrigerated.
**New Product–Documentation:** Order for tofu books from, then talk with Michael Lee, V.P. Gomé Tofu Inc. 1996. Nov. 14. His father, John Lee, a Korean-American, started M.S.B. Food Enterprises in 1986 in the Bronx to make different foods from soybeans using all natural processes. Their main products in 1986 were regular tofu, fried tofu, soymilk curds (*sun tubu*), soybean sprouts, mung bean sprouts, and a small amount of soymilk. In 1992 they introduced *doen jang* (pronounced TEN-jang, Korean Soybean Jang, like miso). MSB Food Enterprises is the parent company for a number of smaller companies, all of which make soyfoods. In 1995 they started a new division, Gomé Tofu Inc., to make tofu specially for the Caucasian American market. In December 1995 the company moved to a new address: 710 Longfellow Ave., Bronx, NY 10474. Phone: (718) 617-4105. The company's main market is still Korean-Americans in the tri-state area (New York, New Jersey, and Connecticut).

Form filled out and Label sent (faxed) by Mike Lee of M.S.B. Food Enterprises / Gômi Tofu. 1998. July 7. The address and phone number are unchanged from 1996. The company began making tofu in June 1986. One label is in Korean and the other in English. The text on the English label states: "Tofu–Original. Excellent meat substitute. More protein and calcium than meat or milk! New! Go natural... Its good for you! Gômi. Easily digestible. Cholesterol free. Low fat food. It blends in beautifully! Slice to fry or broil it. Dice it raw for salad. Mash or whip it to make an inspiring dish! No preservatives. All natural. Keep refrigerated. Change water daily after opening." Note: Gômi means "garbage" in Japanese.

1173. Gay, Julie. 1986. Farmfest visitors to get opportunity for a taste of Tofulicious [at Minnesota Soybean Growers Association]. *Agri News* (*Rochester, Minnesota*). July 31.
• ***Summary:*** The Minnesota Soybean Growers Assoc. will be offering a taste of Tofulicious frozen dessert. As many as 16 county soybean organizations are expected to participate and feature the Tofulicious at local events such as county fairs. The frozen dessert first appeared in the Twin Cities last summer. Address: Minnesota.

1174. Legler, Gretchen. 1986. Its tofu-mania. Soybean dessert treat is gaining popularity as ice cream alternative [Tofulicious from Eastern Foods Corp. in Minneapolis]. *AgWeek* (*Grand Forks, North Dakota*). Aug. 18.
• ***Summary:*** Jim Palmer, executive director of the Minnesota Soybean Growers Assoc., said the group sold 2,200 four-ounce cups of Tofulicious at the Farmfest. In the year that Eastern Foods has been making Tofulicious about 30,000 lb of tofu, soy oil, and soy protein isolate has been turned into 30,000 and 50,000 lb of the frozen treat.

1175. Tennison, Patricia. 1986. Korean barbecue: Labor Day fun that's low on labor. *Chicago Tribune* (*Chicago, Illinois*). Aug. 28. 117-53.
• ***Summary:*** In a sidebar titled "Buyer's guide to ingredients, from soy to moona mool."

"Chili paste or kochujang. Made primarily from chili powder, this oily paste adds extra zip to Korean food. Asian food stores carry it. Not chili sauce can be substituted."

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"Korean soy [sauce] has a musty taste."

Note: This article appeared in the San Francisco Examiner (Sept. 3, p. 103).

1176. Lee, Cherl-Ho. 1986. Traditional food technologies and their recent developments in Korea. In: V.H. Potty, et al. eds. 1986. Traditional Foods: Some Products and Technologies. 292 p. See p. 178-90. Aug. Presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies." Held June 1983 at CFTRI, Mysore, India. [14 ref]

• ***Summary:*** The traditional Korean soybean fermentation technique is unique. Soybean is the only ingredient used, and sauce and paste are made simultaneously. In the first step of the fermentation, meju is made from cooked and mashed soybean balls, which contain no salt. Molds, mainly *Aspergillus oryzae,* grow on the surface of a meju ball, and bacteria, mainly *E.* [*sic, Bacillus*] *subtilis,* inhabit the inside of the ball. One part of meju, one part of salt, and 4 parts of water are mixed in earthen jars, and ripened for several months. The supernatant dark brown liquid of meju-brine mixture is soybean sauce and the brownish solid residue is soybean paste.

Kochujang, a mixture of fermented soybean paste and ground red pepper, is a unique food product available only in Korea; it reflects the hot spice preference of its people. It is prepared by mixing ground meju powder with steamed cereal flour, red pepper, salt and water and allowing further fermentation and ripening of the mixture in earthen jars for several months. Flowcharts are given for soy sauce, soy paste, and kochujang.

Under "Recent developments" (p. 187), the development of improved meju and meju-brine are discussed. Address: Dep. of Food Technology, Korea Univ., Seoul, Korea.

1177. Potty, V.H.; Shankar, J.V.; Ranganath, K.A.; et al. eds. 1986. Traditional foods: Some products and technologies. Mysore, India: Central Food Technological Research Inst. (CFTRI). 292 p. Aug. Papers presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies" held June 1983 at CFTRI, Mysore. 25 cm.

• ***Summary:*** This publication contains 27 papers presented by scientists from countries of Asia, Africa, Europe, and the Americas. Chapters related to soy are cited separately. The traditional foods of the following countries are discussed specifically: Ethiopia, Nigeria*, Sudan, Senegal, Pakistan*, India, Nepal*, Burma*, Thailand*, Malaysia*, Indonesia*, Philippines, Korea*, China*, Japan*, and Mexico*. Countries with foods related to soy are followed by an asterisk (*). Address: Central Food Technological Research Inst. (CFTRI), Mysore–570 013, India.

1178. Jackobs, Joseph A.; Smyth, C.A.; Erickson, D.R. 1986. International soybean variety experiment: Eleventh report of results, 1984. *INTSOY Series* No. 29. xvi + 168 p. Sept. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** "This is the final report of the International Soybean Variety Evaluation Experiments (ISVEX)... ISVEX has been the major component of INTSOY's genetic development program since 1973." Joseph A. Jacobs provided leadership to the ISVEX trial program. Pages viii–xvi contain a complete listing of about 65 cooperating centers and researchers worldwide.

During 1984, soybeans were grown at 96 sites (the name of each site is given) in the following countries: Antigua, Argentina, Bangladesh, Burma, Cameroon, China, Colombia, Costa Rica, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, French Guiana, Ghana, Honduras, Indonesia, Iran, Ivory Coast, Korea, Laos, Liberia, Madagascar, Malaysia, Mexico, Nepal, New Caledonia, Pakistan, Paraguay, Philippines, Portugal, Rwanda, Saint Vincent, Somalia, South Africa, Sri Lanka, Sudan, Swaziland, Tanzania, Turkey, United States, Venezuela, Vietnam, Yugoslavia, Zambia, Zimbabwe.

In 1982, soybeans were grown in Morocco. In 1983 soybeans were grown in Brazil and Rwanda.

In 1985, soybeans were grown at 43 sites in China, Ecuador, Ethiopia, Gabon, Ghana, Guatemala, Iran, Jamaica, Korea, Mexico, Nepal, Pakistan, Paraguay, Philippines, Portugal, Sri Lanka, Thailand, Turkey, United States, Venezuela, Yugoslavia, Zaire, and Zimbabwe.

1179. *News Briefs* (*Meals for Millions, Davis, California*). 1986. MFM (Meals for Millions) celebrates 40 years of dedicated service to millions of the world's hungry and malnourished. Sept. p. 3-4.

• ***Summary:*** "A glance through Meals for Millions' archive. Phase I: Relief.

"1956: Albert Schweitzer has word for Multi-Purpose Food: 'Wonderful.'" Dr. Schweitzer "would like much more 'if it is possible for you to be so generous.' 'It is wonderful food,' Schweitzer said. 'The patients like it and it does them great good. The leper village especially finds it a real help.

"'The way it is packed, in small tins and not too large cartons, makes it easy to store and handle. The tins are the right size and are packed just right for the rigorous tropical climate.'" A photo shows Dr. Schweitzer with patients at his hospital at Lambarene, Gabon.

"1961: Dooley's 'Third Hand' still serves mankind. Six months before his death from cancer in his 34th year [on 18 Jan. 1961], Dr. Tom Dooley vividly characterized Multi-Purpose Food as his 'third hand' in surgical and medical practice in his Muong Sing jungle hospital in Laos. 'I use Meals for Millions,' he said, 'as an instrument of good, an instrument of compassion... every single day... you could say that MPF is Dooley's third hand... You have helped

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MEDICO programs in Vietnam, Laos, Kenya, Cambodia and Peru.'"

"As a living memorial to Dr. Dooley, MFM has pledged an additional 25,000 pounds of MPF to MEDICO." A photo shows Dr. Tom Dooley distributing Multi-Purpose Food at his hospital; he is holding one of the larger cans.

"Phase II: Technology and training.

"1970: 'Meals for Millions, a non-governmental foundation, is successfully utilizing free enterprise methods to help starving people throughout the world. Their educational program of self-help is one of the finest agencies in the humanitarian task of alleviating hunger.'–Governor [of California] Ronald Reagan.

"1976: MFM launches Korean Program. A comprehensive nutrition program in a very poor, rural part of Korea, Wonseong County, was launched by MFM in 1976."

"1979: Foods for Small Children. Fourteen village development workers from eleven Third World nations attended MFM June 1978 Training School focusing on 'Foods for Small Children.'" MFM has trained food technicians since 1967 at its Santa Monica laboratory and plant.

"Phase III: Education and expansion. 1981: Nutrition project planned for Thailand. 1982. African training program gets off to good start" in Kenya.

Note: Harlan H. Hobgood is president of Meals for Millions / Freedom from Hunger Foundation; his portrait photo is shown. The subtitle of these News Briefs is "Self-Help for a Hungry World." Address: P.O. Box 2000, Davis, California 95617.

1180. Rumney, Thomas. 1986. Soybeans: A new world supercrop. *Focus* 36:29-30. Fall.

• ***Summary:*** A map shows world soybean production in 1985. "The estimated value of 1982 U.S. [soybean] production was nearly $12.5 billion, with exports of soybeans and soybean products exceeding $3 billion." Also discusses the rapid growth in soybean production in Brazil, Argentina, and Paraguay. "In 1965, these three countries grew some 558,000 metric tons of soybeans (2% of world production); by 1985, that figure had increased to 23,050,000 metric tons (26% of the world's total)."

"As recently as 1969 India grew no soybeans, yet by 1985 the Indian output was 750,000 metric tons annually. Less spectacular, although quite substantial, are production increases in Taiwan, North and South Korea, Indonesia, and Malaysia." Address: State University College, Plattsburg, New York.

1181. Kozaki, Michio. 1986. Monsuun Ajia no hakkô shokuhin [The fermented foods of monsoon Asia]. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 5-8. Held July 1985 at Tsukuba, Japan. [Jap; eng]

• ***Summary:*** A general review, including many fermented foods not containing soy–but with some containing soy, such as soy sauce (toyo sarsa, si-iu, kecap, nuoc-tuong) and soy paste (Toyo pasta, tao-chieo, tauco). Natto, soy sauce, miso, and tempe are mentioned in Fig. 2, a map titled "Distribution of fermented soy bean foods in Asia." Address: Dep. of Agriculture, Tokyo Univ. of Agriculture.

1182. Yoshida, Shuji. 1986. Minzokugaku kara mita muen hakkô daizu to sono shûhen [The origin of non-salted fermented soybeans from the viewpoint of ethnology]. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 166-78. Held July 1985 at Tsukuba, Japan. English-language summary in Symposium Abstracts, p. 62-62. [20 ref. Jap]

• ***Summary:*** "Two of the earliest kinds of fermented soybeans were *shì* and *dòu-jiàng*. The former antedates the latter, because *shì* can be traced to the Han Dynasty (206 BC-A.D. 200), whereas *dòu-jiàng* does not emerge until the description in *Qimin Yaoshu* (A.D. 536-550). Good descriptions of *shì* and *dòu-jiàng* are given in *Qimin Yaoshu. Shì* is made as follows: A yellow mold is permitted to grow on boiled beans, which are then washed and wetted, after which they are fermented in a cellar for 10-12 days. *Shì* was eaten as a condiment.

"However, *shì* as a food would have appeared prior to *shì* as a condiment. *Sake* which was made from grain through mold fermentation, was originally not for drinking, but rather for eating. Such a primitive *Sake* is still used in Yúnnán. I suppose that a primitive *shì* also was eaten, and that the place of origin of *shì* was South China, according to the description in *Bencao Gangmu* (*shì* was commonly made in South China), and *Bówùzhì* (*shì* was exotic).

"*Dòu-jiàng*, which may have been first mentioned in *Bencao Gangmu* (1596), was a simple mold bean and was technologically more primitive than *shì*, although the existence of *dòu-jiàng* or a similar substance cannot be traced in the literature before *Qimin Yaoshu.* It seems that the first product of fermented beans would be *dòu-jiàng*, or a similar substance, and that its making would have been influenced by *sake* production. Later, *shì* as a food would have appeared and then *shì* as a condiment was produced, as we see from the *Qimin Yaoshu.*

"On the other hand, *dòu-jiàng* was developed from *ròu-jiáng*, preserved meat... *Natto*, *kinema* and *tempeh* would be identified as a substance similar to *dòu-jiàng*, which was a primitive fermented soybean product. Boiled beans became *dòu-jiàng* if they were covered by *Imperata cylindrica* grass, *kinema* if covered by certain leaves, *tempeh* if covered by leaves of *Hibiscus tiliaceus* or banana leaves, and *natto* if covered by ricestraw.

"We know that various kinds of plants are used for

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making *sake* or mold bran. The species used varies by place. Fermented soybeans occur within the *sake*-making area and only at the margin of the distribution. That means several new fermented soybean products like *shì* and *dòu-jiàng* were made in the center of the fermented soybean distribution, and the area gradually expanded toward the margins. They were accepted in areas close to the center, but the most primitive forms would have remained only in the marginal places, where new ones were not accepted."

A large chart (p. 169) shows the relatives and development of fermented black soybeans (*shi*)*;* it includes the names of various unsalted fermented soyfoods and soy condiments (with their geographical area in parentheses). Relatives (fermented soyfoods made from yellow soybeans): Akuni (Sema Naga, in the Himalayas in northeast India), kinema (Limbu, in eastern Nepal), pe-bout (Shan, in eastern Burma), itohiki natto (Japan), and tempeh (Indonesia). Stage 1. Itohiki natto became Chon Kujjiang [perhaps *chungkuk jang,* Korean-style natto] of the Zhanguo Warring States period (475-221 BC) in China. Stage 2A: Unsalted fermented black soybeans were originally used as a food, rather than as a seasoning. To these unsalted fermented black soybeans, koji was added to create homemade unsalted fermented black soybeans (*doushi,* of China), Stage 2B: Salt was added to the unsalted fermented black soybeans to make various salted foods (each with a firm texture like raisins): Daitokuji natto (Japan; with wheat flour added), *pe-ngapi* (upper Burma), and *seang* (Cambodia). Stage 3. Unsalted fermented black soybeans (*doushi*) developed into closely related danshi. Koji was added to danshi to make *rul-kre* (of Bhutan). Cooked soybeans were shaped into balls and fermented naturally to make miso-dama ("unsalted miso balls" [meju], Korea and Japan). Then salt was added to the miso-dama to make various seasonings (each with a consistency like applesauce or paste / miso): Korean soybean jang (*doen jang*), Korean soy sauce (*kan jang*), or soybean miso (*mamé miso,* Hatcho miso, Japan). Stage 4. Salt was added to unsalted fermented black soybeans (*shi*) to make salted fermented black soybeans, from which developed inyu (a fermented soy sauce made with black soy beans, in Taiwan), *inshi* (meaning unclear, of Taiwan), and taucho (*tauco,* of Indonesia). Stage 5. Koji was added to salted fermented black soybeans to make *shi* for food use, and *doushi* (of Sichuan, China). Stage 6. Flour was added to salted fermented black soybeans to make red pepper jang (*kochu jang,* Korea) and spicy fermented black soybeans (*doubanshi,* China).

Note: This chart may be easier to understand when viewed in chart form, however the logic and some of the products seem a bit unclear. It is also unclear which products are fermented with bacteria (like natto). Soyfoods Center has an English-language translation of this chart. Address: National Museum of Ethnology, Osaka (Kokuritsu Minzokugaku Hakubutsukan).

1183. Pie, J-E.; Paik, H.Y. 1986. [The effects of meat protein and soy protein on calcium metabolism in young adult Korean women]. *Korean J. of Nutrition* 19:32-40. [Kor; eng]*

• ***Summary:*** Despite similar dietary calcium intakes, a meat-based diet caused significantly higher urinary and fecal calcium excretion than a soy-based diet (urine: 127 vs. 88 mg/d; fecal: 467 vs. 284 mg/d).

1184. Bensky, Dan; Gamble, Andrew; Kaptchuk, Ted. comp. and trans. 1986. Chinese herbal medicine: Materia medica. Seattle, Washington: Eastland Press. xiv + 723 p. Illustrations adapted by Lilian Lai Bensky. Index. 29 cm. [1 ref]

• ***Summary:*** The soybean is discussed and illustrated on p. 61-62. The illustration shows several clusters of fresh soybean leaves, with flowers and pods. The pharmaceutical name of the preparation is Semen Sojae Preparatum Chinese: *dan dou chi.* Japanese: *tantôshi.* Korean: *tamdugo.* English: Prepared soybean. Properties: sweet, slightly bitter, cold or warm (depending on preparation). Channels entered: Lung, Stomach. Text in which first appeared: *Treasury of Words on the Materia Medica.* The soybean is also listed in "Major combinations" on p. 48 (with scallion or spring onion to treat chills or fever), and on p. 79 (with cape jasmine or gardenia fruit to treat deficiency irritability and insomnia resulting from lingering Heat disturbance in the chest).

Also discusses: Kudzu root–Radix Puerariae–*Pueraria lobata, P. omeiensis, or P. thomsanii* (p. 66-67).

Note: Ted Kaptchuk was born in 1947 and Andrew Gamble in 1946.

1185. Chung, Yong-kyu. 1986. The development of multi-cropping systems and soybean production in the Asian-Pacific region. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 409-16. [10 ref]

• ***Summary:*** A major reason for slow production growth is the low net income. In U.S. dollars it was only $65/ha in Taiwan, but minus $100/ha in Japan and minus $200/ha in Korea.

"The need to develop multi-cropping systems for Asian and Pacific countries is widely recognized... Rice is the dominant crop in the region, and there may be a regional surplus by the late 1980s. Japan and Taiwan have already instituted rice reduction programs..."

"A case study in Korea revealed that the income elasticity for soybean demand, including induced demand, was 1.2851, while the value in relation to soybean used for human consumption was 9.8418... This means that a 10% increase in real per capita income will result in a 12.9% increase in aggregate soybean demand and an 8.4% increase

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in direct consumption."

"World soybean production increased by 5.7% per annum during the last decade... Soybean production in the Asian and Pacific region, however, increased at a rate of only 4.8% during this period. Japan and Korea had small production increases, mainly because of higher yields. Production in Taiwan decreased from 65,000 tonnes in 1970 to 26,000 tonnes in 1980."

"The prospects for soybean production in Taiwan, Japan, and Korea are poor considering recent decreases in production and strong price supports for other crops. The ratio of the farm household sale price to the imported price (1981) in Taiwan, Japan, and Korea was 1.7, 3.7, and 3.1, respectively. This was primarily due to differences in production costs. For example, the production cost for 10 kg of soybean in the USA (1979) was estimated at US $1.34 (Pan 1980) compared with U.S. $3.82 in Taiwan, and US $12.78 in Japan. A dramatic increase in soybean production in the region is therefore unlikely."

"Most governments in the region have already established strong price supports for soybean." Address: Agricultural Economist, Food and Fertilizer Technology Center for the Asian and Pacific Region, 5th Floor, 14 Wenchow St., Taipei, Taiwan.

1186. *Diversity.* 1986. University of Illinois geneticists Theodore Hymowitz and Richard Bernard, also with USDA, have developed soybean germplasm lines that could result in an estimated savings of between $100 and $500 million in processing costs. 9:40.

• ***Summary:*** The new lines, based on germplasm from Korea, lack the Kunitz trypsin inhibitor and do not require heating before feeding to swine and poultry. Address: Univ. of Illinois.

1187. Hesseltine, C.W. 1986. Future of fermented foods. *Mycologia Memoir* No. 11. p. 303-16. Chap. 17. (C.W. Hesseltine and Hwa L. Wang, eds. Indigenous Fermented Food of Non-Western Origin. Berlin & Stuttgart: J. Cramer.) Previously published in 1981 in USDA Miscellaneous Publication FL-MS-333. [11 ref]

• ***Summary:*** Contents: Introduction. Positive factors for increased use of fermented foods. Trends in production of fermented foods. Factors that may effect the wider use of fermented foods in the West. Literature cited. Address: USDA/NRRC, 1815 N. University St., Peoria, Illinois 61604.

1188. Hwang, Y.H.; Hong, E.H.; Kim, S.D. 1986. Soybean-based cropping systems in Korea. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 107-12. [16 ref]

• ***Summary:*** Contents: Introduction. Major soybean-based upland cropping systems: Monocultures, sequential cropping (crop rotation), intercropping (barley/soybean relay-intercropping, corn/soybean strip-intercropping, potato/soybean relay-intercropping, tobacco/soybean relay-intercropping), summer soybean, rice-bund soybean (approximately 15,000 ha/year of rice-bund soybeans are grown in Korea, equal to 7.3% of the country's total soybean acreage). Address: Crop Experiment Station, Office of Rural Development, Suwon 170, South Korea.

1189. Hyun, Peter. 1986. Man sei!: the making of a Korean American. Honolulu, Hawaii: University of Hawaii Press. xiii + 186 p. Plus 3 unnumbered pages of plates. Illust. No index. 22 cm.

• ***Summary:*** *Man sei!* means "Long live Korea." In this autobiographical sketch, the author describes what it was like growing up in occupied Korea under Japanese rule. "Peter was born in Hawaii in 1906, but grew up in Seoul, Korea, where his father, the Reverend Soon Hyun, was one of the leaders of the Korean independence movement struggling against Japanese colonial rule. In Seoul, at age 12, he took part in the nonviolent March First (1919) uprising for independence and freedom; a year later, he and his family escaped to join his father in Shanghai. There, his father and other patriots, established the Korean Provisional Government in Exile. When Peter was age 17 the family moved to Hawaii.

Page 142: He is discussing his life (at age 15) of hunger, poverty and cold in Nanking, China. "Whenever Umma sent me a little money, I would go to the store and buy a jar of preserved tofu–salted beancurd–which I would take with me to the dining room. When the Chinese students finished eating and the table had been picked clean, I would order my precious jar of salted tofu. And because there was always some left-over rice, I could sit alone and leisurely eat three more bowls of rice, spiced with tofu.

Page 31: In Korean, soybean sprouts are known as *kong-na-mul.*

Page 73: *Bee-bim-pap* is a traditional Korean dish made of rice mixed with marinated meat, bean sprouts, and pickled radish; it is "seasoned with soy sauce and sesame oil."

Page 89: They served us bowls of steaming rice gruel (*jook*) "with soy sauce and roasted peanuts in separate dishes."

"That was how I survived."

On the rear dust jacket is a photo of Peter Hyun and a brief biography. A longer biography appears on the next to last page, under "About the author." Address: Oxnard, California.

1190. Kim, Kil-Hwan. 1986. [Soymilk]. Seoul, South Korea: American Soybean Assoc. 67 p. [15 ref. Kor]

• ***Summary:*** The full-color cover of this book shows the

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labels of more than 20 soymilk cartons sold in Korea. Address: Head, Food Science & Technology Lab., Korea Food Research Inst., P.O. Box 131, Cheongryang, Seoul, South Korea.

1191. Shanmugasundaram, S.; Sulzberger, E.W. eds. 1986. Soybean in tropical and subtropical cropping systems: Proceedings of a symposium, Tsukuba, Japan, 26 September–1 October 1983. Revised ed. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. Illust. Index. 26 cm. [500+ ref. Eng]
• ***Summary:*** Note: The first edition, hardcover, published Oct. 1985, was recalled and discarded, due to errors in the text. Contents: Section 1. Cropping systems. 2. Plant breeding. 3. Management. 4. Diseases and insects. 5. Plant nutrition. 6. Physiology. 7. Economics. 8. Related topics. 59 chapters total, most of which are cited separately. Symposium participants. Author index. Subject index.

In the Foreword, G.W. Sellek, Director General of AVRDC, notes that the proceedings of this symposium were published in two sections. The proceedings of the first section, recently published by the Tropical Agricultural Research Center of Japan (TARC), cover country reports and special research projects. These proceedings cover cropping systems. "In the recent past, research was aimed almost exclusively at raising soybean yields rather than developing cropping systems that provide the stability needed to grow soybeans under high-risk conditions. There also seems to be a greater sense of urgency to integrate cropping systems research with disciplines such as plant breeding, crop management, pest control, and plant nutrition." There is a strong "need to ensure that scientists from a variety of disciplines and backgrounds work together so that their research efforts are well coordinated." Address: AVRDC, Taiwan.

1192. Wang, H.L.; Hesseltine, C.W. 1986. Glossary of indigenous fermented foods. *Mycologia Memoir* No. 11. p. 317-44. Chap. 18. (C.W. Hesseltine and Hwa L. Wang, eds. Indigenous Fermented Food of Non-Western Origin. Berlin & Stuttgart: J. Cramer). [29 ref]
• ***Summary:*** The section titled "Fermented Legume Products" defines chao (Vietnamese fermented tofu), chiang-chu (Chinese koji), ch'ou-toufu and ch'ou-toufu-ru (fermented tofu), Damsuejang and doenjang (Korean miso), furu, sufu, hon-fan or red sufu (fermented tofu), in-shi ("Fermented black soybeans from China"), in-yu (Type of Chinese soy sauce made from black soybeans), kanjang (Korean soy sauce), kenima [sic, kinema], ketjap or kecap (Indonesian soy sauce from black soybeans), meitauza or mei-tou-cha (fermented okara), meju (maiju or maeju; Korean soybean koji), natto, oncom (onchom or oncom), see-iu (see-iew; Thai soy sauce made from whole soybeans); soy sauce, soybean paste, tahuri (tahuli; Filipino fermented tofu. See sufu), tao-chieo (tao-jiao; Thai miso), taohu-yi (Fermented tofu from Thailand. See sufu), taokoan, tempe (many types), thua-kab (dry thua-nao), thua-merk (wet and cooked thua-nao), thua-nao (Thai natto), tosufu (see sufu), toufu-ru (fermented tofu), tsue-fan (tsui-fan, chee fan; fermented tofu).

Note 1. This is the earliest English-language document seen (Nov. 2011) that contains the term "Fermented black soybeans from China," or that uses these terms to refer to *in-shi*.

Under "Fermented Cereal-Legume Products" we find: chiang, chiang-yu (chau-yu, Chinese soy sauce), fermented soybeans (fermented black soybeans), hamanatto, kochujang (kochu chang), miso, shoyu, tamari, taotjo (tao-tjo, tao dji; Fermented soybeans from Indonesia or Thailand [sic, No! *Tao-tjo* is Indonesian-style miso and *tao dji* are Indonesian fermented black soybeans]), tao-tjung or tou-chiang (chiang), tao-yu (tou-yu; Chinese soy sauce), tauco (taocho, taoco, taucho; Indonesian miso), tou-pan-chiang (Chinese fava bean miso), tou-shi (toushih; Chinese fermented black soybeans), toyo (Filipino soy sauce). Note 2. This is the earliest English-language document seen (March 2009) that uses the word "taocho" to refer to Indonesian-style miso.

Fermented Vegetable Products include: Chiang-tsai (chiang-tsay; Vegetables in China pickled in chiang or soy sauce or tien-mien-chiang), miso-zuke. Address: USDA/NRRC, 1815 N. University St., Peoria, Illinois 61604.

1193. Woo, Rhung-Jieh. 1986. The effects of economic growth and policy intervention in Japan, Taiwan, and South Korea upon the import demand for soybeans. PhD thesis, Iowa State University. 198 p. Page 1425 in volume 47/04-A of Dissertation Abstracts International. *
Address: Iowa State Univ., Ames, Iowa.

1194. Hoefer, Hans; Lueras, Leonard; Chung, Nedra. 1986-. Korea. 4th ed. Hong Kong: APA Productions. 321 p. Illust. (some color). 23 cm. *
• ***Summary:*** "... rice deliciously mixed with soy sprouts..." (p. 158).

"Enthroned in an earthen jar by the back wall, the House Site Official reigns over everyone and everything within the walls. Other gods reign atop storage jars filled with [chili] pepper and soy pastes–in the kitchen..." (p. 238).

The section on "Food & drink" states: "More common table vegetables–such as mung and soy beans, spinach, lettuce, and black sesame leaves–a typically grown in the back yard garden." A spicy hot seafood soup, called *mae-un-t'ang* "usually includes a good portion of firm, white fish, vegetables, soybean curd (*tubu*), red pepper powder, and an optional poached egg" (p. 267).

Directed by Hans Johannes Hoefer; produced, edited, and designed by Leonard Lueras and Nedra Chung.

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1195. Hammer, K.; Chan, Baik Mun. 1986? Variable landraces collected in Democratic People's Republic of Korea. *Plant Genetic Resources Newsletter* (*FAO/IBPGR*) No. 67. p. 19-21. Undated. [2 ref. Eng]
• ***Summary:*** "Within the framework of an agreement between the respective Academies of Sciences of the Democratic People's Republic of Korea and the German Democratic Republic, a joint mission for exploration and collection of crop genetic resources was conducted in Korea in 1985.

"The collecting work was concentrated in the area around Pyongyang City and covered neighbouring parts of southern Pyongan [sic] and northern Hwanghae Provinces. Collecting was also carried out in Kangwon Province near Wonsan and in Chagang Province near Guichon (Fig. 1)."

Six soybean plants were collected.

Figures: (1) A map shows the collecting route. (2) A photo of representative pulses collected during the mission.

Note: Democratic People's Republic of Korea is also known as North Korea. The German Democratic Republic (DDR) is also known as East Germany. Address: 1. Zentralinstitut fuer Genetik und Kulturpflanzenforschung der Akademie der Wissenschaften der DDR, DDR-4325, GDR.

1196. Probber, Jonathan. 1987. Food and fitness: Soy sauce and diet. *New York Times.* Jan. 21. p. C2.
• ***Summary:*** The Chinese invented soy sauce. The Japanese use a great deal of soy sauce, but theirs is "lighter than Chinese soy sauce." Many households in Korea still prepare their own soy sauce each fall.

There has been a proliferation of soy sauce brands in the USA. Old favorites such as Kikkoman and Ka-me [Kame], which are sold in supermarkets, are now also sold in lower-sodium versions. There is also a brand named Sushi Chef for those who like to make sushi at home.

Regardless of brand, soy sauces contain large amounts of sodium–even the "lite" versions. Kikkoman's "lite," for example, contains 160 milligrams per half teaspoon, which (multiplied by 6) translates into 960 milligrams per tablespoon.

For those on a low-sodium diet–which allows about 1,600 mg of sodium per day–the writer recommends a spray bottle dispenser, with the nozzle adjusted for a fine, misty spray.

1197. **Product Name:** Eastern Flavor Dim Sum or Pot Sticker (Stuffed Dumpling in Wonton Skin) [Vegetable, Shrimp, or Mushroom].
**Manufacturer's Name:** Eastern Foods Corp. (Distributor).
**Manufacturer's Address:** 3235 E. Hennepin Ave., Minneapolis, MN 55413.
**Date of Introduction:** 1987 January.
**Ingredients:** Vegetable: Wheat flour, soy bean protein [isolate], soy bean oil, soy bean curd (soy beans, water, calcium sulfate), green onion, onion, spinach, water, soy sauce, sesame oil, ginger, salt, black pepper. Note: Shrimp is same ingredients except shrimp is listed first.
**Wt/Vol., Packaging, Price:** 7.94 oz (225 gm). Package of 15 retails for $1.89 to $2.49.
**How Stored:** Frozen.
**New Product–Documentation:** Label. 1987. 6 by 9 inches. Gold, red, and blue on clear film. "Microwave Oriental Snack. Fully Cooked. Keep Frozen. Microwaves in 3 minutes. Vegetable Recipe." Talk with Mr. Lee. 1987. Nov. 11. Product was introduced in January 1987. It contains no okara and is now the company's main focus of energy.

1198. **Product Name:** Eastern Flavor Dim Sum or Powza (Stuffed Dumpling in Raised Round Dough) [Vegetable, Shrimp, or Mushroom].
**Manufacturer's Name:** Eastern Foods Corp. (Distributor).
**Manufacturer's Address:** 3235 E. Hennepin Ave., Minneapolis, MN 55413.
**Date of Introduction:** 1987 January.
**Ingredients:** Vegetable: Wheat flour, soy bean protein [isolate], soy bean oil, soy bean curd (soy beans, water, calcium sulfate), green onion, onion, spinach, water, soy sauce, sesame oil, ginger, garlic, salt, black pepper, yeast. Note: Shrimp is same ingredients but shrimp listed first.
**Wt/Vol., Packaging, Price:** 7.94 oz (225 gm). Package of 15 retails for $1.89 to $2.49.
**How Stored:** Frozen.
**New Product–Documentation:** Label. 1987. 6.5 inches square. Gold, red, and blue on clear film. "Microwave Oriental Snack. Fully Cooked. Keep Frozen. Microwaves in 3 minutes. Vegetable Recipe." Talk with Mr. Lee. 1987. Nov. 11. Product was introduced in January 1987. It contains no okara and is now the company's main focus of energy. Brochure. 1987. Percentage of households owning Microwaves: 1982 28%, 1987 65%, 1990 79% (Source: Amana study 1986). Dim Sum is grazing food.

1199. *Soybean Update.* 1987. Top officials of Korea's three soybean crushers are in the U.S. this week to buy soybeans. Feb. 23. p. 3.
• ***Summary:*** "Korea is one of the most rapidly developing soybean markets in Asia, purchasing 35.8 million bu of U.S. soybeans last year. That's up from 15.3 million bu in 1979, the year ASA (American Soybean Assoc.) opened its office in Seoul. Current Korean soymeal demand outpaces demand for soyoil... holding back a potential market for 11 million bu of U.S. soybeans. Whereas more than 98% of Korea's soybean needs are supplied by the U.S., the U.S. supplies less than 40% of Korea's soymeal requirements."

1200. *J. of the American Oil Chemists' Society.* 1987. Oilseeds outlook. Far East soy markets. 64(3):306, 308-09. March.

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• ***Summary:*** Mainly a discussion of the outlook in Japan. Last year China exported 280,000 metric tons (MT) of soybeans to Japan. ASA's Beijing office hopes to help China develop ways of using its own soybeans. Yet the USA can expect to continue to be the primary source of soybeans for Japan.

1201. Yanagida, Fujiharu. 1987. Traditional foods and their processing in Asia. Tokyo: NODAI Research Institute, Tokyo Univ. of Agriculture (Tokyo Nogyo Daigaku, Sogo Kenkyugo). vii + 235 p. Illust. No index. 26 cm. [50+ ref]
• ***Summary:*** "This volume was compiled from manuscripts presented at the seminar entitled "Seminar on Traditional Foods and Their Processing in Asia," which was held on November 13-15, 1986 at the Tokyo University of Agriculture, Japan." About 100 scientists from Japan, Indonesia, the Philippines, Thailand, Burma, Korea, Malaysia, Nepal, and Taiwan attended. The seminar was organized by NODAI Research Institute of Tokyo University of Agriculture. Address: Faculty of Agriculture, Gadjah Mada Univ., Indonesia.

1202. **Product Name:** Tofulicious Chocolate Covered Dessert Bars (Soy Ice Cream Novelties) [Dutch Chocolate, or Vanilla Almond].
**Manufacturer's Name:** Eastern Foods, Inc.
**Manufacturer's Address:** 3235 E. Hennepin Ave., Minneapolis, MN 55413.
**Date of Introduction:** 1987 May.
**Ingredients:** Vanilla Almond: Water, corn sweeteners, partially hydrogenated soybean oil, tofu (soybeans, water, calcium sulfate), isolated soybean protein, tapioca dextrin, natural flavors, calcium carbonate, microcrystalline cellulose (cellulose gel), cellulose gum, mono and diglycerides, carrageenan. Coating: Coconut oil, sugar, cocoa, cocoa (alkali treated), lecithin, vanillin.
**Wt/Vol., Packaging, Price:** 2.5 fluid oz bar, 10 fluid oz per package, in paperboard carton.
**How Stored:** Frozen.
**Nutrition:** Per 2.5 oz. bar: Calories 180, protein 2 gm, carbohydrate 16 gm, fat 12 gm, sodium 28 mg. 11% of RDA for calcium.
**New Product–Documentation:** Labels. 1987. Paper box. 2 by 4 by 7 inches. Full color. Four bars per box. "Non-Dairy Frozen Dessert. No Cholesterol & Lactose Free. Great Taste... That's Good for You." Kingma. 1987. Soya Newsletter. 1(3):10. Talk with Mr. Lee. The product was introduced in May 1987.

1203. Jacobs, Barbara; Jacobs, Leonard. 1987. Cooking with seitan: Delicious natural foods from whole grains. New York, NY: Japan Publications. 256 p. Foreword by Aveline Kushi. Index. 26 cm. [16 ref]
• ***Summary:*** "Seitan is cooked and flavored gluten that has been extracted from [high-gluten] wheat flour. It is very rich in protein, while being extremely low in fat and calories... The traditional Japanese way of seasoning seitan is to cook it in a broth using kombu sea vegetable, natural soy sauce, and fresh ginger root. This... is the one taken for granted as the 'standard seitan flavor' by commercial seitan makers and most people who are familiar with seitan. Many other mixtures of seasonings can be added to the basic seitan broth. Several earlier books on wheat gluten have been written, generally by Mormons.

This book offers you the history, nutritional information, a variety of preparation techniques, and hundreds of recipes that will allow you to convert wheat into a delicious and nutritious food. Especially suited for vegetarians who are interested in high-protein substitutes for animal foods.

Contents: Acknowledgments. Introduction: About wheat




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gluten, gluten, commonly asked questions about seitan. Getting started. Creating seitan from wheat flour (at home in 30-40 minutes). Using the seasonings. Additional methods of cooking. Appetizers. Soups. Main dishes and casseroles. Side dishes. Salads. Sauces, dressings and marinades. Condiments. Sandwiches. Desserts. From the pantry. Sample lunch and dinner menus. Appendix: 1. All about saving and using wheat starch. 2. Storing uncooked seitan. Storing cooked seitan. 4. Commonly encountered problems and some solutions. Nutritional information. Questionnaire for readers. About our ingredients (discusses natural soy sauce, and soymilk). Glossary (includes fu [dried gluten], miso, natural soy sauce or shoyu, soymilk, tamari, tofu). Bibliography.

Recipes containing soyfoods include: Miso soup with fu and wakame (p. 79). Miso-lemon dressing (p. 171). Tangy miso-tahini sauce (p. 180). Tofu spread with variations (p. 181). Seitan-tofu paté (p. 181-82). Tofu "feta cheese" (p. 192-93). Miso-tahini sauce or spread (p. 209).

When Michio and Aveline Kushi started the Seventh Inn Restaurant in Boston in 1971, they introduced seitan, a food that George Ohsawa had popularized in Japan, especially among macrobiotic people. Yumie Kono taught the chefs, one of whom was Lenny Jacobs, how to make seitan (p. 5).

The Introduction (p. 17-18) states: "Seitan is a food with a long history. Although not widely known in the West, it was traditionally eaten in China, Korea, Japan, Russia, the Middle East, and probably many other countries that grew wheat. In America, the Mormons and the Seventh Day Adventists made gluten and used it on a regular basis... The name *seitan* comes to us from the Japanese, who have prepared cooked wheat gluten for hundreds of years... Some natural foods industry insiders think seitan will become the 'tofu of the '80s.'

"Seitan was introduced to the U.S. natural foods industry about sixteen years ago [1970] when a Japanese variety, shrink-wrapped and quite dry and salty, was first imported. There had been several other varieties available from vegetarian groups, primarily the Seventh Day Adventists and the Mormons. Chinese restaurants have also been preparing wheat gluten for many years. The Chinese call it *mien ching,* or *yu mien ching.* Chinese restaurants often refer to it as 'Buddha Food,' claiming that it was developed by Buddhist monks as a meat substitute. There is also a dried wheat gluten available in Oriental food markets called *fu* by the Japanese and *k'ao fu* or *kofu* by the Chinese."

In the USA, about 130,000 pounds of seitan are made each year. The market is growing rapidly. Current U.S. seitan manufacturers are: 1. Upcountry Seitan in Lenox, Massachusetts, the largest known producer in America, which makes about 600 lb/week and distributes it in 6 states. The company, started about 3½ years ago (counting from Jan. 1987, i.e. founded in about mid-1983) by Win Donovan, is now owned and operated by Wendy Rowe and Sandy Chianfoni. They get a yield of 1.33 (i.e. 90 pounds of flour result in 120 pounds of seitan). 2. Rising Tide Natural Market in Long Island, New York. Michael Vitti has been making seitan for 6 years. About 1/3 of his production is bought by another company for use in making sandwiches. 3. Grain Dance in San Francisco, California. Ron Harris has been making seitan for 8 years and is currently selling 250 lb/week in 8 oz. packages. 4. Creative Kitchens in Miami, Florida. Yaron Yemini has been making seitan for 3 years. and has seen a 5-fold increase during this time. He now makes 120 lb/week. His yield is 0.7. 5. The Bridge in Middletown, Massachusetts. The company was founded in March 1981 by Roberto Marrocchesi and Bill Spear. They were making seitan by Oct. 1982. Steve Lepenta now makes 400 lb of cooked seitan each week and claims that sales have doubled in the past two years. 6. Maritime Foods in Portland, Maine. Rosemary Whittaker makes 50 lb/week of seitan. 7. Real Foods of Towson, Maryland. Sharon Warren has been making seitan for 6 years and now makes 150 lb/week.

Reviewed by Linda Elliot in East West. June 1987, p. 94. Note: Talk with Lenny Jacobs. 1990. Sept. 10. There has been little growth in the U.S. seitan industry since the book was published in May 1987. Problems with price and quality. If seitan is frozen, after defrosting it can become spongy and soggy. Address: Massachusetts. Phone: 617-232-1000.

1204. Millon, Marc. 1987. They spend their weekends in search of bellflower, dropwort, sow's thistle and wild mushrooms. *Guardian* (*England*). June 12. p. 21.
• ***Summary:*** Many Koreans spend their weekends (especially in the spring) searching for these wild foods. A recipe for Bulgogi calls for "1/3 pint light soy sauce (such as Kikkoman)" in the marinade.

1205. Kim, Bok-Ran; Han, Y.B.; Park, C.H. 1987. [Changes of free sugar and free amino acid during the natto fermentation used by *Bacillus subtilis* S.N.U. 816]. *J. of the Korean Agricultural Chemical Society* 30(2):192-97. June. (Chem. Abst. 107:19743). [39 ref. Kor; eng]
• ***Summary:*** The free sugars examined were fructose, glucose, sucrose, and maltose. Remarkable increases in the levels of fructose and glucose were observed after 4 hours of fermentation. After that, however, their contents were reduced to a very low level as fermentation continued. The sucrose content dropped dramatically to about the 10% level and stayed low thereafter.

The free amino acid content of natto during 20 hours of fermentation was twice as high as that of unfermented soybeans.

Sensory evaluation showed that 20 hours of fermentation at 43ºC produced the best quality natto based on taste, odor and color.

Contains 5 tables and 1 graph. Address: 1-2. Dep. of Home Economics Education, Korea Univ.; 3. Sampyo Foods Co., Ltd. Lab. All: Seoul, Korea.

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1206. American Soybean Association. 1987. Soya Bluebook '87. St. Louis, Missouri: American Soybean Assoc. 270 p. July. Index (bold face type indicates advertiser). 22 cm.
• ***Summary:*** This is the last issue of the *Soya Bluebook* published by the American Soybean Association.

Contents: Organization: International associations, government trading agencies. Soy Directory: Oil extraction plants/refineries, manufacturers of edible grade soy products & soyfoods, manufacturers of industrial grade soy products. Soybean manufacturing support industries: Category listings, product handling equipment & supplies, soybean processing equipment & supplies, manufacturing services, alphabetical company listings. Marketing & auxiliary services: Marketing services, commercial services & suppliers, exporters of soybeans & soybean products, importers of soybeans & soybean products. Soy statistics: Metric conversions, tables, charts, graphs. Glossary. Standards and Specifications. Indexes: Alphabetical company listings, Soya Bluebook sections and categories, advertisers. Maps.

The section titled "Soy statistics (tables, charts, graphs) (p. 185-244) is a rich source of information, worldwide. Contents: Soybean production–Area planted / harvested and yield: U.S. soybean planting and harvesting dates. U.S. soybean acreage, yield, and production. U.S. soybean planted acreage by state. U.S. soybean harvested acreage by state. U.S. soybean yield by state. U.S. soybean production by state.

U.S. production of major crops: Soybeans, corn, wheat, cotton (graph). U.S. harvested acreage of major crops: Soybeans, corn, wheat, cotton (graph). U.S. yield per acre of major crops: Soybeans, corn, wheat, cotton (graph). Argentine soybean area, yield and production by province. Brazilian soybean area, yield and production by state. Canadian soybean production. Canadian soybean production and utilization.

Soybean production by major countries (graph). Share of world soybean production by major countries (graph). World soybean production. Soybean acreage by major countries (graph). Share of world soybean acreage by major countries (graph).

Soybeans and soybean products: Supply and disposition: U.S. soybeans: Supply, disposition, acreage / yield and price. U.S. soybean meal and oil: Supply and disposition. Soybean usage in the U.S. (graph). U.S. soybean exports–percent of total usage (graph). Argentine soybeans: Supply and disposition. Argentine soybean meal and oil: Supply and disposition. Brazilian soybeans: Supply and disposition. Brazilian soybean meal and oil: Supply and disposition.

U.S. soybean prices, crop value, farm marketings: Prices of U.S. soybeans: No.1 yellow. Prices of U.S. soybeans: Received by farmers. U.S. soybean price support operations. U.S. soybean crop value. U.S. farm marketings of soybeans.

Soybean processing and products–processing facilities and product value: U.S. soybean processing plants (map). Value of U.S. soybean products and crush margin.

Meal: U.S. soybean meal: Prices paid by farmers. U.S. soybean meal: Average wholesale price, Decatur [Illinois]. U.S. soybean meal: Beginning stocks, production, exports and domestic disappearance. U.S. oilseed cake and meals: Supply, disposition, and price. World major protein meals: Supply and utilization.

Fat and Oils: World major oilseeds: Supply and utilization. World major vegetable and marine oils: Supply and utilization. Prices of U.S. soybean oil. U.S. soybean oil utilization. U.S. soybean oil value as percent of total soybean value (graph). U.S. soybean oil: Supply, disposition, and price. U.S. edible fats and oils: Supply and disappearance.

Exports and imports–U.S. exports of soybeans by month. U.S. soybean exports by port and country of destination. U.S. exports: Soybeans by country of destination. U.S. soybean exports by port areas (map). U.S. exports: Soybean oilseed cake and meal by country of destination. U.S. exports: Soybean oil by country of destination. U.S. exports: Soybean oil, P.L. 480, title I and III by country of destination. U.S. exports: Soybean, cottonseed and sunflowerseed oils by country of destination. U.S. exports: Soybean and cottonseed oils by year. Brazilian exports of soybeans and products to major countries. Soybean and product exports by major countries (graph). World share of soybean and product exports (graph).

Before page 199 are two fold-out color maps (color coded by county): U.S. soybean production 1985, and U.S. soybean acreage 1985. Two other maps are: American Soybean Association international offices / world regions, U.S. soybean processing plants, and U.S. soybean exports by port areas.

A full-page table (p. 235) shows U.S. exports of whole soybeans, 1982-1986–Volume of exports (in metric tons) by country of destination and total value each year. Region and country of destination: North America: Canada, Mexico, other, total. South America: Brazil, Colombia, Ecuador, Peru, Venezuela, other, total. Europe and Russia: Belgium & Luxembourg, Czechoslovakia, Denmark, France, Germany (West), Germany (East), Greece, Ireland, Italy, Netherlands, Norway, Portugal, Romania, Soviet Union, Spain, Switzerland, United Kingdom, Yugoslavia, other, total. Middle East. Africa. Asia: China–PRC, China–Taiwan, India, Indonesia, Japan, Korea (South), Pakistan, other, total. Australia & Oceania. Other unidentified. Grand total. Value of exports–total (million $). Address: P.O. Box 27300, St. Louis, Missouri 63141.

1207. *Corporate Report Wisconsin* (*Milwaukee, Wisconsin*). 1987. Kikkoman brews up super soy sauce. July.
• ***Summary:*** The plant on the Big Foot Prairie, 3 miles northwest of Walworth, is operated by Kikkoman Foods Inc., a unit of Kikkoman Shoyu Co. Ltd. of Japan. Production is

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now about 8 million gallons a year compared to about 1.7 million gallons in the plant's first year of operation. In 1977 Kikkoman became the leader in the U.S. soy sauce market. Presently U.S. retail market shares are Kikkoman 47%, La Choy 37%, and Chun King a distant third. "Kikkoman is one of the few Japanese companies to succeed in the U.S. with a traditional Japanese product. It has done so in part by promoting its sweet and salty sauce as an all-purpose and all-American product."

1208. *Soybean Digest.* 1987. Tofulicious–Checkoff research has its just desserts. A good taste that's good for you–and low in calories and fat–comes to you courtesy of soybean checkoff research. June/July. Supplement. p. 4.
• ***Summary:*** Tofulicious began as a research project at the University of Minnesota, funded by state soybean farmers. Minnesota Soybean Growers Assoc. executive Jim Palmer helped coordinate the research with U of M food scientist Dr. William Breene. One of Breene's students, upon graduation, went to work for Eastern Foods Co. in Minneapolis, the manufacturer. Thom Menie, Vice President for Sales and Marketing, says the company is expanding distribution of the five flavors of Tofulicious. The company also makes Dim Sum, a microwavable Oriental snack containing tofu, soy protein, and soybean oil, will soon be available nationwide. A large black-and-white photo shows the front of a carton of Tofulicious brand Non-Dairy Frozen Dessert.

1209. Bernard, Richard L.; Juvik, Gail A.; Nelson, Randall L. 1987. USDA soybean germplasm collection inventory [1898-1944]. Vol. 1. *INTSOY Series* No. 30. vi + 80 p. Aug. [20 ref]
• ***Summary:*** The title page states: "Information on the origins of soybean and wild soybean germplasm including introduced and old United States and Canadian domestic varieties and foreign and domestic strains identified by FC and PI numbers up to PI 150.000 acquired through 1944 and maintained by the United States Department of Agriculture." Note: PI can stand for either "Plant Inventory" or "Plant Introduction."

Contents: Foreword. Curator staff. The USDA soybean germplasm collection: Introduction, history, PI numbers, divisions of the collection, maintenance of the collection, statistical summaries, United States and Canadian varieties, foreign introductions, appendixes, abbreviations (EAS, ARS [Agricultural Research Service], ES, INTSOY, USDA, and USRSL).

Statistical tables: 1. Number of strains by maturity group (MG, p. 4). This table is divided vertically into north (MG 000 to IV), south (MG V to X), and wild soybeans. There are columns for: Old domestic varieties (before 1946), FC strains (mostly from USA), PI strains to 150,000, and total. The three maturity groups with the greatest number of strains are III (479), II (436), and IV (376)–all in the north.

2. Number of strains by country of origin (p. 5). This table is divided vertically into old domestic varieties (before 1946), FC strains, PI strains to 150,000, grand total, and wild soybeans to PI 150,000. The countries that have contributed the most strains to the U.S. collection are: China 871, Korea 335, and Japan 288.

3. Number of PI strains by year from 1898 to 1945 (p. 6). Columns show: Year. Plant Inventory volume. Initial PI designation for all crops. Number of soybean PI designations plus number of domestic varieties derived from them. Number of strains in collection each year. Accumulative total. A total of 7,867 PI soybean strains were introduced out of a total 150,209 plant introductions (about 5.2% of the total was soybeans). 413 domestic varieties were derived from these soybean introductions. The most active years for soybean introduction were 1926-1932. In 1954 there were 1,524 soybeans in the collection, or only 19.4% of those introduced with PI numbers. The rest were lost or discarded.

4. Historical summary of soybean introduction, in four time periods (p. 7): 1898-1923 (26 years, 40 strains/year). 1924-1928 (5 years, 375 strains/year). 1929-1932 (4 years, 1,193 strains/year). 1933-1944 (12 years, 14 strains/year).

5. Soybean instructions from major collecting expeditions (p. 7). Frank N. Meyer in China, Korea, and USSR from 1906 to 1917 collected 114 soybean PI strains–including 1 wild soybean in 1913. P.H. Dorsett in China from 1924 to 1927 collected 969 PI strains–including 5 wild soybeans in 1925. P.H. Dorsett and W.J. Morse in China, Korea, and Japan from 1929 to 1932 collected 4,451 PI strains.

6. Source and identification of individual strains: Old domestic varieties (p. 8-19). 7. Source and identification of individual strains: FC [Forage Crop] strains (p. 20-23). 8. Source and identification of individual strains: PI strains (by year, 1907-1944, to PI 150.000; p. 24-59). A sample entry (p. 34) states: Collected in Japan by P.H. Dorsett and W.J. Morse, USDA Agricultural Explorers, in April to June 1929. Obtained at Nishigahara, Tokyo, on April 15. PI 80.466. Maturity Group V. 32 seeds. 'Okura Maru Daizu,' originally from Hokushu, used candied and the product is called 'Mimame' [sic, Nimame]. Note: Right below this is PI 80.468. Tsurunoko Daizu.

Source and identification of individual strains: Wild soybean strains (by year, 1925-1940, to PI 150.000).

Appendixes: 1. PI strains from which old domestic varieties were derived. 2. Old domestic varieties introduced without PI designation. 3. Old domestic varieties of hybrid or unknown origin. 4. FC strains summarized by country and year. 5. PI strains summarized by country and year: 1898 to 1944 (PI 1 to PI 150.000). 6. Chinese location names. 7. Korean location names.

The source, date, maturity group, and other information for the following 191 old domestic varieties (all of which are still in the USDA soybean germplasm collection)

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is given (p. 8-19): Acadian, Agate, A.K. [FC 30.761], A.K. [Kansas], A.K. (Harrow), Aksarben, Aoda, Arisoy, Arksoy, Arlington, Armredo, Austin, Avoyelles, Bansei, Bansei [Ames], Barchet, Bavender Special A, B, C, Biloxi, Blackeye, Black Eyebrow, Boone, Burwell, Capital, Cayuga, Charlee, Cherokee, Chestnut, Chief, Chusei, Clemson (from Nanjing, China in 1927; released in 1939), Cloud, CNS, Columbia, Creole, Delsoy, Delsta, Dixie, Dunfield, Earlyana, Early White Eyebrow, Easycook, Ebony, Elton, Emperor, Etum, Flambeau, Fuji, Funk Delicious, Funman, Gatan, Georgian, Giant Green, Gibson, Boku, Goldsoy, Granger, Green and Black, Guelph (from Japan in 1889 by Prof. W.P. Brooks, Massachusetts AES; called 'Medium Green' from 1903 to 1907), Habaro, Haberlandt, Hahto, Hahto [Michigan], Hakote, Harbinsoy, Harman, Harrel, Hayseed, Hidatsa, Higan, Hokkaido, Hollybrook, Hongkong, Hoosier, Hurrelbrink, Illington, Illini, Ilsoy, Imperial, Improved Pelican, Jefferson, J.E.W. 45, Jogun, Jogun [Ames], Kabott, Kagon, Kanro, Kanum, Kingston, Kingwa, Korean, Kura, Laredo, Lexington, Lincoln, Linman 533, Louisiana Green, Luthy, Macoupin, Magnolia, Mamloxi, Mammoth Yellow, Mamotan 6640, Mamredo, Manchu, Manchu [Lafayette], Manchu [Lafayette] B, Manchu [Madison], Manchu–Hudson, Manchu–Montreal, Manchu 3, Manchu 606, Manchu 2204, Manchukota, Manchuria, Manchuria 13177, Manchuria 20173, Mandarin, Mandarin (Ottawa), Mandarin 507, Mandell, Manitoba Brown, Mansoy, Medium Green, Mendota, Midwest, Miller 67, Mingo, Minsoy, Missoy, Monetta, Morse, Mukden, Nanda, Nansemond, Nela, Norredo, Norsoy, OAC 211, Ogden, Ogemaw, Old Dominion, Ontario, Osaya, Otootan, Pagoda, Palmetto, Pando, Patoka, Patterson, Peking, Peking S, Pennsoy, Pine Dell Perfection, Pluto, Pocahontas, Poland Yellow, Portugal, Ralsoy, Richland, Roanoke, Rokusun, Rose Non Pop, S-100, Sac, Sanga, Sato, Scioto, Seminole, Seneca, Shingto, Shiro, Sioux, Sooty, Sousei, Soysota, Tanner, Tarheel Black, Tastee, Tennessee Non Pop, Toku, Tokyo, Tortoise Egg, Viking, Virginia, Virginia S, Volstate, Waseda, Wea, White Biloxi, Willomi, Willomi B, Wilson, Wilson B, Wilson-Five, Wilson-Five B, Wilson-6, Wing Jet, Wisconsin Black, Wolverine, Woods Yellow, Yellow Marvel, Yelredo.

For each of these 191 varieties, a table gives the following information: Variety name, maturity group, source and other information [such as country of origin and year of introduction to the USA], prior designation [usually a P.I. number], year named or released, developer or sponsor, literature. The last column refers to a list of 20 bibliographic references in chronological order (from 1907 to 1977) on p. 18-19. Address: Univ. of Illinois.

1210. Chon, Deson. 1987. Chôsen daizu ryôri [Korean soyfoods recipes]. *Daizu Geppo* (*Soybean Monthly News*). July/Aug. p. 32-37. [2 ref. Jap]
• ***Summary:*** Gives numerous popular recipes for using whole dry soybeans, soy sprouts, and tofu. Address: Moranbon Aji no Kenkyujo Shocho, Rigaku Hakase.

1211. *J. of the American Oil Chemists' Society.* 1987. World fats & oils report: Higher oil prices predicted. 64(8):1058-59, 1062, 1064, 1066-78, 1080-85. Aug. [1 ref]
• ***Summary:*** Statistics and general information on vegetable oil production, consumption, and trends in the following countries is given: Australia, Austria, Brazil, Canada, China, Czechoslovakia, Egypt, Finland, France, West Germany, East Germany, Hungary, India, Indonesia, Italy, Ivory Coast, Japan, Korea, Malaysia, Mexico, the Netherlands, Nigeria, Norway, Pakistan, Peru, the Philippines, Poland, Soviet Union, Spain, Sweden, Turkey, Uruguay, Venezuela, and Yugoslavia.

Tables include: 1. World production and consumption of major vegetable and marine oils. 2. Top 10 producers of major vegetable oils (USA, EEC 12 countries, Malaysia, China, Brazil, USSR, Indonesia, East Europe, Argentina, India. The oils: soybean, cottonseed, sunflowerseed, rapeseed, coconut, palm kernel, and palm oil). 3. Top 8 exporters of major edible oils (Malaysia, EEC 12 countries, Argentina, Philippines, USA, Singapore, Brazil, Indonesia). 4. Top 8 importers of major edible oils (EEC 12 countries, Africa, India, USA, Singapore, USSR, China, Pakistan). 5. Margarine, compound fat/shortening, and salad oil production for selected countries (USA, USSR, Japan, India, Pakistan, Netherlands, West Germany, UK, Canada, Poland, Brazil).

1212. Snyder, Harry E.; Kwon, T.W. 1987. Soybean utilization. New York, NY: Van Nostrand Reinhold Co. xii + 346 p. Illust. Index. 23 cm. An AVI Book. [381 ref]
• ***Summary:*** Contents. Preface. 1. Production, marketing, and sources of information: Introduction, agricultural production, marketing, sources of information. 2. Morphology and composition: Morphology, chemical composition. 3. Processing of soybeans: Preparation, flaking, expellers, solvent extraction, oil refining, protein products. 4. Quality criteria for soy products: Protein and oil products. 5. Functional properties of soy proteins: Interactions of soy proteins with water, interactions of soy proteins with lipid, foaming, commentary on functionality. 6. Nutritional attributes of soybeans and soybean products: Inherent attributes of soybeans, changes due to processing.

7. Oriental soy food products: Traditional nonfermented soybean food products, traditional fermented soybean food products. 8. Soybean-supplemented cereal grain mixtures: Protein-rich food mixtures containing soy flours, composite flours containing soy flour, cereal blends containing soybeans. 9. Soy protein food products: Baked goods, meat products, dairy products, other foods containing soy protein. 10. Soybean oil food products: Salad and cooking oils, mayonnaise, and prepared salad dressings, shortenings,

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margarines and related products, soybean lecithin products. 11. Grades, standards, and specifications for soybeans and their primary products: Grades of soybeans, specifications for soybean meals and flours, trading specifications for soybean oils, specifications for lecithins, standards for the use of soy protein products in other foods. References in each chapter. Glossary.

This book is well written (though largely a repetition of previous works) in the area of modern soy protein products. It is weak and poorly researched in the area of "Oriental Soy Food Products," which comprises only 1 chapter (22 pages) of the total, making the book unbalanced. The author of this chapter seems to be almost completely unaware of the many major developments in the Western world during the past 10 years.

Note the following Korean soyfood terms: Fresh soybean = Put Kong. Toasted soy powder = Kong Ka Ru. Soy sprouts = Kong Na Mool. Soymilk = Kong Kook or Doo Yoo. Yuba (Soymilk film) = Kong Kook. Tofu (Soy curd) = Doo Bu. Tempeh (Fermented Whole Soybeans) = no name. Natto = Chung Kook Jang. Soy sauce = Kan Jang. Miso (Soy Paste) = Doen Jang. Fermented tofu (Fermented Soy Curd) = no name. Fermented okara (fermented soy pulp) = no name.

Note the following Chinese soyfood terms: Fresh soybean = Mao-Tou. Toasted soy powder = Tou-Fen. Soy sprouts = Huang-Tou-Ya. Soymilk = Tou-Chiang. Yuba (Soymilk film) = Tou-Fu-Pi. Tofu (Soy curd) = Tou-Fu. Tempeh (Fermented Whole Soybeans) = no name. Natto = no name. Soy sauce = Chiang-Yu. Miso (Soy Paste) = Chiang. Fermented tofu (Fermented Soy Curd) = Su-Fu. Fermented okara (fermented soy pulp) = no name.

Note: This is the earliest English-language document seen (Nov. 2012) that uses the term "Toasted soy powder" to refer to roasted soy flour. Address: 1. Prof., Food Science Dep., Univ. of Arkansas, Fayetteville, AR; 2. Principal Research Scientist, Div. of Biological Science & Engineering, Korea Advanced Inst. of Science and Technology, Seoul, South Korea.

1213. *Soybean Digest.* 1987. Koreans consume more soymilk. Aug/Sept. p. 40.
• ***Summary:*** "Koreans are drinking more soymilk, in part because of the American Soybean Association's programs to promote soyfoods. In 1986, 10 soymilk makers produced 7.8 million liters (2.028 million gallons) of soymilk, a $60 million (U.S.) value and a 23% volume increase compared to 3 years ago."

1214. Unnevehr, Laurian J.; Gleason, Jane E.; Kauffman, Harold E. 1987. Soybeans in international agriculture. *Illinois Research* (*Illinois Agric. Exp. Station, Urbana*) 29(2/3):24-26. Summer/Fall.
• ***Summary:*** Soybean cultivation originated in the North China Plain. Today, China is still a major producer of soybean, accounting for about 10% of world production. Other countries in Asia produce only minor quantities. Since 1970, production of soybeans has expanded significantly in four Latin American countries: Argentina, Brazil, Paraguay, and Uruguay. Among the major producers, the U.S. and Argentina have the highest average yields of about 2 tonnes/ha (30 bushels/acre). Lowest average yields, about 1 tonne/ha (15 bushels/acre), are found in China. Over 80% of world soybean production is crushed to provide meal and oil. The soybean is the single largest source of supply in both protein meal and edible oil markets, providing 30% of the world's edible oil and 50% of world supply of protein meal for animal feeds. Its ratio of protein to oil is highest among all oilseeds. The soybean also has high-quality protein compared to other oilseeds.

Because income is a major determinant of soybean meal and oil consumption, it is not surprising that high-income industrial countries are the largest consumers. The European Economic Community (EEC), Japan, and the U.S. account for two-thirds of world soybean meal consumption and one-half of world soybean oil consumption. Recent growth in demand for soybean products has been greatest in less developed countries because incomes are growing most rapidly there. From 1960 to 1980, per capita income in South Korea tripled from $500 to $1,500.

As a result, meat consumption increased from 12 to 40 kilograms per capita. To satisfy increased meat demand, livestock production and feed use also increased rapidly, causing soybean meal consumption to increase from 0 to 300,000 tons in only 20 years. The use of soybeans for food products is a very small part of total use in most countries, but there are some exceptions. For instance, from 1983 to 1985, Indonesia used 92.9% as food; China, 73.8%; and South Korea, 35.9%. Japan protects its domestic soybean processors by confining imports to whole beans. Address: 1. Asst. Prof. of Agricultural Economics; 2. INTSOY agricultural economist; 3. Director, INTSOY, and Prof. of International Agriculture. All: Univ. of Illinois, Urbana, IL 61801.

1215. *Beachcomber* (*Vashon, Washington*). 1987. Tofu revolution to proceed, problem settled; no sale [at Island Spring]. Oct. 22.
• ***Summary:*** This week Luke Lukoskie struggled to advert an advertised sale of $3,891,800 worth of tofu making equipment Friday. The public sale was to "satisfy obligations" according to the public notice an attorney published in a Seattle newspaper without Lukoskie's consent. A power struggle was taking place. The company was founded 11 years ago by Lukoskie and Sylvia Nogaki in a westside woodshed. She went on to be a business writer and continues as a minor stockholder. After Lukoskie married Soon "Suni" Kim, a Korean-American graduate food technologist, sales expanded. With the help of Cal Tech

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graduate Cliff Brown, the Lukoskies developed machinery to make tofu continuously. An investor was found to pay for a $6 million leap in to national and perhaps international production and marketing.

The U.S. subsidiary of an international food machinery maker made the production line model of the continuous production machine. It now stands on the island in crates awaiting completion of a new 37,000 square foot building near K2. Production in the new plant is expected to start in early 1988. Address: Washington.

1216. Pandey, R.K.; Sumarno, -; Potan, Nark; Navarro, R.; Dharmasena, C.; Beg, Akhtar. 1987. Asia's shortfall in production of soybeans and the response of national programmes. In: S.R. Singh, K.O. Rachie, and K.E. Dashiell. eds. 1987. Soybeans for the Tropics: Research, Production and Utilization. New York, etc: John Wiley & Sons Ltd. xx + 230 p. See p. 101-09. Chapt. 10.

• ***Summary:*** Contents: Introduction. Constraints. National research programmes: Varietal improvement, cultural practices. Cooperative research: A new dimension.

Demand for soybeans and products in the region is about twice the regional production. By the year 2000, if current trends continue, Asia's demand for soybeans is projected to be more than three times the amount produced.

The leading soybean producers in Asia, in descending order of tonnes produced in 1983, are China, India, Indonesia, Korea, and Thailand. In Indonesia, soybean production during the past 10 years has been constant at about 700,000 tonnes (metric tons) per year; soybeans are produced mainly in Java.

In 1984 Thailand produced 284,000 tonnes, which was far below its demand of about 350,000 to 450,000 tonnes. A national program set a goal of producing 390,000 tonnes by 1986.

In the Philippines, Mindanao, located in the south, is the leading soybean producer. During the last 10 years, producing has gradually increased, however in 1983 only 8,320 ha were planted to soybeans; that year, imports totaled 261,000 tonnes of soybean meal and 31,000 tonne of whole soybeans.

In Pakistan, commercial soybean production began in 1970 and is concentrated in the North Frontier Province, Sind and Punjab. The area planted to soybeans is small (4,300 ha) but the potential for expansion is very large.

Vietnam produces only about 1% of Asia's soybeans, however the amount is increasing.

The following countries started research programs on soybean breeding and production at an early date: China, Indonesia, Thailand, India, Philippines, Korea, and Sri Lanka; these programs have made great progress during the past few years. China has large and well-run germplasm collections.

Since 1967, the Indian Council of Agricultural Research has had an interdisciplinary team working on soybeans. The project's headquarters are currently at Pantnagar, and a network of 19 centers throughout India tests varieties and production techniques.

In Indonesia, soybean research is coordinated by the Central Research Institute for Food Crops in Bogor, and conducted by five research institutions.

In Thailand, soybean research is coordinated by the Field Crop Research Center at Chiangmai.

In Sri Lanka, in 1973, the government initiated soybean research, with technical assistance from the International Soybean Program (INTSOY), to promote soybean production and utilization in the country.

In 1984 the Asian Soybean Improvement Network (ASIN) was launched in a cooperative effort to extend the resources devoted to research by national programs, IITA, IRRI, AVRDC, INTSOY, the Australian Centre for International Agricultural Research (ACIAR), and the United Nations Economic and Social Council for Asia and the Pacific. The network is coordinated by representatives of AVRDC and IITA.

Figures show: (1) Pie charts–Asia's proportion of world area and production of soybeans. Concerning world production, Asia has about 15.7% of the total, compared with 57.3% for North and Central America, 24.6% for South America, and 2.4% for others. Within Asia, China has 79.1% of Asia's total soybean production, followed by India (5.9%), Indonesia (4.5%), Korea (3.0%), Others (incl. Japan; 7.2%).

(2) Pie charts–Trade in soybeans, soybean meal and oil in Asia and the world. For soybean oil imports, Asia is the leader (37.9% of the world total), followed by Europe (24.5%), Africa (13.9%), South America (12.5%) ad Others (9.2%). For soymeal imports, Europe is the leader (73.0% of the world total), followed by USSR (10.2%), Asia (8.2%), and Others (8.6%). For whole soybean imports, Europe is the leader (58.0% of the world total), followed by Asia (30.6%), North & Central America (6.4%), USSR (5.0%), and Others (0.0%). Within Asia, for soybean oil imports, India is the leader (36.4%), followed by Iran (22.9%), Pakistan (19.3%), Turkey (6.4%), Bangladesh (3.57%), and Others (11.4%). For soymeal imports, Korea is the leader (15.2%), followed by Philippines (14.7%), Iran (12.9%), Japan (12.5%), Thailand (10.0%), Malaysia (8.0%), Others (26.7%). For whole soybean imports, Japan is the leader (61.2%), followed by China (17.5%), Korea (6.6%), Israel (6.6%), Indonesia (2.7%), and Others (3.9%).

(3) Changes in the area planted to soybean over the past 15 years (1965-1983) in selected Asian countries. Graphs of India, Thailand, Indonesia (which have increased, with India's graph increasing dramatically), Asia, China, and Korea (which have decreased somewhat).

(4) Soybean production, consumption, and projected demand in Asia by the year 2000 (Source FAO, 1960-83; IFPRI, 1977). Asia will have to steadily increase its imports

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of edible oils, since consumption (production + imports) of soybeans is falling behind demand. Address: 1. International Rice Research Inst., Los Baños, Philippines; 2. Central Research Inst. for Agriculture (Lembaga Pusat Penelitian Pertanian), Bogor, Indonesia; 3. Field Crops Research Inst., Dep. of Agriculture, Bangkhen, Bangkok, Thailand. 4. Inst. of Plant Breeding, Univ. of the Philippines, Los Baños, Philippines. 5. Soybean Project, Peradeniya, Sri Lanka. 6. Agricultural Research Council, Islamabad, Pakistan.

1217. Lee, Leonard L. 1987. Eastern Foods Corporation and Tofulicious (Interview). *SoyaScan Notes.* Nov. 11. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** His Eastern Foods Corp. presently makes about 10,000 lb/week of tofu; the capacity is 5,000 to 7,000 lb/day. They also make egg roll and wonton skins. An expensive Pillsbury executive was hired to make a big splash with Tofulicious. It flopped and almost killed the company. He now wants to start importing a line of traditional natural foods from Korea with a classmate (incl. ramen, noodles, crackers, rice vinegar) and to enter the health food, gourmet, and military markets. He is now importing dim sum and has set up a branch in Korea. Line name: Naturally Koryo. He tried to export Tofulicious to Japan, developing a cheerleader point of purchase ad; it flopped. Address: Minneapolis, Minnesota.

1218. *Toyo Shinpo* (*Soyfoods News*). 1987. Okara kara jinzô niku tsukuru. Nihon Powder Kankoku de gôben seisan kaishi. Yasukute fûmi batsugun. Gyôkai no chûmoku atsumeru shin shôhin [Making an artificial meat from okara. Nihon Powder starts a joint company in Korea. The meat is inexpensive and tastes great. It is the new food which is getting the attention of the industry]. Nov. 11. p. 2. [Jap; eng+]
• ***Summary:*** Mr. Koichi Yoshida is the president of Nihon Powder, Uchikanda, Chiyoda-ku, Tokyo, Japan. Phone 03-256-7931. Nihon Powder has decided to produce artificial meat made from okara on a large scale in Korea starting in January 1988. They established a joint company with Hoko Shokuhin (a protein food company in Korea). Nihon Powder has ¥36,000,000 invested in the new joint company or 49% of the control. Together they make a product which is better tasting than any artificial meat made from soy. The new product has a better texture and flavor than other such products. They process okara by adding calcium chloride to it and tofu coagulants to make a fresh tofu chunk. The tofu undergoes an ice-cold temperature ripening process, and is then processed using 2 screw-extruders to make a meatlike product. Before this process can be used though, soybean hulls must be removed to produce a good texture soy imitation meat. Fortunately, the manufacturers use an enzyme which breaks down the bean hulls, allowing them to use okara in their processing.

Okara is such a big problem in Japan that the phrase okara pollution (*okara kogai*) was invented. Some of the tofu makers are very concerned about the build-up of this okara waste. The Nihon Powder company has also invested another ¥180,000,000 to make a plant (320 square meters of space) on 16,500 square meters of land which is scheduled for completion in November of 1987.

1219. *Soybean Update.* 1987. Twenty-six oilseed processors from 18 countries are attending a soybean processing short course sponsored by ASA at Texas A&M University. Nov. 23. p. 3. Also in Soybean Digest. Dec. p. 51.
• ***Summary:*** Specialists in the U.S. processing industry teach the classes which feature lectures and hands-on experience. Ricardo Lopez, Asst. Manager of Prograsa, plans to open the first soybean crushing facility in Honduras in January 1988. Cheil Sugar & Co., Korea's second largest soybean importer, buys about 400,000 tonnes of soybeans a year. His industry is growing at least 10% a year. Participants will use their new knowledge to produce better soybean oil and meal in their own countries.

1220. Beverly Soon Tofu restaurant. 1987. November. New soyfoods restaurant or deli. 4653½ W. Beverly Blvd., Los Angeles, California.
• ***Summary:*** Los Angeles Times. Nov. 29. "One of the best Korean meals I've had in Los Angeles. The tofu, so fresh it was like creamy clouds..." The owner is Monica Yi. Address: Los Angeles, California. Phone: 213-856-0368.

1221. **Product Name:** [Soy Oil {In Tetra-Brik Carton}].
**Manufacturer's Name:** Dong Bang Corporation.
**Manufacturer's Address:** 2, 4-Ka, Yangpyung-Dong, Yungdeungpo-ku, C.P.O. Box 3031, Seoul 150, South Korea.
**Date of Introduction:** 1987 November.
**Wt/Vol., Packaging, Price:** Tetra Brik aseptic carton.
**How Stored:** Shelf stable.
**New Product–Documentation:** Soybean Update. 1987. Nov. 9. This is Korea's first soy oil packaged in a Tetra-Brik carton. Dong Bang decided to launch the product after company officials participated in an American Soybean Association study mission to Italy where the Crivellaro Company has successfully gained market share with a Tetra-Brik packed soy oil.

1222. Central Soya Co., Inc. 1987. Central Soya signs feed technology pact (News release). Fort Wayne, Indiana. 2 p. Dec. 4.
• ***Summary:*** Central Soya has signed a five-year technology licensing agreement and technical service agreement with Great Wall Enterprises Co., a leading food and feed manufacturer, in Taiwan. The contract is the third such Central Soya technology agreement reached with an Asian firm in the past 18 months. In early 1986, and agreement

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was reached with Marubeni Shiryo Company, Ltd., a large Japanese feed manufacturer. And last fall a technology agreement was signed with the Cheil Sugar & Co., Ltd., a large Korean firm engaged in feed manufacturing and oilseed processing. "This is a continuation of our strategy to become a larger part of the Asian market," said Thomas G. Hauenstein, Vice President-International Feed. Address: Fort Wayne, Indiana.

1223. Weinreb, Sam; Martin, Shelly. 1987. Tofu in New York City (Interview). *SoyaScan Notes.* Dec. 29. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Sam: Tofu has become a lost leader in New York City health food stores, sold at a small markup. He makes 1,800 lb/week of tofu including round tofu. He is supported by the co-ops, and is surviving out of sheer stubbornness and because he thinks what he is doing is important.

Shelly: The New York City health food industry is being taken over by the Koreans. They keep their stores open 24 hours a day and pay low or no wages (as to family). They are hard for a manufacturer to do business with. Soy Source has its soy sauce specially made by Wajashan. Address: 1. Local Tofu, West Nyack, New York 10994; 2. Appropriate Foods / Soy Source.

1224. *ASA Member Letter.* 1987. Soybean buyers confer on quality. Nov/Dec.
• ***Summary:*** Soybean buyers in Japan and Korea are learning about U.S. soybean quality from Jim Guinn, American Soybean Association soybean quality director, at soybean quality outlook conferences in Tokyo and Seoul this week. Last year Japan imported 151 million bu of U.S. soybeans; Korea imported almost 38 million bu.

1225. Carter, Thomas E., Jr. 1987. Genetic alteration of seed size: Breeding strategies and market potential. In: Dolores Wilkinson, ed. 1987. Proceedings of the 17th Soybean Seed Research Conference 1987. Washington, DC: American Seed Trade Association. vii + 114 p. See p. 33-45. Held 9-10 Dec. 1987 in Chicago, Illinois. [21 ref]
• ***Summary:*** Contents: Introduction. Soyfood market size. Soyfood market trends–short and long range. Premiums and acreage, the breeder's perspective. Breeding special varieties. Future breeding goals. Conclusions.

"The expanding soyfood markets in Japan and the U.S. have generated considerable interest among American soybean producers in recent years. More than 60% of the soybeans used in these markets are grown in the U.S."

Table 1 (p. 34) shows "Soybean consumption as soyfoods in Japan and the U.S." In Japan about 851,000 metric tons of soybeans are used to make soyfoods such as tofu (532,000), miso (180,000), natto (99,000), soymilk (12,000), and soy sauce (5,000 [plus large amounts of defatted soybean meal]). Large-seeded soybeans grow in the U.S. have found acceptance in making tofu and soymilk, capturing 81 and 100% of the raw soybean sales respectively for these products.

"In survey results, 39 of 43 public breeders and 44 or 67 private breeders responded to questions regarding the breeding of specialty varieties. Twenty-four breeders reported that they are maintaining 36 separate projects for large- and small-seeded varieties (Table 3). Public and private breeders are represented equally in this effort with the majority of these projects underway in the Midwest. Eight public and eight private programs are developing varieties specifically for tofu while 13 public and 7 private programs are developing varieties for natto. One public breeder was interested in soy milk varieties but considered varieties for tofu and soymilk as the same. One private and two public breeders are interested in large-seeded garden types for the fresh market in urban areas with large oriental populations. One public and one private breeder expressed interest in small-seeded varieties for sprouts. Soybean sprouts are primarily a Korean soyfood; and, Koreans buy U.S. soybeans for making sprouts in some years." Address: Research Geneticist, USDA-ARS, North Carolina State Univ., Raleigh, NC. Phone: 919-737-2734.

1226. Jacobson, Jodi L. 1987. Planning the global family. *Worldwatch Paper* No. 80. 56 p. Dec. Worldwatch Inst., Washington, DC.
• ***Summary:*** Over the past two decades, steadily declining birthrates have contributed significant improvements to the health and well being of millions of people and to the growth of national economies. Yet the world population increased by 87 million people in 1987, the largest annual increment ever. Encouraging small families requires a two-pronged strategy: family planning and social change. With few exceptions total fertility rates in the industrial world are below replacement level. The most dramatic declines in total fertility rates (number of children per woman) took place in East Asia and Cuba. From 1960 to 1987 the average number of children per woman fell as follows: Singapore 75%, Taiwan 72%, South Korea 65%, Cuba 62%, China 56% (from 5.5 to 2.4 children/woman), Chile 55%... Mexico 44%, Brazil 44%, Malaysia 43%, Indonesia 41%... India 31%. But in Sub-Saharan Africa, fertility rates have not declined at all. Address: Washington, DC.

1227. **Product Name:** [Soy Flour].
**Manufacturer's Name:** Cheil Sugar & Co. Ltd.
**Manufacturer's Address:** Main Office: Dong Bang Main Building, 17th Floor, 150, 2-Ka, Taepyung-Ro, Chung-ku, Seoul 100, South Korea.
**Date of Introduction:** 1987.
**New Product–Documentation:** Soya Bluebook. 1987. p. 78.

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1228. **Product Name:** La Choy Thick and Rich Teriyaki Sauce.
**Manufacturer's Name:** La Choy Food Products.
**Manufacturer's Address:** 901 Stryker St., Archbold, OH 43502.
**Date of Introduction:** 1987.
**New Product–Documentation:** Talk with Milan Drake. 1988. Jan. 4.

1229. Park, Kun-Young; Kweon, M.H. 1987. [Effect of L-ascorbic acid on the degradation of aflatoxin B1]. *J. of the Korean Society of Food and Nutrition* 16(1):1-8. [26 ref. Kor; eng]
• ***Summary:*** "Large amount of aflatoxin B1 (AFB1) is disappeared in the presence of L-ascorbic acid (AA) in buffer solution at pH values from 1 to 7 during 5 days of incubation at 37 C. AFB1 was quite stable at pH's between 5 and 7 when AA was absent (control), however, about 50 to 60% of AFB1 was degraded in its presence after 5 days." Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan, Korea.

1230. Bartholomai, Alfred. ed. 1987. Food factories: Processes, equipment, costs. Weinheim, West Germany: VCH Verlagsgesellschaft mbH. xv + 289 p. 24 cm. [Eng]
• ***Summary:*** Includes chapters on tofu plant by Takai Tofu & Soymilk Equipment Co. (Japan) (p. 157-59, Chap 22), surimi plant by K.L. Holmes and C. Riley (p. 207-14), protein recovery plant by J. Lyle (p. 223-27), soybean oil extraction plant by K. Weber (p. 231-35), and soymilk plant by Takai Tofu & Soymilk Equipment Co. (Japan) (p. 279-81, Chap. 41).

Within each chapter are the following sections: Introduction, economic considerations, social impact, plant design basis (capacity), plant layout and floor plan, process description. Takai has recently supplied/sold the following plants: (1) Tofu plants to Natural Inc. (Maryland, USA 30 kg/hour), Tempe Production BV (Netherlands, 30 kg/hour), and Castle Trading (Australia, 60 kg/hour). (2) Soymilk plants to Namyang Company (Korea, 2,000 liters/hour), Seoju Industrial Company (Korea, 1,000 liters/hour), Guilin Sweets and Food Factory (China, 1,000 liters/hour), Jinan Soymilk Factory (China, 1,000 liters/hour). Address: 570 Stanhope Rd., Sparta, New Jersey, 07871.

1231. Beuchat, Larry R. 1987. Food and beverage mycology. 2nd ed. New York, NY: Van Nostrand Reinhold. xiii + 661 p. Illust. Index. 23 cm. [20+ soy ref]
• ***Summary:*** Contents: Contributors. Foreword. Preface. Classification of food and beverage fungi, by E.S. Beneke and K.E. Stevenson. Relationships of water activity to fungal growth, by Janet E.L. Corry. Fruits and fruit products, by D.F. Splittstoesser. Vegetables and related products, by R.E. Brackett. Meats, poultry, and seafoods, by James M. Jay. Dairy products, by Elmer H. Marth. Field and storage fungi, by C.M. Christensen. Bakery products, by J.G. Ponte, Jr. and C.C. Tsen. Traditional fermented food products, by L.R. Beuchat. Alcoholic beverages, by G.G. Stewart. Edible mushrooms, by W.A. Hayes. Poisonous mushrooms, by Donald M. Simons. Fungi as a source of protein, by A.J. Sinskey and C.A. Batt. Fungal enzymes and primary metabolites used in food processing, by R. Bigelis and L.L. Lasure. Mycotoxins, by N.D. Davis and U.L. Diener. Methods for detecting mycotoxins in food and beverages, by L.B. Bullerman. Methods for detecting fungi in foods and beverages, by B. Jarvis and A.P. Williams. Appendix. Regulatory action levels for mold defects in foods.

Chapter 9, "Traditional fermented food products, has a section on koji and a long section on fermented soybean foods that discusses: Shoyu, miso, natto (incl. itohiki-natto, yukiwari-natto, and hama-natto / hamanatto; called tu su by the Chinese and tao-si by the Filipinos), sufu, meitauza, and témpé [tempeh]

Tables show: (9.1) Some fermented foods of fungal origin. For each food is given: Product name, geography, substrate, microorganisms, nature of product, and product use. Soy-related products include: Chee fan, Chinese yeast, Hamanatto, kecap, kinema, ketjap, meitauza, meju, miso (incl. chiang, jang, doenjang, tauco, tao chieo), natto, soybean milk, soy sauce (incl. chiang-yu, shoyu, toyo, kanjang, kecap, see-ieu), sufu (tahuri, tao-kaoan, tao-ju-yi), tao-si, taotjo, tauco and témpéh. Address: Dep. of Food Science, Agric. Exp. Station, Univ. of Georgia, Experiment, GA 30212.

1232. Passmore, Jacki. 1987. Asia: The beautiful cookbook. Los Angeles, California: Knapp Press. 256 p. Illust. (color). Index. 37 cm.
• ***Summary:*** This is a stunningly beautiful, oversized book–a feast for the eyes, filled with elegant color photos (many full page), authentic recipes and many insights about Asian cookery. Each recipe is accompanied by one or more photos, Contents: Japan: Simplicity and elegance. Korea: Warm and sustaining. China: From the beginning of time. Philippines: East meets West. Thailand: Titillating, tantalizing. Laos and Kampuchea: Unforgettable foods. Vietnam: Herbaceous overtones. Singapore and Malaysia: A blending of cultures. India: Southern fire, northern serenity. Burma: Exotic offerings. Indonesia: Symphony of flavors. Sri Lanka: Gems from an enchanted isle. Glossary. Acknowledgments.

Japan: Yudofu (Simmered bean curd, with 3 cakes tofu {bean curd}, p. 31). Tofu dengaku (Grilled bean curd on skewers, with 2 lb {1 kg} momen tofu and white miso, p. 31). Ton-negu no teriyaki (Teriyaki pork rolls, p. 38). Miso-shiru (Miso-flavored soup with bean curd).

Singapore and Malaysia: Popiah (with ¼ cup (about 2 oz / 60 gm) compressed bean curd cake, shredded, p. 155, 148-

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49). Tempe lemak (Tempe in coconut milk, p. 166). Hokkien mie (Hokkien style noodles, with 2 cakes compressed bean curd, p. 168). Laksa ayam (Chicken with laksa noodles in coconut sauce, with 2 squares / cakes compressed bean curd, p. 169).

Indonesia: Kecap manis is a sweetish soy and chili sauce (p. 218). Babi kecap (Pork in sweet soy sauce, p. 227).

Glossary (p. 252-54) includes short definitions of: Azuki beans. Bean curd. Bean pastes and sauces. Kecap manis ("based on dark soy sauce, sugar and spices"). Kombu. Nori. Paneer (India). Sesam. Wakame.

1233. Popham, Peter. 1987. The insider's guide to [south] Korea. Edison, New Jersey: Hunter Publishing. 199 p. See p. 60. Illust. (color photos by Alain Evrard). Maps. Index. 23 cm. [9* ref]

• ***Summary:*** The 1988 Summer Olympics in Seoul introduced Korea to the modern world in a big, new way. This book was written for that event.

The chapter titled "Korean cuisine" (p. 58+) explains that it is the least known of the culinary traditions of Asia, and offers strong evidence of the nation's distinctiveness, which shows clear Mongol influence. Like the Chinese and Japanese, the Koreans also eat "soy beans and bean curd" [tofu], and bean sprouts [soy sprouts are more popular than mung bean sprouts]. The undisputed mark of Korean cuisine is kimch'i [kimchi], most of which is still made by fermentation at home of a vegetable (such as cabbage), always with chili and garlic; there are many different types of kimch'i, the most popular of which are cabbage stuffed with oysters, sliced cucumbers with radish and ginger, diced daikon radish with scallions, and white radish sticks floating in brine. Other favorite Korean seasonings, besides garlic and chili, are scallions, ginger, sesame oil, sesame seeds, and soy sauce.

Pages 60-62: "There is also a whole range of fermented pastes and sauces for dipping, called *chang.* Every home and restaurant has its own recipe for *chang,* and each batch comes out differently. Based on a fermented mash of soybeans, the three most common varieties are *"kan chang,* a dark liquid, like soy sauce, *daen chang,* a thick, pungent paste, and *kochu chang,* a fiery version laced with chilies."

Note: This is the earliest English-language document seen (April 2012) that uses the term *kan jang* to refer to Korean soy sauce.

Side dishes, known as *panch'an,* accompany the main dish, rice, and add variety to the basic Korean meal. They include: *Tubu:* Soybean curd, tofu. *Manul changah-chee:* Green garlic pickled in soy sauce. *Don chun:* Beef and bean curd patties spiced with ginger.

Koreas love to make rich, thick stews, especially in winter. *"Chigae* is a special thick stew simmered in heavy clay crocks." Favorite Korean soups (*tang*) and stews include: *Maeun tang:* Rich soup of meat, fish, bean curd, zucchini and scallions. *Ten chang chigae:* Thick stew of meat, fish, bean curd, squash and chilies.

Simple "one-bowl" meals, especially popular as summer lunches, include: *Kong kookso:* Wheat noodles in fresh soy milk. *Udong* [Jap. udon]: Broad wheat noodles with onions, bean curd, egg and chili. *Kongnamul pap:* [Soy] bean sprouts, beef and cabbage served over rice.

A photo (p. 63) shows a man grinding food using a hand-turned stone mill (quern).

1234. Sayers, Robert; Rinzler, Ralph. 1987. The Korean onggi potter. Washington, DC: Smithsonian Institution Press. 288 p. See p. 58-60, 71, 75, 77. Illust. 23 cm. Series: Smithsonian Folklife Studies, No. 5. [166* endnotes]

• ***Summary:*** Onggi are traditional Korean earthenware vessels, used for the storage of pickled vegetables, bean pastes and soy sauces. Fieldwork for this project was initiated by Ralph Rinzler in 1971.

The section titled "Storage containers" (p. 58-59) contains a list of the names of ceramic food jars, with their appropriate uses, as given by people in Korea's capital, Seoul. "Soy sauce, for example, is stored in quantity throughout the year in large and medium size outdoor receptacles (*kannjang tok* and *kanjang hangari*)*;* as needed, the liquid is transferred to a small spouted kitchen form (*kanjang tanji*)." The large outdoor jar used to store soy paste *toenjang* is called a *toenjang tok* and the small kitchen form a *toenjang tanji.* The corresponding jars for red-pepper paste (*koch'ujang*) are called *koch'ujang hangari* and *koch'ujang tanji.*

To understand better how these storage jars are used, it is useful to describe the preparation of four Korean dietary staples: soy sauce, soybean paste, red pepper paste, and kimch'i. "The first of these, reddish black soy sauce (*kanjang*), is made from yellow soy beans boiled four or five hours, then mashed into a paste called *meju.* Today yeast is added to the meju; formerly it was molded into large rectangles or truncated cones, which were dried outdoors on rice straw mats, then hung from the house rafters to leaven [sic, mold] naturally over several months. In the springtime, the mold-covered *meju* is broken up into smaller chunks and submerged in a brine-filled *tok* positioned on an architectural feature of the outdoor living space called a *changdoktae* ("place for sauce jars"). This might be a stone or concrete terrace built up in a sunny part of the dwelling's inner courtyard or, in the city, an apartment balcony or rooftop (Figures 8 and 9, p. 60-61).

Over a period of two or three months, the mistress of the house checks her jars, taking care to see that their contents receive only the proper amount of sunlight. Then, in May or June, she boils the clear, dark liquid in a cauldron and replaces it in still other jars along with red peppers and chunks of wood charcoal, which absorb dirt and inhibit strong odors. The solid moldy matter that floats to the top is

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skimmed off, then crushed, salted, and kneaded into a paste (*toenjang*), which constitutes a second major soy by-product. For most Koreans the making of soy sauce and soy paste is a yearly activity." An affluent family might prepare an even larger supply. The sauce is believed to stay fresh up to three years, and is even said to improve with age.

"A second staple is the hot seasoning *koch'ujang.* In autumn, red chili peppers are harvested and sun-dried for a week or more. Then the peppers are split open and left in the sun a few days longer, after which the seeds are dislodged with a pole. What remains is pulverized in a mortar, then sifted through a pine-root sieve. Simultaneously (or during the making of soy sauce), a *meju* ring is prepared and secreted away in a dark corner of the house to ripen. In the springtime, the red pepper powder and pulverized *meju* are combined with rice paste *ch'apssalchuk,* salt, and sugar. The *koch'ujang* is not cooked, but is left to ferment in a storage jar for three or four months."

Most cauldrons are made of iron, although some, made of carved soapstone, are used for preparing medicinal foods. "Ceramic cauldrons are perhaps the least common; however a stew of fermented soybean paste [*toenjang*] is sometimes cooked in a small example (*toenjang sot*) manufactured from a low-firing refractory clay called *koryôngt'o,* which is more resistant to shattering than dense, homogeneous stoneware bodies (*chômt'o*) (Fig. 17), p. 71.

Photos show: (1) Korean onggi peddlers, ca. 1900, with long wooden racks that hold a heavy load of many containers on their backs (frontispiece). (2) Rooftop terrace (*changdoktae*) for sauce jars. Photo by Ralph Rinzler, 1971 (p. 60). (3) Rural version of *changdoktae* at Kaya village, Kyonggi Province (p. 61). (4) A small ceramic cauldron (*toenjang sot*) for preparing soy paste, Kyongju, N. Kyongsang Province (p. 71). (5) A small pouring vessel (*kanjang tanji*) for soy sauce (p. 77). Address: 1. Dep. of Anthropology, California Academy of Sciences, San Francisco, CA 94118.

1235. Shurtleff, William; Aoyagi, Akiko. 1987. Soymilk industry and market: Updates from 1984 to 1987. Lafayette, California: Soyfoods Center. 17 + 59 p. Index. 28 cm. [165 ref]
• ***Summary:*** This 1987 update to the Soyfoods Center's two-volume 1984 *Soymilk Industry and Market* has two parts: (1) Year in Review, describing key events and trends each year from 1984 to 1986. (2) A bibliography of soymilk from January 1987 to late 1987, based on records in the SoyaScan database; at the end is a 10-page index. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1236. Miyazawa, Mitsuo. 1988. [Re: History of Sendai Miso Shoyu Co. Ltd.]. Letter to William Shurtleff at Soyfoods Center, Jan. 14. 2 p. Handwritten. [Jap; eng+]
• ***Summary:*** Although this company was founded in 1919, its roots go back to the late 1500s. In March 1593 (Bunroku 2) 3,000 soldiers of Idate Han (the former feudal domain in northeast Japan where Sendai is now located) went to Korea, led by Daté Masamuné (DAH-tay Mah-sah-MU-nay) in the army of Toyotomi Hideyoshi. It was found during the summer battles that the miso brought by the soldiers from most other Hans started to spoil; only that from Idate Han (Sendai) remained tasty, and it was shared with the other soldiers. From this time the fame of Sendai Miso began to spread throughout Japan.

During the Genroku Period (1688-1703) the miso makers in the Sendai area formed a trade group named Miso Nakama. "Nakama" means "colleague, fellow worker, comrade, or associate." They established rules and made miso under the motto "Examine the quality first." During the Kyoho Period (1716-1735) they started selling shoyu and the group changed its name to Miso Shoyu Nakama." Sasa Ju (Sasaki Jubei) joined this group in the year 1834 (Tempo 5) and worked to protect its quality and tradition. During the Taisho Period (1912-1916) the Japanese economy was strong and demand for miso and shoyu from the Sendai area increased. So in 1919 the members of the Miso Shoyu Nakama formed Sendai Miso Shoyu K.K., headed by a descendant of Sasaki Jubei with the same name. The current president of Sendai Miso Shoyu K.K. is the 8th generation named Sasaki Jubei.

Since the mid-1970s the company has exported quite a bit of its naturally fermented miso and shoyu to macrobiotic and natural foods companies in the USA and Europe. Address: Sendai Miso Shoyu Co. Ltd., Furujiro 1-5-1, Sendai 982, Japan.

1237. Times Supermarkets. 1988. Display ad: Sale. *Honolulu Advertiser* (*The*) (*Hawaii*). Jan. 17. p. 10.
• ***Summary:*** "Koha KochuJang. $1.49. 8 oz."

1238. Chung, Je-Bong; Lee, K.H.; Sohn, H.S.; Kim, S.M. 1988. Studies on thermophilic flat-sour bacteria in soymilk: Isolation, identification and determination of heat resistance. *Korean J. of Food Science and Technology* 20(2):218-24. [16 ref. Eng; kor]
• ***Summary:*** To optimize thermal processing of soymilk, 4 strains of thermoresistant flat-sour bacteria were isolated from soymilk. The isolates were aerobic spore-forming rods and grew at 65ºC. Based on morphological and physiological properties, all isolated strains were identified as *Bacillus stearothermophilus.* The average D values for the 4 strains were 77.27, 20.20, and 2.76 and 1.39 minutes at 110, 115, 121 and 125ºC, respectively, and the average z value was 8.36ºC. Address: All: Central Research Inst., Dr. Chung's Foods Co. Ltd., 1-25 Songjung-dong, Chungju, Choongbuk-do 360-290, South Korea.

1239. Lee, Byeong-Ho; Ryu, B.H.; Choi, S.H.; Kim, K.H.;

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Kim, H.S.; Chae, Y.Z. 1988. [Protoplast fusion between *Zygosaccharomyces rouxii* and *Saccharomyces cerevisiae* isolated from soy sauce mash]. *Korean J. of Food Science and Technology* 20(2):164-69. [33 ref. Kor; eng]
• ***Summary:*** The protoplast fusion was undertaken in order to breed a new and improved yeast for use in soy sauce fermentation. Address: Dep. of Food and Nutrition, Dongeui Univ., 24 Gaya-dong, Pusanjin-gu, Pusan 614-010, South Korea.

1240. *Soybean Digest.* 1988. Million metric milestone marked. Feb. p. 44.
• ***Summary:*** Korea had another record-setting year by importing 1,081,075 tonnes (40 million bushels) of U.S. soybeans in 1987. Korea used 937,063 tonnes for crushing and 144,012 as food. This marks the second year in a row that Korea surpassed the million tonne mark in soybean imports from the U.S.

1241. Jangtoh Soontofu Restaurant. 1988. March. New soyfoods restaurant or deli. 4451 Beverly Blvd., Los Angeles, California (in the Beverly Hobart Plaza).
• ***Summary:*** This restaurant, which opened in March 1988, is geared for Koreans. Signs outside are written in Hangul, the Korean alphabet. "The restaurant serves only two dishes–*soontofu* and *kongbiji*, both of them soups. *Soontofu* is made with tofu, *kongbiji* with ground soybeans. That may sound like an extremely limited menu, but there are variations."

"Jangtoh makes its own tofu, producing several batches a day. If you've never tasked warm, soft, fresh tofu, don't miss the opportunity to try it here. A small bowl of this cloud-like substance comes with each meal. The kitchen garnishes it with a bit of chopped green onion, dried seaweed and sesame seeds. Then you spoon on a wonderful sesame-soy sauce-garlic condiment from a jar on the table."

Jangtoh, owned by Bu-A and Brian Chung, opened in March 1988.

Jangtoh Soontofu Restaurant, 4451 Beverly Blvd., Los Angeles; (213) 665-8664. Address: Los Angeles, California. Phone: 213-665-8664.

1242. **Product Name:** [Korean Soybean Jang / Miso {Tehn-Jung Miso, Ten-Gan}].
**Foreign Name:** Ten Gan.
**Manufacturer's Name:** Park's Brand Products.
**Manufacturer's Address:** Vineyard Blvd., Kalihi Valley, Oahu, Hawaii.
**Date of Introduction:** 1988 March.
**New Product–Documentation:** Hawaii Directory of Manufacturers. 1973. p. 11. Park's Brand Products, Inc., Dba Park's Brand Kim Chee, 145 North King St., Stand 53, Honolulu, HI 96817. Tehn Jung (Mise) [Miso]. Note: This product is called "Mise" in all Hawaii Directories of Food Manufacturers, 1973-78. The company was not listed in any previous Directory of Manufacturers from 1953 to 1971.

Hawaii Directory of Manufacturers. 1979-80. p. 11. The address has changed to 1712 Liliha St., Honolulu, HI 96817. The product is now called "Tehn Jung-Miso." They also make roasted sesame seeds. Letter from Takao Nihei. 1988. July 19. Says the address is now 1657 Liliha, Honolulu, Oahu, HI 96817. But the Honolulu Phone Directory shows the address as 3171 Waialae Ave., Honolulu, HI 96816. Phone: 808-733-1302.

Talk with Mike Irish, the owner. 1988. July 22. In March 1988 the company moved from the plant at Liliha St. to 3171 Waialae Ave. At the time they bought another kimchi company, Ham's kimchi. The King Street address was where the product was and still is sold. Most of it is sold there, with a little being sold at a couple of other Korean stores. The only soyfood product they make is Korean soybean jang (doen jang); he pronounces it "ten-jang" but spells it Ten-Gan on the label. He also makes kochu jang, the Korean hot chili paste, with sweet mochi rice as the base; it contains no soy. He also makes lots of kimchi. Parks Brand Products was founded in 1938 by a lady in a little store on Vineyard Blvd., in the Kalihi Valley on Oahu. Her maiden name was Park and her married name was Ko. Her company started out making kimchi, kochu jang, and soybean jang as their three main lines. She grew her own vegetables to make the kimchi. In 1973 they discontinued kimchi but made kimchi sauce in bottles. Mrs. Park's kids took over the company. When they wanted to retire, Mike bought the company from them in 1985. He is half Korean, half Irish. Mrs. Park/Ko died in 1987. He believes he is the oldest existing miso manufacturer in Hawaii. He is the largest Korean food manufacturer in the state and his biggest product is kimchi. He doesn't sell much of his soybean jang, largely because the price is about 2.5 times as much as most Japanese miso or imported Korean Jang. He sells it in small porcelain crocks as a specialty item. Note: In Honolulu/Oahu City Directories 1941-42, 1947-48, 1958-59 there is no listing for Parks Products. Letter from Michael P. Irish. 1988. Nov. 29. "We no longer produce miso (ten-gan) and I no longer have any old labels or articles about the product."

1243. *High Plains Journal* (*Dodge City, Kansas*). 1988. Farmers in Asia, U.S. gain from soy fish feeds. April 18. Also in Soybean Update. March 21. p. 3.
• ***Summary:*** Dr. Dean Akiyama, who heads up the American Soybean Association's aquaculture programs in Japan, Korea, Taiwan and southern China, says U.S. soybean meal and science could push shrimp production to all-time highs. "Shrimp culture in Southeast Asia is booming," Akiyama said. He also noted that feed trials have shown shrimp feeds can use up to 40% soymeal [mixed with fish meal] with no substantial loss in overall production. In the past, only fish meal has been used to feed shrimp.

"Soymeal is cost effective," Akiyama said, "The basic

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nutritional principles found in fish meal are also found in soymeal. The only difference is, soymeal is cheaper. We have proven soymeal mixed with fish meal can save a farmer up to 45% on his feeds costs." A shrimp farmer spends about $4 to $8 to raise a pound of shrimp, then sells it for $15 a pound. A typical farm can have up to a tonne of shrimp per acre, per crop. Producing 2.5 tonnes/acre on an average year, the farmer makes $18,000 for every acre farmed.

1244. Business Trend Analysts, Inc. 1988. The market for salad dressings, sauces and condiments. 2171 Jericho Turnpike, Commack, NY 11725. 260 p. Price: $750.
• ***Summary:*** Sauces include the following table sauces: Ketchup, meat (incl. steak, worcestershire, vegetable, and seafood sauces), barbecue, Mexican (incl. chili, taco, enchilada, etc.), prepared mustard, and soy and teriyaki. Gravies, dips, and dry sauce mixes are not included. Ketchup is the largest segment, about 40% of the total. It has grown at 4.6% annually from 1982-87, but growing faster during the same time are soy and teriyaki sauce (10.3%), barbecue sauce (11.4%), and Mexican sauce (9.2%). In 1977 soy and teriyaki revenues represented 3.1% of total sauce sales, compared to 6.7% in 1987. BTA expects the market to grow at 8.9% annually reaching $280 million in 1997. Kikkoman, the leading producer of soy sauce in the U.S. sells most of its product is the western portion of the country. In 1987 it launched a national ad campaign to expand to the rest of the country.

According to U.S. Dept. of Commerce statistics, sales of soy and teriyaki sauce (in million dollars) and market percentage have grown from $7.7 and 1.8% in 1972, to $25.0 and 3.1% in 1977, to $50.1 and 4.9% in 1980, to $98.1 and 6.0% in 1985, and to an estimated $132.0 and 7.0% in 1988. Other estimated market shares in 1988 were ketchup 39.2%, meat 19.6%, barbecue 14.4%, Mexican 12.1%, and prepared mustard 7.8%. Thus soy and teriyaki have the smallest share.

But the growth rate for soy and teriyaki sales have been slowing, in part due to lower inflation rates. The rate was 26.6% in 1972-77, 24.2% in 1977-82, 10.3% in 1982-87, and a projected 8.9% in 1987-97. In this latter period the growth rate is higher than for any other sauce category.

In 1987 for leading U.S. soy sauce producers, sales and market share were: Kikkoman Foods Inc. $49 million and 41% market share; La Choy Food Products (Subsidiary Beatrice/Hunt-Wesson) $43 million and 36%; Nabisco Brands Inc. (Subsidiary RJR Nabisco), maker of Chun King, $12 million and 10%. All others, $16 million and 13%. Note: Chun King Frozen Foods line was sold to ConAgra, Inc. (Omaha, Nebraska) in 1987. Nabisco still owns the soy sauce and other packaged goods. the U.S. soy and teriyaki market, an estimated 41%., with 1987 sales of $49 million.

According to Department of commerce statistics, U.S. imports of "thin" soy sauce have grown steadily from 13.3 million lb in 1978, to 15.9 in 1980, to 29.6 in 1985, and an estimated 40.0 in 1987. In 1986 roughly 38.9% of this came from Japan, followed by 26.9% from Hong Kong, 12.8% from China, 12.0% from Taiwan, and 9.3% from Others (incl. South Korea, Canada, and Philippines). These imports of 32.5 million lb in 1986 were worth $13.9 million. Between 1980 and 1986 roughly 2,500 lb/year of soy sauce have been exported, a negligible amount. The main destinations were West Germany, Canada, and Mexico. Address: Commack, New York.

1245. *Graphic* (*Brooklyn, New York*). 1988. The "scoop" on David Mintz, the father of Tofutti. May 25.
• ***Summary:*** David Mintz, a successful kosher caterer from Brooklyn, never believed tofu could change his life, but it has. In 1972, while searching for a milk substitute for kosher desserts, pastries, pies and sauces, he discovered tofu. In 1981, he introduced Tofutti ice cream to the world. More than 38,000 outlets in all 50 states–including supermarkets, health food stores, groceries, gourmet shops and department stores–carry the product. Tofutti is also available in Canada, Japan, Australia, Korea, Hong Kong, and the U.S. Virgin Islands.

1246. Menie, Tom. 1988. Eastern Foods Corp. and Mr. Lee R. Lee's resignation in April (Interview). *SoyaScan Notes.* May 27. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Mr. Lee resigned as the head of the company at the end of April and is now probably involved in his new venture of importing natural foods from Korea. He still owns stock in the company and is still on the board. The company was in bad financial shape at the time. The corporation is owned by its stockholders. He and his brother in law owned a controlling interest, but with some options on the company's last stock offering, some other people ended up controlling the company. Now, Tom is handling the sales and marketing duties and Warren Thunstrom is handling production. The company is planning a stock offering in the near future and has many innovative food ideas on the drawing boards.

Tom says he heard from someone and read in some publication a figure of $50 million projected for retail sales of Kikkoman's tofu in 1988. William Shurtleff believes that this figure at least 5 times too high. Address: Sales and Marketing Manager, Eastern Foods Corp., 3225 Hennepin Ave., Minneapolis, Minnesota 55413. Phone: 612-331-3353.

1247. Lamalle, Cecile. 1988. What's new in food world. *Post* (*New York, NY*). June 1.
• ***Summary:*** "Another product–though this one's never going to make it in Sheboygan, I predict–are the frozen soybean pods from Korea. You don't eat the pod, but you pop out and eat the soybeans inside: they make for a satisfying, high protein, gentle snack. Koreans enjoy these with a glass of

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beer. I loved them, but I'm afraid their taste is too subtle for palates dulled by the salty, sugary, MSG-laden snacks so favored by most Americans."

1248. *Toyo Shinpo* (*Soyfoods News*). 1988. Hyakkaten deno tôfu jitsuen hanbai hajimaru [Tofu is being made and sold in a department store in Korea]. June 1. p. 11. [Jap; eng+]
• ***Summary:*** In Seoul, Korea, there is a newly built department store, "Lotte World." In it there is a traditional tofu shop which uses a stone grinder to crush their soybeans. They had to get special permission to use a stone grinder, as they are generally considered unsanitary. Their shop is arranged so that shoppers can get a good look at how the tofu is being made, unlike the equivalent store in the Ikebukuro department store in Japan. There is also a counter where customers can eat their tofu. The store does not put the tofu in a water tank. The tofu is very firm.

1249. *Soybean Update.* 1988. Import of soybeans and soymeal on the rise. June 27.
• ***Summary:*** ... at an annual rate of 15% in Korea. Kyung Lee is director of ASA's office in Seoul, Korea. "Lee says soybean crushers in Korea have put together multi-million-dollar campaigns to promote soyoil as a cooking oil." However, Lee says ASA (The American Soybean Association) is "emphasizing cold uses of soybean oil. You can pour soyoil straight onto salads or fish."

"Crushers in Korea prefer U.S. soybeans over those from nearby China, mostly due to the inconsistency of the Chinese shipments."

1250. Harper, J.M. 1988. Feature personality: Interview with Mr. Mark H. Sterner on his work with LECs. *LEC Newsletter* 12(2):1-3. July.
• ***Summary:*** Beginning with this issue, the LEC Newsletter will feature one of these groups or individuals. We contacted Mark Sterner for our first profile, because he has been associated with the LEC project almost from the start of the concept. He has made a number of contributions to the literature and the world through the expertise he possesses."

"LEC: What are you currently involved with in your work?

"MHS: I am with Island Empire Foods, a company I started about three years ago."

"LEC: When did you first become interested in extrusion processing as a method for manufacturing soy-based foods?

"MHS: Back in 1970, by watching an extruder at Wenger Manufacturing operate in Sabetha, Kansas. Just seeing one operate and being somewhat amazed at the possibilities that exist started me thinking.

"LEC: After your initial exposure, you began work at Meals for Millions Foundation. What were you doing there?

"MHS: I was interested in becoming more familiar with extrusion, and the opportunity arose at Meals for Millions to set up a training program and a pilot lab for different companies to come in and do test work at Meals for Millions.

"LEC: What kind of extruders did you first have at Meals for Millions?"

"MHS: When I first started, they only had a Wenger X-5 on which we did some screw design work and parts changing to allow us to texturize protein. We sent a film to Wenger showing their X-5 texturizing protein, which was a first on this equipment.

"LEC: Didn't Meals for Millions mostly use Sprout-Waldron extruders?

"MHS: Sprout-Waldron had manufactured an extruder for the pet food industry and they wanted to get into human food products. They had enough interest and faith in it that they were willing to go ahead and donate a machine to Meals for Millions which we modernized to make it capable of texturizing protein."

LEC: Why did you move away from testing existing machines and start to design your own MFM extruder made from local parts? [found in developing countries].

MHS: People from developing countries who came to our training program where they learned to use extruders (made in the USA) couldn't afford such an imported extruder, so the need for a locally built extruder kept arising.

"LEC: Next, you designed a small-scale extrusion machine [the village texturizer] and provided plans to interested people. How many of these machines were manufactured?

"MHS: We don't really know exactly because we produced units at Meals for Millions and also through a joint venture with the Korea Institute of Science & Technology [KIST, Seoul, Korea] for their use in Korea and Asia.

"LEC: Is it still possible for people to get plans to build their own machine?

MHS: Yes, definitely from KIST and probably from Meals for Millions (P.O. Box 2000, Davis, California 95615 USA). Address: Inland Empire Foods, 1710 Palmyrita Ave., Suite 8, Riverside, California 92507.

1251. **Product Name:** [Sahm Yook Soymilk (Plain)].
**Foreign Name:** Sahm Yook Dou Ru.
**Manufacturer's Name:** Sahm Yook Korean Foods.
**Manufacturer's Address:** 320 Panjeong-ri, Jiksan-myun, Chunwon-gun, Choongchungnam-do 333-810, South Korea.
**Date of Introduction:** 1988 July.
**Ingredients:** Soy milk, high fructose corn syrup, corn oil, rapeseed oil, salt.
**Wt/Vol., Packaging, Price:** 200 ml Tetra Brik Aseptic carton. Retails for 220 Won (6/90).
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Talk with Eric C. Fehlberg. 1990. March 8. The Seventh-day Adventist food company in South Korea, Sahm Yook Foods, now makes soymilk (only plain, no flavors) packaged in Tetra Brik cartons and foil

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Doypack/Doynpack. The company was established in about 1978, and it began to make soymilk in May 1985. After launching soymilk, the company began to grow dramatically, as that product grew. Last year they built a very large, new soymilk plant (based on Adventist technology) and they are now about the 2nd or 3rd largest soymilk maker in Korea.

Label (Tetra Brik carton). Sent by Eric Fehlberg. 1990. March 12. 2.5 by 3.25 by 1.5 inches carton. Red, yellow, dark green, and light green on white. Front panel says "Soy Milk" and an illustration shows 3 yellow soybeans in a green pod.

Form filled out by C.Y. Yoon, General Manager, Sahmyook Korean Foods. 1990. June 23. Note that on the envelope the company name is printed Sahmyook Korean Foods, but the brand name is typed 4 times on the form as Sahm Yook. The address on the envelope is 320 Panjung Jiksan Chunwon Choongnam, Korea. The soy milk in a foil retort pouch was introduced in April 1985. The same product with the same ingredients was launched in a Tetra Brik carton in July 1987.

1252. Hymowitz, Ted. 1988. Dr. C.M. Woodworth and the start of modern soybean varieties. Thoughts on soybean breeding today (Interview). *SoyaScan Notes.* Aug. 1. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ted considers 1921 to be the year that the soybean success story began in America. That was the year the Woodworth came to Illinois and became the first person in the U.S. to really look at the soybean from a technical, genetic point of view. That was when the first varieties started to be developed using genetic principles. He started the first hybridization program. Illini, a selection from AK (a mixture of "all kinds") and the first modern variety based on genetic principles, was released in 1927.

Ted is a soybean geneticist, not a breeder. A breeder develops varieties for commercial purposes; a geneticist studies inheritance. They are very different. The faster that university breeders are phased out, the better. Universities do not have the resources to compete. The cost is horrendous, and the results are marginal. Private companies have the resources to advertise, the facilities and computers and staff. Universities shouldn't be in that field. One main rationale was to have breeders to train other breeders. One problem with the companies is that they take from germplasm collections but do not return anything. That is causing a lot of trouble. There are a lot of hard feelings. The USDA soybean germplasm collections in Illinois and Mississippi are available free of charge with no questions asked to anyone (government, company, or individual) in the world, including the Third World. So it is a back and forth exchange. Last year they sent out something like 18,000 packets of soybeans. Only Cuba, North Korea, etc. can't order. Even the Soviets can order our soybean varieties.

Bogdan Belic (pronounced BEL-ich) was the man who sent Ted the early reference to the soybean in a monastery in Eastern Europe. He was a real scholar, a professor in the European sense, one who was not above advocating a cause such as Paul Erlich and Rachael Carson. Nowadays America produces narrow academic specialists, and few are hungry to learn. Address: Dep. of Agronomy, Univ. of Illinois, Urbana, IL.

1253. Weiss, Don; Weiss, Phyllis Wachob. 1988. Seoul food: beyond the kimchee barrier. *San Francisco Examiner* (*California*). Aug. 21. p. 149.
• ***Summary:*** "Special to the Examiner: The only Asian food on the official menu at the Los Angeles Olympics was kimchee, the spicy pickled vegetable dish of Korea. You can bet the menu will be a lot different at the 1988 Seoul Olympic Games."

Sesame seeds "make a nice compliment to the other inevitable ingredient of pulgogi, a thick red chili sauce called *kochujang.*"

1254. Drake, Milan. 1988. La Choy and other teriyaki sauces (Interview). *SoyaScan Notes.* Aug. 24. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** La Choy now makes and sells 2 teriyaki sauces, the regular and the new (1987) Thick and Rich, which is more of a basting sauce, similar to the Armour basting sauces. The regular was launched at least 20 years ago. He has been with the company for 16 years, now in charge of technical services. In about 1984 La Choy was acquired by Hunt-Wesson, and now much of La Choy's information is located in Fullerton, California. He is not aware of the S&W company. La Choy's big competitor for teriyaki sauce is Kikkoman. Chun King (Gino Pallouci), may have had an early teriyaki sauce, but no longer sells it, after Reynolds took them over.

Chun King started a lot of things then dropped them. Armour was in Chicago, probably now in Phoenix. La Choy no longer makes any fermented soy sauce; its now all hydrolyzed (HVP), and that is what goes into their teriyaki. They also add soy sauce to quite of few of their own products, such as egg rolls. Este Kiern of the Oriental Show-You Company, Columbia City, Indiana, is a super man, now in his 80s but looks like he's 50, and the best living source on the early U.S. soy sauce industry. Address: La Choy Food Products, Archbold, Ohio 43502.

1255. Chen, Edwin. 1988. Criminal charges filed over 'grossly filthy' tofu plant [K.Y. Foods]. *Los Angeles Times.* Aug. 30. p. 3. Metro section.
• ***Summary:*** The plant, at 4607 S. Main St., has been the subject of two previous criminal prosecutions, in 1979 and 1982, when it was owned by D.Y. Imports, which was acquired a year ago by K.Y. Foods.

Named in Monday's complaint were K.Y. Foods Inc.'s

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general manager, Taek Kwan Oh of Monterey Park, and president Kyu Yong Kim of Alhambra. Address: California.

1256. Hill-Holtzman, Nancy. 1988. Korean foodmaker charged with allowing fecal bacteria in its tofu. *Los Angeles Herald-Examiner.* Aug. 30.
• ***Summary:*** A Korean-style food manufacturer with a history of health violations was charged yesterday with 31 misdemeanors after inspectors found high levels of fecal bacteria in the firm's tofu products and decaying rodents in its warehouse. K.Y. Foods, under its former ownership of D.Y. Imports, was hit with criminal charges in 1979 and 1982 for health violations, Hahn said. In 1985, the company destroyed $30,000 worth of contaminated tofu during inspections.

The company's food products are sold under the brand names CR Brand, DY Brand and KY Foods.

KY Foods General Manager Taek Kwan Oh, 25 of Monterey Park and its president, Kyu Yong Kim, 53, of Alhambra, were named in the complaint. Address: California.

1257. *ASA Member Letter.* 1988. Lee wants to better the best in Korea. Aug. p. 2.
• ***Summary:*** With soybean imports increasing at an annual rate of 15% in Korea, Kyung Lee thinks the future is bright. "Soybean oil consumption still needs to be improved, and we're running promotion programs to get the message across." Lee said that soybean crushers in Korea have developed multimillion dollar campaigns to promote soyoil as a cooking oil. However, Lee said the American Soybean Association is taking a different approach. "We're emphasizing cold uses of soybean oil," Lee said. "You can pour soybean oil straight on salads or fish."

1258. *Toyo Shinpo* (*Soyfoods News*). 1988. Kankoku tônyû saisei choki e. Nihon no tônyû gyôkai wa teimei [Korean soymilk market starts to grow again. Japanese soymilk industry is in a low state]. Oct. 1. p. 14. [Jap; eng+]
• ***Summary:*** The Korean soymilk market, which rose and then fell like the Japanese soymilk market, is now re-entering a period of growth. According to a recent Korean newspaper, domestic soymilk sales from January to August, 1988 were 42,000 million won, up 20% over last year's figure. Sales are expected to increase during the winter at the end of this year, so total sales for the year are expected to reach 72,000 million won. The won is the Korean unit of currency.

1259. Yamauchi, Shoan. 1988. The Los Angeles tofu market (Interview). *SoyaScan Notes.* Oct. 23. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The Los Angeles tofu market has become extremely competitive in recent years. There are at least 9 tofu manufacturers in the greater Los Angeles area, all run by Asian-Americans. The Japanese-American companies, ranked in descending order of size are: House Foods & Yamauchi Inc., Aloha Products (Culver City), and Meiji Tofu. The Chinese-American companies, ranked by size, are American Food Co. (Mr. Jackson Wu), Mighty Soy, Soyfoods of America (Ken Lee), Wy Ky, and Visoy. The only Korean company is Obok in Orange County. Address: House Foods & Yamauchi Inc., 526 S. Stanford Ave., Los Angeles, California 90013. Phone: 213-624-3615.

1260. Bernard, Richard L.; Juvik, Gail A.; Hartwig, Edgar E.; Edwards, Calton J., Jr. 1988. Origins and pedigrees of public soybean varieties in the United States and Canada. *USDA Technical Bulletin* No. 1746. 68 p. Oct. [20 ref]
• ***Summary:*** Contents: Old domestic varieties. Modern domestic varieties from public institutions. Germplasm resources information network. Tables: 1. Number of U.S. and Canadian soybean varieties by maturity group. 2. Number of U.S. and Canadian soybean varieties by country of origin. 3. Origins and pedigrees of old domestic soybean varieties. 4. Lost old domestic soybean varieties. 5. Literature on old domestic soybean varieties in chronological order. 6. Origins and pedigrees of modern domestic soybean varieties from public institutions. 7. Genetic information on backcross-derived public soybean varieties. 8. Genetic information on backcross-derived soybean parental lines. 9. Public soybean variety registrations and licenses. 10. Corrections to published pedigree information.

Abstract: "In this report are described the origins of the 440 U.S. and Canadian soybean varieties that are maintained in the USDA Germplasm Collection at Urbana, Illinois, and Stoneville, Mississippi. Varieties in commercial use before the mid-1940's were mostly introductions, and this report includes for each the geographic place of origin, the person or institution that provided the seeds, the foreign variety name (if any), as well as information about when it was released and who released it in the United States or Canada. Modern varieties have been developed by hybridization and selection. In this bulletin, the pedigree is specified and where and when each variety was developed and released. This information allows researchers and breeders to trace modern soybean varieties back to their introduced ancestors and facilitates breeding plans and evaluation of the germplasm base of the current commercial soybean crop."

Table 4, titled "Lost old domestic varieties," lists the source of each: Acme–PI 14.954 from Shanghai, China, in 1905. Akasoya–From Japan via Indiana. Allison Black–D.T. Allison, Tennessee. Amherst–PI 4.913 (PI 17.275) from Japan in 1900. Arikara–O. Will Company, North Dakota. Arkan–PI 87.050 from Niummen, Keisho Nando, Korea, in 1930. Arksoy 2913–Arkansas Experiment Station, Marianna (similar to 'Arksoy'). Auburn–PI 21.079A from Tieling, Manchuria, China, in 1907. Baird–PI 6.414 (PI 22.333) from Pyongyang [P'yongyang], Korea, in 1901. Biltan–Selection

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from 'Otootan', South Africa.

Brindle–PI 20.407 from Merkoechofka, Siberia, in 1906. Brooks–PI 16.789 from Hangchow, China, in 1905. Brownie–PI 6.414 (PI 17.256) from Pyongyang, Korea, in 1901. Buckshot–PI 6.334 (PI 17.251) from Tokyo, Japan, in 1901. Burnette–From Farmville, North Carolina. Butterball–PI 8.433 (PI 17.273) from Japan in 1902, via Rhode Island AES [Agricultural Experiment Station] in 1903. Chame–PI 80.473 from Tokyo, Japan, in 1929. Chang–PI 54.610-2 from Changchun, Kirin, China, in 1921. Chernie–PI 18.227 from Khabarovsk, Siberia, in 1906. Chinaton Echo–From Harrow, Ontario, Canada.

Chiquita–PI 27.707 from Hankow, China, in 1910. Chuku–La Choy Company, Ohio. Cibao–From El Salvador. Delnoshat–Delta Station selection 6679, Mississippi. Delredo–From Mississippi. DeSoto–Ohio farmer. Dortchsoy No. 2–Dortch Seed Company, Arkansas (selected from 'Ogden', similar to 'Ogden'). Dortchsoy No. 6–Dortch Seed Company, Arkansas. Dortchsoy No. 7–Dortch See Company, Arkansas. Doxie–Georgia Experiment Station.

Duggar–PI 17.268C, a selection from 'Ito San.' Early Brown–PI 25.130 and PI 25.161 from Tennessee AES and Indiana AES in 1909. Eda–PI 17.257 from Japan in 1890. Edgecombe–R.P. Cocke, Williamsburg, Virginia. Edna–PI 6.312 (PI 17.252C) from Tokyo, Japan, in 1901. Edward–PI 14.953 from Shanghai, China, in 1905. Fairchild–PI 19.184 from Newchwang, Manchuria, China, in 1906. Farnham–PI 22.312 from Shanghai, China, in 1908. Feed All–A.M. Johnson, North Carolina. Flat King–PI 6.312 (PI 17.252) from Tokyo, Japan, in 1901.

Flava–PI 16.789A from Hangchow, China, in 1905. Gala–Georgia Experiment Station. Gem–P.B. Hutchins, Missouri. George Washington–From Virginia. Giant Yellow–PI 22.415 from Naples, Italy, in 1908. Golden–Harrow Experiment Station, Ontario, Canada. Goshen Prolific–Farmer selection, North Carolina. Hamilton–From USDA number 23 by Ohio Experiment Station in 1909. Hankow–PI 6.559 from beyond Chiu Niu, China, in 1901. Hansen–PI 20.409 from Merkoechofka, Siberia, in 1906.

Hay Boy–Farmer selection, North Carolina. Herman–From North Carolina. Hiro–PI 86.038 from Obihiro, Hokkaido, Japan, in 1930. Hope–PI 6.335 (PI 17.267) from Tokyo, Japan, in 1901. Ignotum–E.E. Evans, Michigan. Italian–Canada Experiment Station. Ito San–PI 17.268 from Japan in 1890. Jet–PI 17.861 from Sachon, China, in 1906. Johnsoy–A.E. Johnson, North Carolina. Kentucky A–Kentucky Experiment Station selection.

Kia–Illinois Experiment Station selection. Kungchuling–From Manchuria, China. Looney No. 2–Farmer selection, Tennessee. Lowrie–PI 22.898A from Paotingfu, Chihli, China, in 1908. Loxitan–Delta Experiment Station selection, Mississippi. Ludeke–Farmer selection, North Carolina. LZ–Louisiana Experiment Station selection. Mammoth Brown–Unknown. Manhattan–PI 6.333 (PI 17.277) from Tokyo, Japan, in 1901. Matthews–Farmer selection, Georgia.

Merko–PI 20.412 from Merkoechofka, Siberia, in 1906. Meyer–PI 17.852 from Peking, China, in 1906. Midunk–Funk Brothers Seed Company, Illinois. Mikado–Farmer selection, Indiana. Misstucky–Farmer selection, Kentucky. Morgan–PI 22.633 from Sheklung, Kwongtung [Kwangtung / Guangdong], China, in 1908. Mount Carmel–PI 70.218-2 from Wuchiatzu, Manchuria, China, in 1926. Mukden No. 4–Wisconsin Experiment Station selection. Nanking–PI 71.597 from Nanking, China, in 1927 (see CNS, p. 6). Nanksoy–PI 104.881 from Nanking, China, in 1934.

Nansemond Early–Farmer selection, Virginia. Natsu–PI 19.984 from Yokohama, Japan, in 1907. Nemo–PI 19.985 from Yokohama, Japan, in 1907. Nielsen–PI 22.644B from Hangchow, Chekiang, China, in 1908. Nigra–PI 22.407 from Hong Kong, China, in 1908. Nuttall–PI 6.416 (PI 17.253) from Pyongyang, Korea, in 1901. Okute–PI 19.986 from Yokohama, Japan, in 1907. Oloxi–Coker's Seed Company, South Carolina. Otoxi–From South Africa. Ozark–PI 37.272 from Kogen Province, Korea, in 1914.

Pee Dee–Coker's Seed Company, South Carolina. Pingsu–PI 18.259 from Tschang-ping-tsu, China, in 1906. Preston–Virginia Experiment Station selection. Quillian–Farmer selection, Oklahoma. Rattlesnake–Kentucky Experiment Station selection. Riceland–PI 20.797 from Shanghai, China, in 1907. Rila–Marsh Foundation, Ohio. Sainte Anne–Canada Experiment Station selection. Samarow–PI 17.260 from J.M. Thorburn and Company in 1902. Saskatoon–Farmer selection, Canada.

Sedo–PI 23.229 from Tientsin, Chihli, China, in 1908. Sherwood–PI 17.862 from Tientsin, China, in 1906. Southern Green–PI 62.839 from Nanking, China, in 1925. Southern Prolific–PI 37.250 from Keiki Province, Korea, in 1914. Stuart–PI 22.644 from Hangchow, Chekiang, China, in 1908. Summerland–Canada Experiment Station selection [British Columbia]. Suru–PI 89.128 from Kyojo, Korea, in 1930. Swan–PI 22.379 from Canton, Kwangtung, China, in 1908. Taha–PI 21.999 from Boshan, Shantung, China, in 1907. Tanloxi–Delta Station selection 483, Mississippi.

Tashing–PI 20.854 from Harbin, Manchuria, China, in 1907. Tensas–PI 104.881 from Nanking, China, in 1934 (same as Nanksoy). Texoil–Farmer selection, Texas. Tinzan–From Australia. Trenton–PI 24.610, a selection from 'Mammoth (Yellow)' in Kentucky in 1904. Trinitaria–From El Salvador. U.S.-5–PI 54.563-5 from Jungchiangko, Shengking [Liaoning], China, in 1921. Vilnensis–From Poland. Vireo–PI 22.874 from Tokyo, Japan, in 1908. White Eyebrow–PI 30.745 from Wulukai, Kirin, China, in 1911.

Yellow Biloxi–North Carolina Experiment Station selection. Yokotenn–PI 19.981 from Yokohama, Japan, in 1907. Yosho–PI 6.314 (PI 17.262) from Tokyo, Japan, in 1901.

Talk with Dr. Richard Bernard. 1998. July 12. He considers this to be his best publication on this subject, but

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it is quite similar to *INTSOY Series* No. 30 titled "USDA soybean germplasm collection inventory. Vol. 1," published in August 1987. Address: 1-2. Urbana, Illinois; 3-4. Stoneville, Mississippi.

1261. Karta, Susani K. 1988. Market trends in the development of traditional soyfood. Paper presented at the ASEAN Food Conference '88: Food Science and Technology in Industrial Development. 18 p. Held 24-26 Oct. 1988 at Bangkok, Thailand.
• ***Summary:*** Contents: Introduction. Traditional soyfood. Market situation and trends. Indonesia. Singapore. Malaysia. Thailand. Constraints in the market development of soyfood (in each of the above 4 nations). Major trends in the development of traditional soyfoods. Marketing strategy of soyfood. Tables: 1. Traditional non-fermented soyfood products. 2. Nutritional composition of traditional non-fermented soyfoods. 3. Description and uses of traditional fermented soyfood products. 4. Nutritional composition of traditional fermented soyfoods.

5. 1987 estimated consumption of soybeans as foods in the Far East [total and per capita in East Asia]. China, 1,062 million population, 7,325,000 tonnes, 6.9 kg/capita. Japan, 122 million population, 1,141,000 tonnes, 9.3 kg/capita. South Korea, 42.1 million population, 330,000 tonnes, 7.8 kg/capita. Taiwan, 19.6 million population, 260,000 tonnes, 13.3 kg/capita.

6. Southeast Asia soybean consumption for food. From 1983 to 1989 the increase in 1,000 metric tons was: Indonesia 927 to 1,600. Singapore 14 to 26. Malaysia 32 to 70. Thailand 40 to 150. Philippines 9 to 24. Total 1,022 to 1,870 (increase of 82.9% in 7 years).

7. Per capita soybean consumption for food in Southeast Asia. From 1983 to 1989 the increase in kg/person was: Indonesia 6.0 to 8.8. Singapore 5.6 to 10.5. Malaysia 2.1 to 3.7. Thailand 0.8 to 2.6. Philippines 0.2 to 0.5. Average total: 3.8 to 5.9 (increase of 55.3% in 7 years).

8. 1987 estimated consumption of soybeans as foods in Southeast Asia [total and per capita]. Indonesia, 175 million population, 1,575,000 tonnes, 9.0 kg/capita. Thailand, 53.6 million population, 118,000 tonnes, 2.2 kg/capita. Malaysia, 16.1 million population, 55,000 tonnes, 3.4 kg/capita. Singapore, 2.6 million population, 20,000 tonnes, 7.7 kg/capita. Philippines, 61.5 million population, 18,000 tonnes, 0.3 kg/capita.

9. Indonesian soybean production, imports, and consumption as food (in tonnes). From 1983 to 1989, production rose from 536,000 to 1,250,000, imports decreased from 391,000 to 350,000, and the amount consumed as food increased from 927,000 to 1,600,000. About 50% of the soybeans used for foods in Indonesia go to make tempeh, and 40% are used to make tofu.

10. Singapore soybean consumption as food. From 1983 to 1989 the amount increased from 14,000 tonnes to 26,000 tonnes. Most of these soybeans are used to make tofu and soymilk. 11. Malaysia soybean imports and consumption as food (in tonnes). From 1983 to 1989, production rose from 182,000 to 440,000, and the amount consumed as food increased from 32,000 to 70,000. 12. Thailand soybean production, and consumption as food (in tonnes). From 1983 to 1989, production rose from 113,000 to 490,000, and the amount consumed as food increased from 40,000 to 150,000. Only in 1988 were soybeans imported–40,000 tonnes. This growth of soyfood consumption is due partially to the Government of Thailand's interest in promoting the awareness and utilization of soyfood products. The Thailand Agricultural Extension Service program and other institutions have been actively advocating of soyfoods into the food industry and the human diet, especially in rural areas. The government controls soybean imports by issuing licenses.

In summary: The soybeans with the highest per capita soybean consumption for soyfoods are: Taiwan 13.3 kg, Japan 9.3 kg, Indonesia 9.0 kg, Singapore 7.7 kg, South Korea 7.3 kg, and China 6.9 kg. The greatest potential for growth lies in China, where it is very common to find markets running out of soyfoods early in the morning. There is also great potential for growth in Malaysia, Thailand, and the Philippines. Address: American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore.

1262. Meyer, Amy. 1988. The soy sauce market in America (Interview). *SoyaScan Notes.* Nov. 1. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Total soy sauce sales in the U.S. are about $125 million for 1987. The major market segments are consumer retail, restaurants and institutions, and industrial/food processors. The latter is estimated at about $4 million. The figures compiled annually by Progressive Grocer only cover grocery stores.

La Choy is the leader is retail sales, followed by Kikkoman, then Chun King. Kikkoman is the leader in sales to restaurants, followed by Yamasa, then Chinese imports.

Last year San-J sold about $5 million worth of soy sauce in the U.S. Of this, $3 million went to industry (food processors) and $2 million to retail (mostly health food). Amy is gathering this information for publication in a professional journal, probably the *Journal of International Marketing.* Address: 21 Beacon St. #10, Boston, Massachusetts 02108. Phone: 617-523-3780.

1263. Nordquist, Ted. 1988. Brief early history of Aros Sojaprodukter in Sweden (Interview). *SoyaScan Notes.* Nov. 22-24. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ted Nordquist, the foremost soyfoods and tofu pioneer in Sweden and in Scandinavia, founded Aros Sojaprodukter and started making tofu there in Feb. 1981.

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Born on 10 Dec. 1945 in Oakland and raised in California, Ted graduated from Alameda High School (Alameda, California) in 1963. He attended college at Cal Poly in San Luis Obispo. During his sophomore year he won a scholarship from the California State International Programs to spend his sophomore year at the University of Uppsala in Sweden, where he arrived in September 1965. He studied Swedish his first year, and then took classes in Swedish. He also studied Swedish for a year at Stockholm. Ted lived in Stockholm from Sept. 1967 to Sept. 1968. He then moved to Uppsala, where on 26 March 1969 he "ran into" a Swedish woman named Anne-Marie Karlson at a grocery store. "I asked her out to a movie and after the movie a cup of hot chocolate. We have been together ever since."

Returning to Cal Poly he graduated in Aug. 1968 with a BSc degree in Industrial Arts. He was then accepted for international graduate school at Stockholm University, where he arrived in Sept. 1968. After 1 year of study he entered a PhD program at Uppsala University in Sept. 1969, doing research on problems of developing countries and working in a mental hospital.

On 9 Jan. 1971 he was married in Golden Gate Park, California to Anne-Marie Karlson. The marriage ceremony was performed by Dr. Haridas Chaudhuri, President of the Cultural Integration Fellowship and California Institute of Asian Studies (in San Francisco).

In the summer of 1971 he completed his oral examinations for the political science degree, but still had to write his thesis. Then the U.S. government tried to draft him into the military to go to Vietnam. The American Friends' Service Committee (Quaker) helped him to obtain Conscientious Objector status. He did his alternative service at the California Institute of Asian Studies in San Francisco under Dr. Haridas Chaudhuri, as director of research. While at the Institute, Ted also took (for graduate credit) several years of Sanskrit and comparative religion and philosophy. At the time Ted was thinking of taking a PhD degree at the California Institute of Asian Studies.

At about this time Andreas, Ted and Anne-Marie's first child (and son) was born on 3 Sept. 1973 at St. Francis Hospital in San Francisco.

After going back and forth on the idea, Ted and Anne-Marie decided to go back to Uppsala–which they did just before Christmas, 1973. Ted had applied for and received a grant to write his dissertation. In Sweden, Ted returned to the department of political science at Uppsala and told them he wanted to do his dissertation on Auroville, the famous spiritual center founded by Sri Aurobindu in southeast India. Ted wanted to write on the cultural & political aspect of the community there. But the political science authorities didn't feel competent to let Ted do that. "It was very strange to them. So they sent me to the department of philosophy, which sent me to the theology faculty. None of them agreed to let me do my dissertation on Auroville." But then Ted found a way around the problem. He had read about Dag Hammarskjöld (the Swedish diplomat, economist, and author) and in pursuing this interest he met a man who had the chair of the faculty of the history of religion in the humanities (not theology); he lived in the old tower building behind the cathedral at Uppsala. He said that he would serve as Ted's advisor, but that Ted would first have to take a degree in the history of religion before writing his thesis on Auroville. So Ted got a Swedish bachelor's degree in history of religion–but with a lot of credit for his previous work at the California Institute of Asian Studies. Instead of the typical 3 years, it took Ted only about one year to get his degree. All of Ted's reading and classes (since 1969) were in Swedish. Ted's grant to write the thesis was transferred to the history of religion department. But before he could write his thesis, Ted applied for a grant to go to Auroville, India–which he was unable to get.

Ted had been in communication with Kriyananda (see color photo; born James Donald Walters in 1926; he was a direct disciple of the great Paramahansa Yogananda), so he decided to return to California. He and Anne-Marie went to New York in July 1975, bought a Volkswagen bus, and drove to California and the Ananda ashram. Ted had a $250/month grant to do his dissertation. Ted and his family went to Ananda with a tent and sleeping bags. Ted was there for 12 months and during that time he did all the field work and research for his dissertation. Anne-Marie ended up going back to Sweden with Andreas, who was only 2 years old at the time.

In Oct. 1975 Ted and Janet Fehring (Ahava) met Bill Shurtleff, Akiko, and Bobbie Shurtleff (Bill's mother) at Ananda Cooperative Village, where Bill and Akiko had been invited to do a program on tofu. Afterwards the five went hiking at Echo Lake, Desolation Valley, and Lake Tahoe.

Then Ted started making and selling a tofu kit in Alameda. On 14 Jan. 1976 Ted and Janet attended a lecture on tofu that Bill and Akiko presented at the Berkeley Co-op, and helped prepare a tofu dip. Ted's father, Leo, had become very ill with cancer and Ted was making him fresh tofu, one of the few foods he could digest, every morning. In Jan. 1976 Ted's father died in Alameda.

Ted stayed in the USA until March, went back to Sweden for a short visit to see Anne-Marie, then returned to California to help his mom sell her house. In Sept. 1976 he returned to Sweden permanently. For the next two years, he wrote his dissertation, had it published in book form, and defended it in June 1978. His dissertation was titled *Ananda Cooperative Village, a Yoga Community in California.* That same month Ted got his PhD degree at the Univ. of Uppsala with his thesis on the history of Ananda Cooperative Village.

But by this time Ted was already working at the Univ. of Uppsala as a research assistant (with a hefty salary) and teaching. He was teaching social psychology of religion. In about 1978 Ted met Tim Öhlund (Ohlund) in Sweden.

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Tim was taking night classes in traditional Asian foods. They started talking about tofu and Tim suggested that Ted give a class on tofu as part of the course Tim was taking. With about 30 people in attendance, Ted made tofu and then showed slides. There was a lot of interest in the subject and various health organizations started asking Ted to do classes and demonstrate tofu. This turned into Ted's hobby. But in late 1978 and early 1979 he started thinking it would be interesting to start a business on the side, while still working and teaching at the university.

In 1979 Ted visited Traditional Tofu Co. in Oakland, and first saw tofu made on a commercial scale. In Feb. 1980 Ted founded Aros Sojaprodukter in Uppsala, then from June to Dec. Ted and his wife's (Anne-Marie's) father renovated a soft drink factory in Örsundsbro (about 25 minutes by car from Uppsala) to make it a tofu plant. It was the perfect facility; it was inexpensive ($175/month), the room they planned to use to make tofu had plenty of water and electrical outlets, as well as floor drains. Ted was able to assemble the funding by mid-1978. Part of the money came from a loan from Ted's mom. A Korean professor named Kim also invested with a buy-out option. The lady who owns Sweden's largest health food store also gave Ted a loan.

That December Ted installed Japanese (Takai) tofu equipment in the plant. In Feb. 1981 Ted and Tim Ohlund started tofu production, water packed. At about the same time their Book of Tofu was published in Swedish. By fall, they started vacuum packing with in shallow plastic trays.

In the summer of 1984 Ted quit working at the university and devoted all his time and effort to Aros Sojaprodukter. Address: Orsundsbro, Sweden. Phone: 0171-604 56.

1264. Chen, Edwin. 1988. Tofu maker closed for 2 years for filthy plant. *Los Angeles Times.* Dec. 6. p. 1, 8.
• ***Summary:*** K.Y. Foods, a major West Coast producer and supplier of tofu and other Asian-style fare, on Monday was banned from operating for two years and ordered to pay more than $20,000 in fines and other penalties as a result of grossly unsanitary conditions at its Los Angeles plant. In exchange for a no-contest plea, charges against two K.Y. executive–General Manager Taek Kwan Oh, 25 of Monterey Park, and President Kyu Yong Kim, 53, of Alhambra–were dropped by the Los Angeles city attorney's office.

The plant at 4607 S. Main St., had been the subject of two previous criminal prosecutions in 1979 and 1982 when it was owned by D.Y. Imports which was acquired in July 1987 by K.Y. Foods. K.Y. products were sold in Los Angeles, San Francisco and in parts of Colorado and Nevada under the brand names of CR Brand, DY Brand and KY Foods. In 1979 the D.Y. Imports plant pleaded no contest to five counts of health violations and paid a $3,150 fine. In 1982, it pleaded no contest to another six health code violations and paid a $3,400 fine. Similar conditions in 1985 prompted health officials to issue a recall of tofu made at the plant.

1265. **Product Name:** Smoked Tofu, Teriyaki Tofu, Homestyle Tofu Balls, Gourmet [Nigari] Firm Tofu, Fiber Tofu, BBQ Tofu.
**Manufacturer's Name:** Dae Han, Inc.
**Manufacturer's Address:** 737 S.E. Alder St., Portland, OR 97214. Phone: 503-233-8638.
**Date of Introduction:** 1988 December.
**Ingredients:** No ingredients given on labels.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Paul Moss, who has worked with Dae Han for 7 years. The company name is now Dae Han, Inc., 737 S.E. Alder St., Portland, Oregon 97214. Phone: 503-233-8638. They now make tofu, smoked (& baked) tofu (7.5 oz), regular and cajun-style tofu burgers, homestyle tofu balls (5.25 oz), soymilk, teriyaki tofu (7.5 oz), fiber tofu (10 oz), BBQ (barbecue) tofu (7.5 oz), and kimchi. All the products listed above were introduced in Dec. 1988. Paul plans to use their plant to make tempeh.

Labels for each of these products sent by Paul Moss. 1990. May 10. 4 by 2.5 inches. Self adhesive. Colorful. On each label is written "High protein. Low calorie. Cholesterol free. No preservatives. (Keep Refrigerated)." The Gourmet firm tofu is certified kosher by Rabbi Yonah H. Geller.

Leaflet from Dae Han, Inc. 1991. July. Quality and unique. A photo shows all of the products, and their names are listed.

1266. **Product Name:** Tofu Burger [BBQ Style, or Cajun Style].
**Manufacturer's Name:** Dae Han, Inc.
**Manufacturer's Address:** 737 S.E. Alder St., Portland, OR 97214. Phone: 503-233-8638.
**Date of Introduction:** 1988 December.
**Ingredients:** No ingredients given on labels.
**Wt/Vol., Packaging, Price:** 7 oz.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Paul Moss, who has worked with Dae Han for 7 years. 1990. March 28. The company now makes these 2 burgers, which were introduced in Dec. 1988.

Labels sent by Paul Moss. 1990. May 10. 4.5 by 3 inches, oval. Self adhesive. Dark brown, light brown, red, black, and white. On each label is written "High protein. Low calorie. Cholesterol free. No preservatives. (Keep Refrigerated)."

Leaflet from Dae Han, Inc. 1991. July. Quality and unique. A photo shows all of the products, and their names are listed. The company also makes kim chee (mild or spicy).

1267. Park, Kun-Young; Lee, K.B.; Bullerman, L.B. 1988. Aflatoxin production by *Aspergillus parasiticus* and its stability during the manufacture of Korean soypaste

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(doenjang) and soysauce (kanjang) by traditional method. *J. of Food Protection* 51(12):938-45. Dec. [26 ref]
• ***Summary:*** "Aflatoxin (AF) production and its stability on meju (crushed Korean soybean cake) by a pure culture of *Aspergillus parasiticus* and a mixed culture of *A. parasiticus. A. oryzae* and *Bacillus subtilis* (fermentation 1) during the manufacture by traditional methods of Korean soy paste (doenjang) and soy sauce (kanjang) were studied. There was a difference in the amount of aflatoxin production on different varieties of soybeans, but the pattern of toxin production was similar."

"Doenjang (fermented soy paste) and kanjang (fermented soy sauce) are the most important soybean products in Korea."

Note: This is the earliest English-language document seen (April 2021) that uses the term "soypaste" to refer to a type of miso. Address: 1-2. Dep. of Food Science and Nutrition, Pusan National Univ., Pusan, Korea.

1268. *FAO Yearbook–Production.* 1988-2004. Serial/periodical. Rome, Italy: Food and Agricultural Organization of the United Nations. Yearly. ca. 350 p.
• ***Summary:*** See also the earlier FAO Production Yearbook, of which Vol. 12 was 1958.

1269. Chang, K.Y. 1988. [Old references related to agriculture in Korea. III. Kind and varieties of leguminous crops (1492-1886)]. *Korean J. of Breeding* 20(4):355-63. [Kor]*
Address: Gyeongsang National Univ., Chinju Coll. of Agriculture, South Korea.

1270. **Product Name:** La Choy Lite Soy Sauce.
**Manufacturer's Name:** La Choy Food Products. Div. of Beatrice/Hunt-Wesson, Inc.
**Manufacturer's Address:** 901 Stryker St., Archbold, OH 43502.
**Date of Introduction:** 1988.
**Wt/Vol., Packaging, Price:** 10 oz bottle retails for $1.39 (3/89).
**How Stored:** Shelf stable.
**New Product–Documentation:** Ad in Cooking Light. 1989. Jan/Feb. p. 103. "Revolutionary China. New La Choy Lite Soy Sauce. It's based on the idea that less sodium doesn't have to mean less taste. So it has 47% less sodium than regular soy sauce. And the great taste that beat Kikkoman Lite 2 to 1."

Sun-Tattler (Hollywood, Florida). 1989. March 16. This product contains 110 mg of sodium per ½ teaspoon. It also contains preservatives.

1271. Cost, Bruce. 1988. Asian ingredients: Buying and cooking the staple foods of China, Japan and Southwest Asia. New York, NY: William Morrow & Co. 333 p. Illust. Index. 27 cm. [39 ref]
• ***Summary:*** Soy related: Soybean sprouts and recipe (p. 86). Beans, incl. soybeans (p. 146-50). Asian "dairy" (p. 186-87): The soybean and the coconut (incl. bean curd, doufu-nao, fermented bean curd / fu-ru, molded bean curd / chou dou-fu, dried bean curd / dou-fu gan, and bean curd skin [yuba]. Soybean milk.

Soybean sauces, condiments and pastes (p. 195-211): Salted and fermented black beans with recipes for "Roast chicken with black beans stuffed under the skin," and "Soft-shell crabs with ginger, lemon, and black beans" ("Fermented black beans, often flavored with bits of ginger and sometimes orange peel, are usually sold in 8-ounce plastic bags." Acceptable brands: Mee Chun or Koon Chun Sauce Factory. "Earthier and probably more classic are the Yang Jiang Preserved Beans (with ginger) from Kwangtung, China), bean sauce (other names: Yellow bean sauce, brown beans sauce, bean paste, jiang; two types are with the beans whole or ground), hot bean sauce / paste with recipe, hoisin sauce, sweet bean sauce (made with soybeans [probably tian mian jiang, p. 202], Taiwan), soy sauce (Chinese, Japanese, tamari; Highly recommended light soy sauce: Pearl River Bridge. Highly recommended dark: Pearl River Bridge Mushroom Soy, flavored with straw mushrooms), Java's ketjap and other soy sauces miso with recipe, yellow miso (*Shinshu miso*), white miso (*shiro miso, Kyoto shiro miso*, sweet white miso), red miso (*aka miso*), Hatcho miso [soybean miso], barley miso (*mugi miso*), fermented bean curd (white or red; also called preserved bean curd, wet bean curd, bean cheese, dou-fu ru or fu-ru {Mandarin}, fu yu {Cantonese}) with two recipes).

"Red fermented bean curd" is described on pages 210 (also called "red bean cheese"), 211, and 283 (together with "red rice").

Concerning ketjap (p. 206): Tomato ketchup, although it may seem to be of Asian origin, may or may not come from a family of Asian pickled products. But the word "ketchup" is clearly of Asian origin. [Note: The modern Indonesian word for soy sauce is *kecap / ketjap / kechap.*] "It comes from the Malay *kechap*, which apparently derives from the *kôe-chiap* of a southern Chinese dialect (Amoy); both of these refer to the kind of briny liquid preserves that include fish and soy sauces." Throughout most of Southeast Asia, fish sauces are the standard condiment, in Indonesia (incl. Java) soy sauce is more widely used. Sweet Indonesian soy sauce (*ketjap manis*), which is very widely used, is traditionally sweetened with palm syrup and seasoned with garlic, star anise, salam leaves, and galangal.

Also discusses: Seaweed (p. 165-70): Kelp (Laminaria), laver (Porphyra), wakame, dashi, hair vegetable / black moss / hairlike vegetable (China; Gracilaria verrucosa), agar-agar. Monosodium glutamate (p. 247)

Bruce Cost was born in 1945. A photo and brief biography appears on the inside rear dust jacket. Address:

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[San Francisco, California].

1272. Kloppenburg, Jack Ralph, Jr. ed. 1988. Seeds and sovereignty: The use and control of plant genetic resources. Durham, North Carolina: Duke University Press. viii + 368 p. Index. 24 cm. Published in cooperation with the American Association for the Advancement of Science. [100+* ref]
• ***Summary:*** This book contains 16 chapters by various authors, divided into four sections. References are found at the end of each chapter. See also Kloppenburg's chapter titled "Seeds of Struggle."

Soybeans are mentioned in several places: They were introduced to the USA from Manchuria, Korea, China, and Japan (p. 70-71).

The potato was in Europe for more than 150 years before it became a successful crop; the soybean was in the USA for more than 100 years before it became successful (p. 87-88).

In Chapter 7, titled "The contribution of exotic germplasm to American agriculture," by Thomas S Cox, J. Paul Murphy, and Major M. Goodman, is a section devoted to "Soybeans (*Glycine max*)" (p. 130-32). Address: Asst. Prof. of Rural Sociology, Univ. of Wisconsin, Madison.

1273. Lautensach, Hermann; Dege, Katherine; Dege, Eckhart. 1988. Korea: A geography based on the author's travels and literature. Translated from the German. Supplemented with a thoroughly revised and expanded index. And edited by Katherine and Eckhart Dege. Berlin, Heidelberg, New York, London, Paris, Tokyo: Springer-Verlag. xvii + 598 p. See p. 20, 160, 174, 180-81, 201, 203, 229, 420-21, 452, 476, 482, 488. Illust. Maps (some color). 26 cm. [936* ref]
• ***Summary:*** "With 42 photographs, 95 diagrams, 46 tables and a [larger color] map." This classic was first published 40 years ago (a few months before the end of World War II) and the field work was done 50 years ago, when Japan still ruled Korea and all place names were Japanese; these names have all been updated.

Vavilov classes soybeans among the plants that originated in the East Asian grain gene pool, and he includes Korea in the gene pool. Thus it is "quite possible" that soybeans were domesticated in Korea itself. Hulbert (1902) includes among the non-Chinese crops black soybeans, two of the three kinds of kaoliang, wild sesame (Perilla), and buckwheat (p. 20).

On page 21 is a very interesting "Chronological table of Korean history. Comparison with Chinese and Japanese history." A major change took place in 680 AD when the Three Hans [Three kingdoms] (Tribal Leagues; Koguryo [Gouryeo, in the north], Paekche [Baekje, in the southwest], and Shilla [Silla, in the central and south east]) merged into one, named Silla. In 918-925 it became Koryô [Kingdom of Goryeo; Wang Dynasty], which in July 1392 became Chosôn [Joseon Dynasty; Yi Dynasty], that lasted until August 1910 when the Japan-Korea Annexation Treaty was enforced by the Empire of Japan.

Chapter 6, titled "The anthropogeographical character of ancient Korea" (p. 149+) contains extensive information about agriculture and food. Page 160: In wealthier sites, the farm buildings enclose a courtyard, to which an entrance gate gives access (Fig. 37c, p. 158). Some enclosures are so complete that a square courtyard results. "In some corner or other of the courtyard stand the huge brown earthenware jars, in which soy sauce (Jap. *shoyu*, Kor. *kanjang*) is prepared and stored."

Nature and traditional culture: Plants found between the subtropical zone and the temperate zone include soybeans, foxtail millet, maize, and hemp. Since ancient times, rice has been Korea's most important cereal crop. The great majority of it is grown in irrigated paddies. Paddy rice (an aquatic plant) has a different name in Korea from upland rice. Hubert (1902, p. 108) mentioned eight varieties of rice grown in traditional Korea, including glutinous rice, whose flour is made into rice cakes by mixing it with water and spicy herbs, then beating the cold mass for a long time with wooden hammers (p. 174).

Page 180: In East Asia, after cereal grains, pulses / legumes are the next most important crop. In Korea, by far the most important is the soybean (Kor. *k'ong*), which makes few demands on the soil. Korea's climate is ideal for soybeans (Tanaka 1931, p. 18); it is even better than Manchuria's climate, because of the large amount of precipitation during the summer. Today, soybeans are an indispensable part of the various dry-field crop rotations. After planting of the paddies has finished, soybeans are planted on the ridges too; there they grow extremely well without being fertilized. Soybeans are grown throughout Korea, but least in the Kaema upland because of the warmth they require. In northern Korea, on dry fields, they are planted between the end of March and beginning of May. Toward the south, planting is delayed until the end of June. They are generally harvested in October, except in Chejudo, where they are not harvested until early November. Soybeans are the crop that is left standing the longest, and they are not harvested until their leaves have turned brown and started to fall.

Soybeans are used as a very nutritious food for both humans and horses. Also, cooked soybeans are used as a fertilizer for the rice paddies. "Above all, though, the hot brown soy sauce, which is never lacking on any Korean or Japanese table, is made of them, using salt and pepper and a process of fermentation. Bean curd (Kor. *tubu*, Jap. *tofu*) and soybean paste (Kor. *toenjang*, Jap. *miso*) are also made of them."

Adzuki beans, cotton and hemp are discussed on p. 181.

The Korean regions: On the forest slopes, which were deforested but the Japanese are energetically reforesting, one

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can find various lianas [climbing vines] such as *Pueraria hirsuta* [Jap. kudzu]. In the northern part of the coastal fringe, soybeans are grown on the ridges between paddies (p. 200-01).

Namyang is a link in the shortest connection between Tokyo and Harbin, which includes the ship passage between Tsuruga or Niigata and Ch'ongjin. "For this reason, this section has been operated by the South Manchurian Railway since 1 October 1933." The northernmost bays and harbors, especially Unggi, Najin, and Ch'ongjin, and their cities, are developing at an unusually rapid rate. "They have become the export harbors for central Manchuria, particularly for soybeans" (p. 203).

In the Kaema upland we find "fire-field farming" and soybean fields in the valley bottoms or basins. "The most important fire-field crops at lower elevations are foxtail and barnyard millet, barley, soybeans, kidney beans, hemp and sesame." "The Japanese forestry commission has taken over management of the remaining forests. In the natural forests, wood is cut selectively and only as much as grows back" (p. 229).

Korea as a Japanese possession [colony]: "In southern Korea, barley has replaced rice as the principal staple food under the influence of Japanese economic policy." A large portion of the rice is sold to Japan.

Table 37 (p. 420), titled "Cultivated area, harvested amounts and yields per acre of the most important crops, 1935," includes: Soybeans: 785,000 ha. 7.9 hectoliters of weight. Worth: 60.2 million yen. Yield: 10.1 hectoliters per ha. Adzuki beans: 235,000 ha. 1.7 hectoliters of weight. Worth: 14.3 million yen. Yield: 7.3 hectoliters per ha. The table also includes paddy rice, upland rice, barley, naked barley, wheat, foxtail millet, barnyard millet, broomcorn millet, kaoliang, maize, oats, buckwheat, potatoes, sweet potatoes, mung beans, etc.

"The soybean vies with foxtail for the third place in the order of crops, by cultivated area. Its is a very profitable, undemanding crop that does not fail even in meteorologically abnormal years. Therefore its harvest curve does not have the ups and downs that are characteristic of many other crops, particularly paddy rice (Fig. 84). Acreage and yield per hectare have not increased nearly as much during the Japanese period, however, as for many other crops. Nevertheless, soybeans are the third most important item of agricultural export today, and the quality is supervised by the state. Approximately one-fourth of the harvest is exported. The most important export markets are Unggi, Ch'ongjin, Songjin, Wonsan, Shinuiju, P'yong-yang, Kumch'on and Ch'olsan (T. Tanaka 1931). They are located without exception in the northern half of the country" (p. 421). Note: Since 1948, the northern half of Korea has been a separate nation, North Korea.

"The Korean adzuki bean, particularly that from the northeastern coast, is highly priced in the Japanese market because of its high quality." By acreage it is the sixth most important crop in Korea (p. 421).

The soybean mills that process Manchurian soybeans into oil and meal lie on the Japan Sea coast of Hamgyongbuk-do (p. 452).

Table 43 (p. 476), titled "Korea's most important import and export goods, 1939," shows that "Beans" were the No. 7 export item to Japan, worth 23 million yen. The leading export was rice (149 million yen) followed by fertilizer (53), copper (52), fish etc. (32). "Of the beans exported to Japan... soybean take first place. Soybean exports to Japan had a weight of 1.3 to 1.9 million q" [1 quintal = 100 kg] in the years 1934-1938. "In contrast, from the northeastern ports Manchurian beans were shipped to Germany and England." In addition, large amounts of soybeans were imported by Korea itself from Manchuria (0.29 to 1.02 million q). Large amounts of soybean products made in Korea were also shipped to Japan (incl. soybean oil as much as 11.500 q, bean curd [tofu] up to 1.2 million q). Moreover soybean oil (up to 3,210 q) and bean curd (as much as 1.3 million q) were imported from Manchuria (p. 476).

Considerable amounts of dried seaweed and laver [nori] were also exported to Japan (p. 477).

Pages 482-83 try to characterize Korea's significance in 1938 for the economy of Greater Japan (pan-Japan) in general and Japan proper in particular. Pan-Japanese production included that of Korea, Manchuria, and Formosa. "The Korean rice crop in 1938 (44.8 million q) amounted to 23.4% of the pan-Japanese crop and 36.6% of that of Japan proper; 63.2% of Japan's rice imports came from Korea. The soybean crop in 1938 amounted to 6.4% of the pan-Japanese crop, 68.7% of the crop of Japan proper; 17.8% of the soybean imports of Japan proper came from Korea. The relationship was that of a master country to a dominated colony. For example, the Japanese forced the Koreans to eat barley so that the Japanese could import and enjoy the rice grown in Korea.

Soybean production on steep slopes and at high altitudes is mentioned (p. 488).

Hermann Lautensach lived 1886-1971. This book was first published in 1945 in German. Address: Prof., Dr.

1274. Rapp, Neville Sue; Chung, Y.; Shin, S.H.; Hong, I.S.; Jang, J.Y.; Seel, D.J. 1988. Mutagenic and anti-mutagenic properties of meju and other Korean food products from fermented soybeans. *Yonsei Medical Journal* 29(2):117-23. [26 ref]

• ***Summary:*** "In order to investigate the mutagenic activity of Meju [soybean koji], an important component of the Korean diet, both chemical techniques and the Ames test were used. To determine if antimutagenic activity is present in Meju and other soybean based foods, the Ames Test was done in the presence of aflatoxin B1, benzo(a)pyrene, and other mutagens. Although aflatoxin contamination was found

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in 6 of 43 samples of Meju tested, the amounts were less than 1 ppb in all but one. Meju had a protective effect against mutations produced by both aflatoxins and benzo(a)pyrene, both of which act via an epoxide, but not against other mutagens tested."

The Meju was collected from rural households in Chonbuk, Chonnam, and Kyungnam Provinces in south central Korea. "One sample each of Doenjang (soy paste) and Kanjang (soy sauce) from Chonbuk were also tested for mutagenicity. These foodstuffs are both produced from Meju; neither contained any mutagenic activity." Address: 1. Christian Medical Research Center, Presbyterian Medical Center, Chonju, Korea.

1275. Belleme, John. 1989. The imperial sauce: Rich, dark, and subtle, Japan's traditionally made shoyu is an outstanding and versatile seasoning. *East West.* Jan. p. 72-77. [2 ref]

• ***Summary:*** Westerners indiscriminately sprinkle soy sauce on everything from beef to popcorn. Almost half of the 60 million dollars spent annually by Americans on soy sauce goes for a product that is not even fermented. Kame, La Choy, and Chun King brands for example, are the result of a 1-day chemical process. The ingredients are soy extract, alcohol, sugar, salt, food coloring, and preservatives. Nearly all other soy sauce sold in the U.S.–such as Kikkoman, Yamasa, Marukin, Higashi-Maru, and Maruten–is made from chemically processed soy meal by a high-tech, accelerated method and temperature-controlled fermentation, and it usually contains sodium benzoate as a preservative.

Traditional shoyu products reach U.S. consumers in a roundabout way. For example, Muso buys traditional shoyu from the Marushima Brewing Co. of Shoda Shima, Japan, and exports it to Eden Foods, which sells it to American consumers under the Eden label. Ohsawa Japan buys from the Yamaki Brewing Co. of Tokyo, and sells to Ohsawa America, which bottles and sells it under the Lima label. The largest producer of traditional shoyu is the Sendai Shoyu and Miso Co. of Sendai, Japan. Sendai makes Johsen Shoyu, which is exported by Mitoku and is bottled in the U.S. under different brand names, including Westbrae, Tree of Life, Emperor's Kitchen, Mitoku-Johsen, and Mitoku Macrobiotic.

The author notes that, "My 8 years of miso-making in Japan and at American Miso Co. have taught me that miso aged in wood is superior to that aged in plastic... although Sendai shoyu and Miso Company started making high tech shoyu in 1950, Sasaki insisted that his company also continue to make traditional shoyu." Although at times Sasaki's pet project seemed a financial disaster, in 1970 he received a phone call from a Tokyo businessman, Akiyoshi Kazama. Kazama, a friend of macrobiotic teacher Michio Kushi, was looking for a supply of traditional shoyu for Kushi's students. When Sasaki showed Kazama his 12 2,000 gallon cedar casks of naturally aging whole soybean shoyu a few days later, Kazama knew his search was over. Kazama shipped Johsen Shoyu to the U.S. in 5 gallon wooden buckets at first.

Jubei Sasaki has passed away, but his 12 casks of traditional shoyu have grown to 100 and his son continues the whole soybean shoyu tradition.

4 recipes are given. Address: P.O. Box 457, Saluda, North Carolina 28773. Phone: 704-749-9537.

1276. *LEC Newsletter.* 1989. Whole raw soybeans texturized. 13(1):7-8. Jan.

• ***Summary:*** Until now, the manufacture of textured plant proteins has required the use of defatted oilseed flours which have received little or no heat treatment. Some years ago Hank and Mark Sterner, while employed by Meals for Millions, developed an innovative LEC, the design of which was subsequently taken over by the Korean Inst. of Science and Technology [KIST] in Seoul. Paul Allred, of Riverside, California, is a retired Seventh-day Adventist who has worked extensively on extrusion processing with Wenger equipment in Mexico. He directed a project in Navojoa, Mexico, which now uses several X-25 extruders to make standard textured soy protein products. Recently Mr. Allred observed that the Sterner screw design permits texturization of oilseeds without removal of the oil. The resulting product has a typical textured soy protein structure and a pleasant roasted soy flavor. The extra oil in the product makes it much more palatable directly from the extruder. Allred recently made parts for a Wenger extruder located at Africa Basic Foods in Uganda. He believes these will enable that machine to texturize whole (undefatted) soybeans. Address: Colorado State Univ., Ft. Collins, Colorado.

1277. Han, I.K.; Choi, Y.J.; Chu, K.S. 1989. The utilization of full fat soybean for egg production and egg quality in the laying hens. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 1861-65. [24 ref]

• ***Summary:*** "Extruded full fat soybean can serve as effective protein source for layer diets if economically justified." Address: College of Agriculture, Seoul National Univ., Suweon 440-744, Korea.

1278. Ontario Soybean Growers' Marketing Board. 1989. 40 years of progress: Fortieth anniversary, 1949-1999. Chatham, Ontario, Canada: OSGMB. 49 p. 22 x 28 cm.

• ***Summary:*** Contents: A message from the Ontario Minister of Agriculture and Food (Jack Riddell). Chairman's message (Ted McGrail). History of soybeans in Ontario (p. 3). Year by year: 1948-1989–One page is devoted to each year. The 3-element / column format is the same for most years and pages, except when there is a photo of the new staff person or a special photo is added: (a) A portrait photo of

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the chairman for that year. (b) Brief statement of important developments that year (mostly soybean price, production, acreage, yield, support price or deficiency payments). (c) Names of the director(s) from each of the six districts–1. Elgin. 2. Essex. 3. Pelee Island. 4. Kent. 5. Lambton. 6. Middlesex. Page 47 briefly summarizes 40 years of progress.

Four graphs (p. 48-49) show changes related to Ontario soybeans from 1949 to 1989: (1) Soybean acreage grew from 104,000 acres to 1,290,000 acres; the most rapid growth occurred after 1976. Annual average yields and 5-year average yields have increased steadily–the 5-year average from about 18 bushels/acre in 1949 to about 36 bushels in 1989. Soybean production grew from about 3 million bushels in 1949 to a peak of about 45 million bushels in 1987. The soybean crop value (farm cash receipts) grew from almost nothing in 1949 to over $351 million in 1988; rapid growth began after 1971 and 1976.

Chronology of some important events extracted mainly from individual years.

"1949–The Ontario Soya-Bean Growers' Marketing Board was established under the Farm Products Marketing Act. Under the provisions of the new regulations eleven soybean growers were elected as directors to the board. Together they represented some 6,000 soybean producers in six Ontario districts. The first office of the board was located in the office of the Agricultural Representative in Essex, and Angus McKinney was the first secretary. K.A. Standing acted as assistant on a part-time basis. Board operations were financed during the 1949-50 crop year by one half cent per bushel license fee [like the later U.S. checkoff fee].

"1950–The license fee was increased [doubled] from one-half cent to one cent per bushel, the level at which it remained until 1959.

"1951–The first annual convention of soybean growers was held Feb. 15-16, 1951 at the Community Hall, Chatham [County of Kent]. Imports from the U.S. were totalling about 5 million bushels annually.

1952–K.A. Standing became general manager (with portrait photo). The board established its office in Chatham sharing facilities and staff of one secretary with the Ontario Seed Corn Marketing Board on Market Street. The first task was to set up a complete grower records system.

"1953–Expansion of office requirements resulted in a move to new quarters on Fourth Street in Chatham.

1954–The OSGMB organized the first export of Canadian soybeans. The shipment was made from Port Stanley [Ontario] to interests in the United Kingdom. Initiated to generate competition in the domestic market, exports were to continue in every succeeding year. Some 1,492,000 bushels of soybeans were exported during the 1954-55 crop year.

1956–The number of elected directors increased to 14 from 11.

1957–The average price of soybeans paid to growers dropped to $1.95 per bushel–the lowest since World War II. The board pressed for legislation to stabilize returns to growers.

"1958–The board was successful in having soybeans brought under the Agricultural Stabilization Act. The crop was supported at $2.10 per bushel. The average price paid to growers was $1.90, resulting in a deficiency payment of 19.6 cents per bushel for a total of $1,200,000 paid to growers. The office was moved from Fourth Street to Wellington Street West in Chatham. Otis McGregor became assistant secretary-manager (with portrait photo).

Note. Letter (e-mail) from Kim Cooper formerly of OSGMB. 2010. Feb. 18. The growers always had to pay a premium to take part in income stabilization programs. So it was not simply a government subsidy. At first, the premiums had to be paid up front, but after a few years, the premiums were deducted from the payout, if there was any payout.

1960–L.R. Addeman became information officer for both the soybean and wheat boards.

1963–The ban on coloured margarine is lifted in Ontario.

"1964–Increased emphasis was put on [soybean] research when federal and provincial programs were brought under a coordinated plan.

"1965–Domestic crushings reached a 16-year high at 20.8 million bushels, as did soybean imports at 16.5 million. There was no price support in 1965 and succeeding crops, the last having been applied to the 1964 crop at $2.15 per bushel."

1970–Canadian soybean production first tops 10 million bushels.

1973–The first shipment of Ontario soybeans (Harosoy variety) was made to Japan. The Ontario Soybean Symposium was held at Ridgetown College of Agricultural Technology, sponsored by the Board, the Ministry of Agriculture, and Food and Agriculture Canada. K.A. Standing became general manager of both the soybean and wheat boards and Otis McGregor was appointed marketing manager of both boards.

1974–D. Sanderson became secretary to the Ontario soybean and wheat boards.

1975–The Soybean Board established its own separate office in a rented building on Kell Drive in Chatham. Otis McGregor became secretary manager of the Soybean Board.

1977–The metric system started to be used in agriculture in Canada; metric ton (tonne) officially replaced bushel. "An Advance Payment Program was established for soybeans under the federal Advance Payments for Crops Act. The program provided interest free loans to producers who stored their soybean crop at harvest for future sale." A record high yield average of 39 bushels per acre was set. Mario Baletto became market information coordinator.

"1979–The Board initiated a program to promote soybeans as a food product and hired home economist Linda

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Lantz to manage the program. Soybeans were the featured crop at the Royal Agricultural Winter Fair.

"1980–Soybeans began trading duty free between Canada and the United States following the elimination of a 60 cent per bushel tariff, via the General Agreement on Tariffs and Trade" (GATT). Fred Brandenburg became assistant secretary manager.

"1982–The Board participated in a soybean export market development mission to Japan, Hong Kong, Malaysia, Singapore, and Korea; it was organized by the Ontario Ministry of Agriculture and Food. Continued low prices trigger stabilization payments of 38 cents per bushel federally and 37 cents per bushel provincially."

1983–Two new districts were formed, bringing the total to 8. District 7 ran east to the Quebec border reflecting the advance of soybean production to the north and east from its traditional area.

1984–A new office for the Board was erected at 180 Riverside Drive in Chatham. "A two-day conference–the Ontario Soybean Symposium–and an incoming mission of soybean buyers from the Far East [East Asia] and Europe were sponsored jointly" by OSGMB and OMAF. "Prices dropped again making a provincial stabilization payment of 36 cents per bushel necessary." Note: Stabilization support prices are based on an average of market prices for the past five years.

1985–Fred Brandenburg became secretary manager of the board and John Davidse became executive assistant to the board. "Ontario became self-sufficient in soybean production for the first time as the 37,000,000 bushel crop exceeded the 33,165,000 bushel crush. Low prices continued as did stabilization payments–42 cents per bushel from the federal program and 39 cents from the provincial program."

1986–"Ontario's single biggest soybean export sale of 50,000 tonnes was made to the USSR." Low soybean prices paid to producers continued. In addition to federal and provincial stabilization payments, "the Special Canadian Grains Program paid soybean growers on the basis of 18 cents per bushel."

1987–Tino Breuer became marketing specialist. Districts were again redistributed to reflect the average soybean production in each.

1989–The Board celebrates its 40th birthday with a new logo and a change in the spelling of its name from "Soya-Bean" to "Soybean." 15 directors now represent 24,000 growers in 8 districts across the province. 1,280,000 acres of soybeans were grown in 1988–more than 14 times as many as in 1948. Soybeans are Ontario's #1 cash crop, worth over $350 million in farm cash receipts in 1988. Address: P.O. Box 1199, Chatham, Ontario, Canada N7M 5L8. Phone: 519-352-7730.

1279. Packaged Facts. Subsidiary of FIND/SVP. 1989. The Oriental foods market. 625 Avenue of the Americas, New York, NY 10011. 225 p. Feb. [1 ref]

• ***Summary:*** Contents (main divisions): I. Introduction. II. The overall market, including a brief history in America. The market leaders, in descending order, are La Choy, Stouffer, Chun King, Nissin, Kikkoman, Budget Gourmet, JFC. III. The frozen segment. IV. The canned/packaged segment: Sauce sales now over $100 million and soy sauce nearly 3/4 of all sauce sales. V. The tofu segment (detailed below). VI. The dry soup segment: Nissin number one. Appendix: Company profiles: BCI Holdings Corp., Nestlé S.A., Nissin Foods Co., Kikkoman International (in American since 1956). ConAgra, Sanwa Foods, Others (Kraft, Benihana, JFC International).

Section V is "The Tofu Segment" (p. 153-178). Contents: I. The products: Brief history. A protein staple in the Orient. The Miracle food. Tofu high in protein. Calcium content can be high. How it is made. Raw tofu the most common form. Other forms found in specialty stores. How tofu is used.

II. The market: Tofu sales reach $71 million in 1988 (Gives dollar volume in millions from 1984 [$57] to 1988 [$71]. Source: Packaged Facts). III. Factors in future growth: Popularity of Oriental cuisine. Tofu adopted by dieters and health conscious. Consumers attracted by low price. Dinners and entrees being introduced. Tofu helpers (Betty Crocker's Oriental Classics Dinners [General Mills] call for the addition of tofu, chicken, or meat). Tofu substitutes are proliferating (value-added tofu based ice creams, puddings, burgers, cheese, hot dogs, salad dressings, etc.). Interest by corporate giants (Pillsbury and Carnation). Tofu used in U.S. National School Lunch Program (it is estimated that 50 million lb of soy proteins are used each year in school lunches). IV. Projected sales: $119 million market by 1995 (7-8% dollar increase annually). V. Market composition: Raw tofu over half of sales. Supermarkets account for 60% of sales. V. The Marketers: Field narrowed to 150 or fewer marketers. Four major marketers (Hinoichi, Azumaya, Morinaga, Nasoya; produce 100,000+ weekly). The second echelon (Northern Soy, Quong Hop, White Wave, Island Spring; produce 15,000–30,000 lb/week). VI. The competitive situation: Precise market shares unavailable. Hinoichi, Azumaya, Nasoya, and Morinaga lead. Tomsun, failing with Jofu [tofu yogurt], files for Chapter 11. Watch out for Kikkoman. VII. Advertising and promotion: No measurable expenditures (except by Tofutti). VIII. Packaging: Plastic and foil. IX. Distribution and retail: Distribution. 60% of raw tofu sold in supermarkets. Pricing includes higher margins. Assortment. Most tofu shelved with produce. Pricing data at the retail level: In its *Key Price Book,* Marketing Services Corporation publishes detailed information on tofu products sold in California supermarkets. This includes data on package sizes, case sizes, competitive pricing, margins, and promotional discounts. Figures for Kikkoman Kinugoshi, and two textures of Morinaga were

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compiled on 1 Feb. 1989. X. The consumer: Size of user base unknown. Roper poll reveals a dislike of tofu. Those most likely to use. Address: New York. Phone: 212-645-4500.

1280. Park, Yang-Ho; Lee, Choon-Soo. 1989. Yield increasing of soybean on the newly reclaimed hillside land through phosphorus fertilizer management. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 734-39. [18 ref]
• ***Summary:*** "Soybean is one of the most important upland crops in Korea. But the total production of soybean and Korea's self-sufficiency have been decreasing every year. The yield per unit acreage is very low, only 1,320 kg/ha. In 1987, domestic production of soybean was 203,878 metric tons (tonnes) on 153,744 ha, and it was 14.2% in total self-sufficiency. Thus this grain has had to be imported from other countries. Korea imported 1,131,000 tonnes in 1987 and more every year. To solve these problems, the government has tried to find out all the possible measures to increase soybean production." Address: Agricultural Sciences Inst., Rural Development Administration, Suweon 440-707, Korea.

1281. Shanmugasundaram, S.; Tsou, S.C.S.; Cheng, S.H. 1989. Vegetable soybeans in the East. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 1979-86. [12 ref]
• ***Summary:*** "Soybeans harvested and used green, between the R6 and R7 growth stages are termed vegetable soybeans. Japan, Korea, China, Thailand and Nepal currently grow and consume vegetable soybeans... For the Japanese consumer, vegetable soybeans have two or more seeded pods, bright green pod wall after blanching or cooking, large seed, gray pubescence, colorless hilum, specific pod length and width and no more than 175 pods per 500 gm. The outer pod coat should be devoid of any blemishes. After boiling, the taste should be slightly sweet and not oily. A number of seed companies, especially in Japan breed vegetable soybeans. AVRDC is currently developing vegetable soybeans that are adapted to the tropics and subtropics...

"The whole plant is harvested and the leaves are stripped; the stems with pods are bundled and sold in Japan and Thailand. In Taiwan, Nepal, China and Korea, the pods are stripped from the plant and marketed... The majority of the vegetable soybeans in Taiwan are frozen in the pod and exported to Japan...

"In terms of nutrient content, the vegetable soybean can be considered as an excellent source of thiamine, a good source of protein, riboflavin, iron and phosphorus. It has adequate vitamin C; it is fair in calcium, but poor in vitamin A.

"In Japan, the area devoted to vegetable soybean increased from 6,980 hectares in 1967 to 14,000 hectares in 1986 including those planted in vinyl houses... The total vegetable soybean requirement in Japan is about 130,000 to 150,000 tons of green pod per annum. The production in Japan varies from 110,000 to 120,000 tons. To meet the domestic demand, Japan imports about 30,000 to 50,000 tons... The amount of frozen vegetable soybeans exported from Taiwan in 1981 was worth US $21 million and reached almost US $63 million in 1987. The domestic Taiwanese consumption of vegetable soybean also steadily increased from 4,700 tons in 1984 to more than 13,000 tons in 1987...

"At present, there are 27 frozen food processing companies in Taiwan which process frozen vegetable soybeans... Five major processors handle 2,713 tons to 11,552 tons per annum...

"In Japan, vegetable soybean varietal development is conducted by the private seed companies. During the past 30 years the seed companies in Japan developed more than 50 new vegetable soybean varieties. Currently, the most popular ones to name a few are: Tsurunoko, Ryokkoh, Kegon, Hatsutaka, Taisho shiroge, Nakate Kaori, Suzumo, Enrei, Fukuda, Raityo, Shirobato, Tamasudare, Hakutyo and Shiratsuyu." Address: 1-2. Asian Vegetable R&D Center, P.O. Box 205, Taipei 10099, Taiwan; 3. Council of Agriculture, 37 Nan-Hai Rd., Taipei 10728, Taiwan.

1282. Xu, Bao; Lu, Qinhua; Zhuang, Bingchang. 1989. Analysis of ecotypes and their geographical distribution of wild soybean (G. soja) in the world. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 98-103. [8 ref. Eng]
• ***Summary:*** "The analytical data show 343 germplasm lines (China 292, Japan 32, South Korea 14, and USSR 5), seven ecotypes and their geographical regions and 13 sub-regions were divided... Typical wild soybean is an annual herb, twining around companion plants. Its main stem and branches are almost identical. The leaflets are ovate, oblong or lineolate in shape. The flowers are dark, light or reddish purple. The pods are about 2 cm in length, containing 1-5 seeds. The seeds are black with brown or black bloom. The weight of 100 seeds is about 1-3 gm... Since 1978, about 5,000 accessions of wild soybean have been collected in China. Characters as high protein content, good adaptability are considered superior." Address: Soybean Inst., Jilin Academy of Agricultural Sciences, Gongzhuling, Jilin province, China.

1283. Thompson, Jay. 1989. Early work with tofu at Rochester Zen Center (Interview). *SoyaScan Notes.* April 11. Conducted by William Shurtleff of Soyfoods Center. [1 ref]
• ***Summary:*** "The Zen Center of Rochester was founded by Kapleau roshi in 1966. In about 1974 we started by

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importing tofu from Toronto. I would go to a Korean [Chinese?] shop named Yet Sing at #11 Baldwin Street. It looked like a normal residential home near a popular dress store named Morningstar. But when you descended to the basement it looked like a scene out of Dante's inferno. Everybody had hip boots on. There was ankle deep water, steam everywhere, and you could just see these laboring bodies through the mist. It seemed like there were 20-30 people in the basement working very hard. You had to clamber over huge bags of soybeans on pallets. No one spoke English. You used fingers with the front man to say how much you wanted. They only had one product as far as I could tell. I carried the tofu away in about eight number 10 cans filled with water. I would take the bus back across the Canadian border and many a time I was given a hard time by the customs officials. I hauled tofu down from Toronto once or twice a month for several years. When Zen students from Toronto came down for sesshin, we always asked them to bring tofu. One reason we wanted to start making our own tofu was that this trip was so difficult."

Jay first got in touch with William Shurtleff when he read a small letter Shurtleff had written to the *East West Journal* (15 June 1975, p. 3). In about August 1975 he wrote Shurtleff in Japan and got back a typed sheet describing how to make tofu on a home scale. In a second letter he requested instructions for making tofu on a larger scale.

"We made tofu in the kitchen a few times, realized we couldn't make enough at that scale, then used the instructions to build a small shop in the basement of Zen Center. We got a beam with a weight on it for pressing, installed a candy stove and a big pot. Greg Mello built the shop. Being in charge of the kitchen, and since this was a kitchen project, I was actively involved. Mello and Greg Weaver eventually took that small shop to a larger shop on North Goodman Street. The basement shop existed for several years. Once the commercial shop began, our kitchen bought tofu from them rather than making it ourselves. Mello left the Zen Center staff when the tofu shop went commercial. Andy Schecter and Norman Holland soon joined the shop.

"There were two favorite ways of serving tofu at the Zen Center: Tofu with Tahini Sauce, and Tofu Sticks, which were somewhat like fish sticks, make by baking breaded tofu, then serving it with tartare sauce." Address: Rochester, New York. Phone: 716-275-6779 Office.

1284. Thompson, Martha Gifford. 1989. Early work with tofu at Rochester Zen Center (Interview). *SoyaScan Notes.* April 11. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** The staff of 30-50 people in the Zen Center kitchen prepared strictly vegetarian meals. Kapleau roshi at that point had a dairy allergy, so very few dairy products were used in the meals. The diet was almost a vegan one. The Toronto Zen Center, was an affiliate group nearby in Canada. In Toronto, which has a large Asian population, were at least three tofu shops: one very small family-run Korean shop on Baldwin Street (which is no longer there), one on Avenue Road (perhaps Chinese run), and a third on Dundas Road. A member of the kitchen staff would make the 2½ hour trip to Toronto, go the shop on Baldwin Street (which had no name) to buy tofu. "The first room was stacked to the ceiling with soybeans. Down in the basement were many people slogging around making tofu. It was quite a scene, and nobody spoke any English. At that point we realized that we could make tofu ourselves. The trip to Toronto was always a hassle. You always got stopped at the border; they always thought you were smuggling something. Jay Thompson took the lead in setting up tofu making facilities. Kapleau roshi was very excited about and supportive of the project, in part because he had practiced for so long in Japan, and in part because he likes projects, right livelihood, and soyfoods. Once the shop was set up in the basement, we also made a lot of soymilk, yuba, and soy yogurt, and served spicy curds; we tried everything! The tofu shop of course never received any financial support from Zen Center." Address: Rochester, New York. Phone: 716-461-5388 Home.

1285. *Soybean Update.* 1989. Another record in Korea. April 24. p. 3.

• ***Summary:*** "Commercial feed production in Korea was 9.6 million tonnes, an increase of 6.6% over the previous record set in 1987."

"Korea is the world's sixth-largest importer of U.S. soybeans, consuming about 73 million bushels annually."

1286. Garrett, Lynn J. 1989. Commodity feature: Soybean and soybean meal update for East Asia. *World Oilseed Situation and Market Highlights.* April. p. 40-45.

• ***Summary:*** In this excellent report, the most recent import figures are for crop year 1988-89. Countries discussed are Japan, Taiwan, Republic of Korea, Indonesia, and Philippines. Address: Agricultural Economist, USDA Foreign Agricultural Service (FAS). Phone: 202-720-2852.

1287. PTI. 1989. Indian trade tariffs offend U.S. *Times of India* (*The*) (*Bombay*). May 1. p. 20.

• ***Summary:*** "India is described along with Japan, South Korea, Brazil, Canada and the European community as among the 'worst offenders' in putting up unfair trade barriers in a national trade estimate report (NTER) released by Mrs. Carla Hills, the U.S. president's trade representative yesterday." The president is George Bush.

Subsidies by the European community are said to deny $1.5 billion in sales of American soyabeans to Europe.

1288. Juvik, Gail A.; Bernard, R.L.; Chang, R.; Cavins, J.F. 1989. Evaluation of the USDA wild soybean germplasm

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collection: Maturity groups 000 to IV (PI 65.549 to PI 483.464). *USDA Technical Bulletin* No. 1761. 25 p. May.
• ***Summary:*** "This report contains data on the origin, descriptive characteristics, agronomic performance, and seed composition for 200 wild soybean (*Glycine soja* Siebold & Zucc.) accessions in maturity groups 000 to IV from the USDA Wild Soybean Germplasm Collection. These accessions (PI 65.549 to PI 483.464) were introduced from China, Japan, South Korea, and the Soviet Union into the United States from 1925 to 1984. A total of 38 categories of data is presented for each entry. These accessions were evaluated at Urbana, Illinois, in 1984 and 1985."

Note: This report consists mostly (about 90%) of full-page tables. The rest is definitions and explanations of abbreviations. Address: 1. USDA-ARS, agronomist, GRIN (Germplasm Resources Information Network), Beltsville, Maryland.

1289. Park, Kun-Young; Lee, E.S.; Moon, S.H.; Cheigh, H.S. 1989. [Effects of browning products and charcoal on the degradation of aflatoxin B1 in Korean soy sauce (kanjang) and its model system]. *Korean Journal of Food Science and Technology* 21(3):419-24. June. [19 ref. Kor; eng]
• ***Summary:*** "The effects of browning products (BP) from Kanjang (soy sauce) and charcoal on the degradation of aflatoxin B1 (AFB1) in Kanjang and its model system were studied. Approximately 60% of AFB1 was degraded in the presence of 0.05% BP at pH 7 of phosphate buffer after 2 days of incubation at 30 ºC. The mutagenicity of the APB, which reacted with the BP was decreased to about 50% and 70% in Salmonella typhimurium TA98 and TA100 strains, respectively ($p<0.05$). When a few pieces of charcoal were added to home made Kanjang, AFB1 was quite stable for 5 days at 30ºC, however, about 80% of AFB, was removed when the charcoal was either in distilled water or in 20% of NaCI solution after 2 days of incubation. Activated carbon instead of the charcoal removed AFB1 completely in the all samples under the same conditions." Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan [Korea].

1290. Applewhite, Thomas H. ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, Illinois: American Oil Chemists' Society. xii + 575 p. Held Oct. 1988 in Singapore. No index. 29 cm. $125.00.
• ***Summary:*** These proceedings contain 96 chapters, divided into the following sections: Keynote session. Oilseeds extraction–foods/feeds. Preparation of vegetable protein ingredients. Processing for feedstuffs I. Preparation and uses of non-oilseed vegetable food proteins. Processing for feedstuffs II. Vegetable protein utilization–foods/feeds. Vegetable proteins–nutrition and regulation. Nutritional/antinutritional considerations for diverse species I. Vegetable proteins–nutrition and related technology. Nutritional/antinutritional considerations for diverse species II. Vegetable protein processing for foods I and II. Nutritional/antinutritional factors of specific protein sources I and II. Utilization of vegetable protein food ingredients. Nutritional/antinutritional factors for specific protein sources III. Biotechnology applications in plant and animal systems. Volunteer presentations. Address: (Retired) Kraft, Inc., Research & Development, 801 Waukegan Rd., Glenview, Illinois.

1291. Bernard, Richard L.; Juvik, Gail A.; Nelson, Randall L. 1989. USDA soybean germplasm collection inventory [1945-1985]. Vol. 2. *INTSOY Series* No. 31. vi + 203 p. July.
• ***Summary:*** Volume 1 of this two-volume set was published in Aug. 1987 as INTSOY Series No. 30. The title page states: "Information on the origins of soybean and wild soybean germplasm acquired from 1945 to 1985, identified by PI numbers between PI 150.000 and PI 500.000, and maintained by the United States Department of Agriculture."

Contents: Foreword. Curator staff. The USDA soybean germplasm collection: Introduction, history, PI numbers, maintenance of the collection, statistical summaries of the collection, source and identification of individual strains, appendixes, abbreviations, Germplasm Resources Information Network (GRIN). Statistical tables: Number of strains introduced from 1945 to 1985 by maturity group, number of wild soybean strains introduced from 1925 to 1985 by country of origin, number of soybean strains introduced from 1945 to 1985 by country of origin, number of soybean strains introduced by year, major sources of introduced soybeans. Source and identification of individual strains: Soybean strains (1945 to 1985), wild soybean strains (1925 to 1985). Appendixes: 1. Soybean strains summarized by country and year, 1945 to 1985. 2. Wild soybean strains summarized by country and year, 1908 to 1985. 3. Chinese location names. 4. Korean location names. INTSOY Publication series. Address: Univ. of Illinois.

1292. Chen, Steve. 1989. Preparation of fluid soymilk. In: Thomas H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 341-52. Contains 8 tables and 9 diagrams. [41 ref]
• ***Summary:*** Contents: Development & history of soymilk (based on *Soymilk Industry and Market* by Shurtleff & Aoyagi). Problems of soymilk production: beany flavor, trypsin inhibitors, flatulence factors. Basic steps in soymilk production. Methods of soymilk production. Yields of soymilk: Typically 70-80% of the protein and 55-60% of the solids from soybeans are recovered in the soymilk. Soymilk standards and quality control. Cost and price of soymilk production. Soymilk utilization and types. Nutrition of soymilk. A photo shows Steve Chen. Address: American

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Soybean Assoc., P.O. Box 3512, Taipei, Taiwan ROC 10099.

1293. Hanaoka, Toshio. 1989. Miso preparation and new uses. In: Thomas H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 369-74. Contains 4 tables and 4 figures. [27 ref]
• ***Summary:*** "The prototype of miso was introduced to Japan from Korea at least 1,300 years ago. Misho (the original type of miso) was first cited in *Taihouryou* in 701 A.D. Although the production method for misho was not described, it probably resembled soybean miso today. In the northeast district of China, it was called 'misun,' and in Korai (located in north Korea 935 to 1392 A.D.) 'misso' and in south Korea 'mijo.' The process includes pounding and mashing of cooked soybeans, shaping into balls, wrapping in rice straw, hanging the wrapped materials under the eaves and mixing with salt and water and often was seen at farmhouses in prewar Japan... Miso originally was made at Buddhist monasteries for internal and use in aristocratic circles.

"Another route of introduction was from China to Japan by Buddhists and envoys who produced fermented soybean foods such as Kinzanji-miso. The difference of this process from the Korean process was to make koji from cooked whole soybeans with barley or wheat without pounding.

"The industrial production of soybean miso was started in Aichi prefecture in 1625 and that of rice miso in 1645 at Sendai as the original of Sendai miso today... Thereafter, the number of miso factories increased gradually in the Tokugawa period (1600-1867) and rapidly up to about 5,000 at the end of World War II. Recently, miso factories introduced many advanced facilities and equipment for economical and hygienic production. The number of miso factories was reduced to about 1,700, amalgamating to large scale factories of which capacity was over 3751 tons in 1984. They produced 353,000 tons equivalent to 59% of total industrial production. Employing 182,000 tons of soybeans, 104,000 tons of rice, 23,000 tons of barley and 72,000 tons of salt, *ca.* 568,000 tons of miso were produced by all factories in 1985. In addition, the amount of home-made miso is roughly estimated as 60,000 tons. The amount of miso supplied per capita was 4.9 kg in 1987...

"Ninety per cent or more of miso is used as an ingredient of soup in Japan... Daily per capita consumption was 28 to 30 g during the years from 1951 to 1959. From that time until 1985, it gradually decreased to the level of 16 g which is enough to prepare one bowl of miso soup." Address: Hanamaruki Inc., 4-22-10 Himonya, Meguro-ku, Tokyo 152, Japan.

1294. Karta, Susani K. 1989. Traditional Chinese soyfood. In: Thomas H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 382-87. [18 ref]
• ***Summary:*** Contents: Abstract. Introduction. Variables in manufacturing tofu: Soybean variable, processing variable, maceration and extraction (soaking and grinding) stages, filtration and heating stages, coagulation stages, types and concentration of coagulants used in tofu manufacturing. Tofu products.

Tables: (1) Chinese nonfermented soy food products. Five columns show: Food items, Chinese names, organisms used, description, uses. The soy foods are: Fresh green soybeans (*mao-tou*). Toasted soy powder (*tou-fen*) (Description: "Ground toasted dry soybeans, nutty flavor"). Soy sprouts (*huang-tou-ya*). Soy milk (*tou-chiang*). Soy milk film / yuba (*tou-fu-pi*). Soybean curd (*tou-fu*).

(2) Chinese fermented soy food products. Five columns (same as table 1) The soy foods are: Fermented whole soybeans (*tou-shih*). Soy sauce (*chiang-yu*). Soy paste (*chiang*). Fermented tofu (*so-fu* [*sic*]). Actinomucor or Mucor molds are used. Description: Creamy cheese, mild flavor, salty. Uses: Relish, also cooked with meat or vegetable.

(3) 1987 consumption of soybeans as foods in Asian countries. The results are presented here in descending order of per capita consumption: Per capita soybean consumption, country (population), total soybean consumption in 1,000 tonnes. Taiwan 13.3 kg/capita, (19.6 million), 260,000 tonnes; Japan 9.3 kg/capita, (122.2 million), 1,141,000 tonnes; Indonesia 9.0 kg/capita, (175 million), 1,575,000 tonnes; South Korea 7.8 kg/capita, (42.1 million), 330,000 tonnes; Singapore 7.7 kg/capita, (2.6 million), 20,000 tonnes; China 6.9 kg/capita, (1,062 million), 7,325,000 tonnes; Malaysia 3.4 kg/capita, (55 million), 55,000 tonnes; Thailand 2.2 kg/capita, (53.6 million), 118,000 tonnes; Philippines 0.3 kg/capita, (61.5 million), 18,000 tonnes. (4) Nutritional composition of traditional nonfermented foods: Fresh green soybeans, toasted soy powder, soy sprouts–raw, soy milk, soy milk film / yuba, tofu (Source: *Food Composition Table for Use in East Asia,* 1978). (5) Nutritional composition of traditional fermented foods: Fermented soybeans [tou-shih], soy sauce, soy paste [doujiang], fermented tofu (Source *Food Composition Table for Use in East Asia,* 1978).

In China, fried tofu is called Tou-Pok. Address: American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore.

1295. Kim, Seung Ho; Kwon, Tai-Wan. 1989. Vegetable protein foods in Korea. In: Thomas H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 439-42.
• ***Summary:*** A superb article, perhaps the best ever seen in English on soyfoods in Korea.

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Contents: Abstract. Introduction. Situation of traditional protein foods. Situation of vegetable proteins. Traditional protein foods in Korea: Soy sauce (*kan jang*), hot soy paste (*ko chu jang*), *chung kuk jang* (a kind of soy paste made by mixing natto [*naap doo*] with seasonings [salt, red pepper, and garlic], and grinding then aging the mixture), soybean sprouts (*kong na mool*).

Note 1. This is the earliest English-language document seen (June 2021) that uses the term "ko chu jang" to refer to Korean-style red pepper and soybean paste (miso).

Note 2. This is the earliest English-language document seen (June 2021) that uses the term "chung kuk jang" to refer to Korean-style natto.

Tables: (1) Domestic Korean production and import of soybeans from 1982 to 1987. Domestic production rose to 250,000 tonnes from 233,000 tonnes. Imports for food uses rose to 144,000 tonnes from 104,000 tonnes. Imports for feed uses rose to 936,000 tonnes from 479,000 tonnes. Total supply rose to 1,330 tonnes from 816 tonnes, up 63% in 5 years.

(2) Consumption of soybeans in traditional Korean foods, in 1,000 metric tons, from 1982 to 1987 (1982/1987). Figures in parentheses are for home production. Soy sauce (*kan jang*) 69(50)/70(51). Soy paste (*doen jang* [Korean soybean miso]) 51(41)/50(40). Hot soy paste (*ko chu jang*) 5(4)/5(4). Soybean curd (*doo bu*) 60/114. Soy milk (*doo yoo*) 7/14. Others: Homemade soybean curd and soy milk, *chung kuk jang, choon jang* (kinds of soy paste), soybean sprouts (*kong na mool*), and whole soybeans 145/141. Total 337/394, or an increase of 19.9% in 5 years.

Note 3. This is the earliest English-language document seen (March 2009) that uses the term "choon jang" to refer to Korean-style soybean paste (miso).

(3) Domestic production and import of soybeans in Korea (Estimated for 1987, in metric tons): Soy protein–Textured vegetable protein (domestically made) 4,500. Soy protein isolate (import) 1,800. Soy protein concentrate (import) 150. Wheat protein–Textured vegetable protein (domestic) 900. Vital gluten (domestic) 150. Gluten (wet & dry) (import) 409. Total 7,909.

(4) Nutritional composition of soybeans and soybeans sprouts (per 100 gm).

Figures show: (1) Manufacturing method for rice hot soy paste (*ko chu jang*) (flow sheet). Numbers represent typical ratio of ingredients in volume. (2) Manufacturing method for chung kuk jang (a type of soy paste {Korean-style natto}) (flow sheet). Numbers represent typical ratio of ingredients in volume. Note 4. In Fig. 2 (p. 441), 3.6 units of salt are added with 0.36 units of garlic and 0.54 units of red pepper. Also: A Korean version of Japanese natto is named *naap doo*. This is the earliest English-language document seen (June 2021) that uses the term *naap doo* to refer to natto.

A photo shows one of the authors. Address: Korea Food Research Inst., P.O. Box 131, Chongryang, Seoul, South Korea.

1296. Housman, Bob. 1989. Eastern Foods Corp. becomes Mainland Express (Interview). *SoyaScan Notes.* Sept. 25. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Eastern Foods Corp., founded by Mr. Lee R. Lee, a Korean, was a leading U.S. manufacturer of tofu and soy ice cream (Tofulicious). Lee's company declared bankruptcy, then it was foreclosed on by a venture capital group. On March 3 Bob's group, Goods, Inc., bought the assets and inventory (but not the accounts payable or accounts receivable) and created a new subsidiary named Mainland Express. The new principals are Bob and Scott Housman. They moved the plant and started making tofu again in late April or early May of 1989. They never stopped production. They made an extra's week's inventory, moved the equipment to Goods, Inc.'s location at Spring Park, and were back in operation within a week.

The company has 5 other food manufacturing businesses in Spring Park. They grow and sell alfalfa sprouts, make pickled and flavored mushrooms, grow 5 million pounds/year of fresh mushrooms, make Kennedy label salad dressings, and pack portion-pack juices and novelty bottles for amusement parks. He bought Eastern Foods in part because he was already selling products to most EF's customers. So it was a good tie-in; now he is selling more to those same customers. And tofu can go national with the pickled and flavored mushrooms. Mainland Express now makes 3 types of tofu (soft, firm, and extra firm), plus Tofulicious. Even in Minnesota, a dairy state, there is a lot of interest in tofu. Bob has no idea where Mr. Lee is. A lot of investors are looking for him. Some people say he took off with some of the money. Eastern Foods had a poor accounting system and poor cost control. Address: P.O. Box 405, Spring Park, Minnesota 55384. Phone: 612-471-8034.

1297. Johnson, Dale W. 1989. General uses of whole soybeans. In: E.W. Lusas, D.R. Erickson, and Wai-Kit Nip, eds. 1989. Food Uses of Whole Oil and Protein Seeds. Champaign-Urbana, IL: American Oil Chemists' Society. vii + 401 p. See p. 12-29. Chap. 2. Proceedings of the Short Course on Food Uses of Whole Oil and Protein Seeds held at Makaha, Hawaii, May 11-14, 1986. [35 ref]
• ***Summary:*** Contents: Introduction: Introduction. Oriental nonfermented products: Yuba, kinako Thai desserts (tofu guan, med khanoon), Thai foods (protein crisp, cooked baby food, canned evaporated soybean milk, taow-huey, kanom ping kaset). Fermented foods: Natto, hama-natto, tao tjo (a miso-type product made in Indonesia and Thailand), ontjom (made from peanuts, coconut press cake, or okara), kochu chang, ketjap, sufu, yogurt-type products, tauco, soy sauce, miso, tempeh. Western world type products. Full fat soy flour (enzyme active, heat treated). Soybean hulls. Whole soybeans in animal feed. Chapatty [chapati]. Full fat

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soy grits. Heat treatment of soybeans. Heat treatment and texturizing. Low-fat products. Snacks (soynuts–dry roasted or oil roasted, plain or seasoned). Soybean sprouts. Soy butter [soynut butter]. Combinations of soybeans and cereals. Soybeans as vegetables (mao-tou, edamame, or fresh green soybean). Defatted products. Nutrition. Soybean handling and equipment considerations. Solvent plant considerations. Address: Food Ingredients (Minnesota) Inc., 2121 Toledo Ave. North, Golden Valley, Minnesota 55422.

1298. *SoyaScan Notes.* 1989. Influence of Japanese and Japan on soyfoods in America (Overview). Dec. 7. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** The Soyfoods Center's SoyaScan database presently contains 30,790 publications and commercial products related to soya. Of these, 876 (2.9%) concern the influence of Asian-Americans (Japanese, Chinese, Koreans, or Indonesians) or their home countries on soyfoods. Of these 876 records, 638 (73%) concern Japanese influence, compared with 178 (20%) that concern Chinese influence–including Chinese from Taiwan, Hong Kong, Singapore, etc. Thus Japanese influence on soyfoods in America is much greater than that of any other Asian cultural group. We can identify at least seven major areas of influence:

1. Soyfoods Terminology. It is interesting to note that many of the most popular soyfoods in America are most widely known by their Japanese names. We say tofu (not doufu or bean curd), miso (not jiang or soybean paste), natto, okara (not soy pulp), yuba (not doufu-p'i or soybean skin). Even "soy" (as in soy sauce) is derived from the Japanese word "shoyu." Increasingly Americans interested in natural foods also use the terms shoyu and tamari to distinguish them from HVP soy sauce.

2. Kikkoman. By far the most influential Japanese soyfoods company in America today is Kikkoman, just as soy sauce is by far the most important soyfood product. Kikkoman was also the first Japanese company to introduce soyfoods to America. In 1868 the first Japanese immigrants to Hawaii took kegs of Kikkoman brand shoyu with them. In 1879 Kikkoman brand shoyu was registered in California, where it was exported to Japanese immigrants. Exports rose steadily, until between 1949 and 1954 exports of Kikkoman shoyu to the U.S. ranged from 213,000 to 305,000 gallons a year. Kikkoman's first real attempt to reach any foreign market dates from 1956 when, during the U.S. presidential elections, Kikkoman ran television ads to promote its product to mainstream American audiences as a seasoning for meat, fish, and poultry. In 1957 Kikkoman International Inc., a new sales company was established in San Francisco. Sales skyrocketed. In 1973 Kikkoman opened a huge modern shoyu plant at Walworth, Wisconsin. In 1976 Kikkoman passed La Choy to become America's best-selling soy sauce.

3. Introducing Soyfoods to Hawaii. The first Japanese who arrived in Hawaii in 1868 brought shoyu and miso with them. The earliest known soyfoods company there was a shoyu brewery started in 1891 in Honolulu by Jihachi Shimada. This was also the earliest known soyfoods company started by a Japanese anywhere in the Western world. Hawaii became part of the USA in 1898 by annexation. Hawaii and California were the first two areas in the U.S. where soyfoods became widely available. During the 20th century, Japanese started roughly 183 companies in Hawaii making shoyu, miso, and tofu–far more than Chinese (6) or Koreans (2). They developed innovative new products–such as sweet Hawaiian-style shoyu and miso. These products profoundly influenced the food life of Hawaii.

4. Soyfood Manufacturers in the USA. The earliest known soyfoods manufacturer in the Continental USA was a company (the name is unknown) run by the wife of Chieko Hirata that started making tofu in Sacramento in about 1895. The second earliest was Yamamori Jozo-sho, which started making shoyu in San Jose, California, in 1897. Many of the earliest soyfoods companies in America were run by Japanese Americans. By 1942 at least 158 soyfoods manufacturing companies had been started in America by Asian Americans; of these, 143 (91%) were run by Japanese Americans. When *The Book of Tofu* was published in 1975, it listed 55 tofu companies in America, all run by Asian-Americans; 39 were Japanese- and 16 were Chinese-run. Today America's two largest tofu companies are both run by Japanese Americans: Azumaya Co. in San Francisco, and House Foods & Yamauchi Inc. in Los Angeles. Hawaii's three largest tofu companies are also run by Japanese Americans: Aloha Tofu Co., Kanai Tofu Factory, and Hawaii Tofu. Morinaga Nutritional Foods in Los Angeles and Kikkoman Foods in San Francisco both import large amounts of aseptically packaged long-life silken tofu from Japan.

Another major manufacturer is San-Jirushi Corp. of Kuwana, Mie-ken. In the late 1970s San Jirushi started exporting tamari and soybean miso to America. They set up an office in the early 1980s and began to promote their product as "real" tamari to industrial food processors and the natural foods market. In Sept. 1987 the company opened a state-of-the art tamari plant in Richmond, Virginia, with a capacity of 1 million gallons a year. The company now has 75% of the industrial soy sauce market in America.

In Oct. 1986 a major new joint stock company named American Soy Products began producing Edensoy soymilk in Clinton, Michigan. It was a joint venture between Eden Foods and 4 Japanese companies: Marusan Ai, Kawatetsu Shoji, Muso Shokuhin, and Seikensha. Edensoy has since become America's best-selling soymilk. Prior to 1986 much of the soymilk sold in America was made in Japan.

Finally, three of America's 4 largest miso manufacturers are run by Japanese-Americans. The largest is Miyako Oriental Foods in Los Angeles. The other two are located in

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Hawaii.

5. Soyfoods Imports from Japan. The first importers of shoyu and miso were Japanese distributors such as Japan Foods Corp., Mutual Trading Co. and Nishimoto. But starting in 1962 American macrobiotic and natural foods companies started to import large amounts of shoyu and miso. Pioneers were Chico-San, Erewhon, Eden Foods, Westbrae, Edward & Sons, Tree of Life, and Great Eastern Sun. U.S. imports of soy sauce from Japan jumped from 1.7 million lb (174,400 gallons, worth $317,000) in 1949, to 18.6 million lb (1,897,000 gallons, worth $3,116,000) in 1972, an 11-fold increase in quantity during only 23 years.

6. Teachers and Information. Many Americans first learned about soyfoods from Japanese teachers, especially macrobiotic teachers, such as George and Lima Ohsawa, Michio and Aveline Kushi, Herman and Cornellia Aihara, and Noboru Muramoto. All have written many influential books and lectured and taught extensively since the 1960s. In addition, many young Americans learned how to *make* soyfoods from these macrobiotic teachers. Moreover, Japan is Asia's best source of information about soyfoods. For example, the Soyfoods Center's SoyaScan database contains 5,095 publications and products about soya and Japan, compared with 1,867 on soya and China or Taiwan.

7. Tofu Equipment Manufacturers. Hundreds of tofu companies have started in America since the mid-1970s. The majority of these are run by Caucasian Americans and most use specialized tofu equipment made in Japan by Takai Tofu & Soymilk Equipment Co., or by Sato Shoji.

1299. **Product Name:** Tofu.
**Manufacturer's Name:** Han Yang Oriental Food Manufacturing.
**Manufacturer's Address:** 3819 94th St., S.W., Tacoma, WA 98499. Phone: 206-588-7303.
**Date of Introduction:** 1989.
**New Product–Documentation:** Talk with Ed Elkin. 1991. Feb. 8. About 12-15 months ago Boo Han changed hands; it is now named Hang Yang, owned by Mr. Choy, a Korean-American, who does not speak English–although his brother does. Hang Yang is very aggressive and doing well; he just upgraded to a new tofu system. The company is at the same location it was when he purchased it from Boo Han. He makes tofu, rice cakes, and kimchi. In Feb. 1991, the phone directory has a listing for Han Yang Oriental Food Manufacturing, 3819 94th St. S.W., Tacoma, Washington 98499. Phone: 206-588-7303.

Form filled out and faxed by John Choi, owner. 1998. July. Han Yang Oriental Food Mfg., 3819 94th St. S.W., Tacoma, WA 98499. Phone: 253-588-7303. Company began making and selling tofu on 1 March 1989.

1300. Kim, K.J.; Kim, K.H.; Chung, W.K.; Jeong, S.K.; Kang, K.H. 1989. Studies on quantity and quality of seed protein in food crops. *Research Report RDA.* 32:133-47. *

1301. Park, Kun-Young; Lee, E.S. 1989. [Effect of ammonia and pH on the degradation of aflatoxin B1 during the storage of Korean soy sauce (kanjang)]. *J. of the Korean Society of Food Science and Nutrition* 18(1):115-122. [17 ref. Kor; eng]
• ***Summary:*** "The mechanisms of aflatoxin B1 (AFB1) degradation by ammonia and alkaline pH during the storage of Korean soy sauces were studied. In the 0.05%, 0.1% and 0.5% of ammonia solutions, almost all of AFB1 (96-100%) was degraded after 2 to 24 hrs of incubation at 30ºC. Increased levels of ammonia in both home made soy sauce (HMSS) and commercial soy sauce (CSS) caused slow increases in pH, The pH change was higher in CSS than in HMSS." Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan, Korea.

1302. Sahm Yook Korean Foods. 1989. [Sahm Yook Soymilk Products (Leaflet)]. Chunwon-gun, Choongchungnam-do, South Korea. 1 p. One sided. 19 x 25 cm. Color photo. [Kor]
• ***Summary:*** A photo on the front shows 5 packages of soymilk and a glass of soymilk surrounded by fresh green vegetables and mikan oranges. The back shows a young lady with a Western-style hairdo holding a Tetra-Brik carton of Sahm Yook Soy Milk. The three foil pouches are displayed nearby. Ways of using the product are described with cartoons below. Other photos show two cans of gluten products, Vegeburger, and Vegemeat. Address: 320 Panjeong-ri, Jiksan-myun, Chunwon-gun, Choongchungnam-do 333-810, South Korea.

1303. **Product Name:** [Nulife / Nülife Malted Soybean Drink].
**Manufacturer's Address:** Korea.
**Date of Introduction:** 1989?
**Ingredients:** Incl. malt.
**Wt/Vol., Packaging, Price:** 250 ml.
**New Product–Documentation:** Photocopy of Label sent by Anders Lindner. 1989. Illustration on the front panel shows a house with two trees to its left.

1304. Howard, Clare. 1990. Soybean growers target tofu: Farmers see market sprouting for soy-based foods. *Journal Star* (*Peoria, Illinois*). Jan. 2. [1 ref]
• ***Summary:*** The article opens with a photo of the produce manager at a supermarket in East Peoria, Illinois, holding up 2 packs of Mori-Nu Tofu. "Soybeans could achieve a $1 billion niche in the food industry by the mid-1990s, and Illinois farmers stand to make additional inroads in the Asian tofu market." Jim Shearl, manager of the Illinois Crop Improvement Assoc., worked with a team of agricultural researchers at the Univ. of Illinois to develop "Illinois Tofu No. 1," a new soybean variety with all the characteristics ideal for making tofu. These soybeans, which should earn

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a premium of $0.10 or more per bushel, must be stored and shipped separate from other soybeans. Neither Argentina nor Brazil nor other U.S. states have developed such a bean. Lowell Hill, agricultural economist at the Univ. of Illinois, noted "This is a significant steppingstone. Traditionally farmers produce and then find a market. We've turned that around and determined what the market wants and then set out to produce a soybean to meet that need." Hill said the Koreans import about 300,000 tons of soybeans for tofu manufacturing, representing a $61.7 million market.

1305. Soejono, Irlan; Kagatsume, Masaru. 1990. Shifts and development in trade of various food crops in East Asia, 1960-1984. *CGPRT Working Paper* No. 5. xviii + 168 p. Feb. 28 cm.

• ***Summary:*** For each country discussed, this book gives information on: Production and supply of coarse grains, pulses, and root and tuber crops. Consumption and demand. Trade and trade elasticities. Forecast and policy implications: Prediction on import demand, indication of policy implications.

The countries are: Japan (p. 1-28). People's Republic of China (p. 29-42). Republic of Korea (p. 43-62). Taiwan (p. 63-79). The Territory of Hong Kong (p. 81-92). Appendixes (p. 95-165). References (p. 167-68).

Summary: As people in the East Asia subregion become more affluent and westernized, they consume less food grains directly and more livestock products.

Japan: Japanese rice production peaked in 1963 at 13.42 million tons, but surpluses have continued to grow. The government has tried various schemes to induce farmers to switch from rice other crops, including soybeans. Graphs show: (I-6, p. 6) "Soybean production, area and yield, 1960-1984." Soybean production in Japan dropped from 418,000 tonnes in 1960 to 100,000 tonnes in 1976. Because of the Rice Farming Diversification Policy, soybean production since 1976 has increased, rising to 238,000 tonnes in 1984. The graph also shows harvested area and yield during this period.

(I-13a+b, p. 13, 14) "Total demand for soybeans its components [in Japan], 1960-1984." The total demand has increased steadily from 1.517 million tonnes in 1960 to 4.814 million tonnes in 1984. About 80% of this demand (3.952 million tonnes in 1984) was for soybeans to be processed. About 90% of these (3.765 million tons in 1984) were crushed into oil and meal. Small and relatively static amounts were processed to make miso (182,000 tonnes) and soy sauce (5,000 tonnes) in 1984.

(I-21a, p. 21) "Volume of soybean (grain) imports, import values and import prices, 1960-1984.

(I-21b, p. 22) "Volume of soybean oil imports, import value and import prices, 1960-1984.

(I-22, p. 22) "Volume of soybean cake imports, import values and import prices, 1960-1984.

Table I-2 "Projected import quantities (1,000 tons) of selected CGPRT crops in Japan, 1984-1999.

For the People's Republic of China, Fig. II-6 (p. 33) shows soybean production, area and yield, 1974-1984.

For Korea, Fig. III-5 (p. 47) shows soybean production, area and yield, 1960-1984.

For Taiwan, Fig. IV-5 (p. 67) shows soybean production, area and yield, 1971-1984.

For the Territory of Hong Kong, Fig. V-5(a) (p. 87) the volume of soybean grain imports, import values and import prices, 1960-1984.

The various appendices (p. 95+) give the data lists for each country used in creating the previous graphs. Address: 1. Senior Agricultural Economist, CGPRT Centre, Jl. Merdeka 145, Bogor 16111, Indonesia; 2. National Research Inst. of Agricultural Economics and the Ministry of Agriculture, Forestry and Fisheries of Japan.

1306. Fehlberg, Eric C. 1990. Recent Seventh-day Adventist work with soymilk (Interview). *SoyaScan Notes.* March 7. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** So Good soymilk from Australia has had remarkable success since it was launched in April 1987. Sanitarium Health Food Co. was the first to make soymilk in Australia. It caught on rapidly, and soon prompted 4-5 competing brands to be launched, but none of them have sales nearly as large as So Good. The main problem has been the company's inability to produce enough to keep up with demand. It was launched in about April 1987. In Oct. 1989 they sold 1,738 long tons (2,240 lb/ton, thus 3,893,120 lb). The equipment used to produce the soymilk is Adventist technology, not that purchased from Alfa-Laval, STS, etc. although in the last 6 months Sanitarium Foods purchased a pilot plant from Alfa-Laval which they plan to use in their laboratory. Originally So Good was packed under contract by a nearby dairy company in Combibloc cartons. After a year or so they purchased their own Combibloc packaging machine. Australia started to make soymilk after DE-VAU-GE in West Germany. The latter is very happy with their STS system, and Fehlberg is now seriously considering ordering one or two more turnkey soymilk plants for other countries in the near future. Sanitarium Foods has a very strong research lab.

The Seventh-day Adventist food company in South Korea, Sahm Yook Foods, now makes a Tetra Pak soymilk. The company was established in 1978, but did not begin food production until Sept. 1981. It began to make Sahm Yook Soy Milk in May 1985. Only a plain soymilk is produced–no flavors. After launching soymilk, the company began to grow dramatically, as that product grew. Last year they built a very large, now soymilk plant (based on Adventist technology) and they are now about the 2nd or 3rd largest soymilk maker in Korea. Address: Director, International Health Food Assoc., Seventh-day Adventist General Conference, 12501

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Old Columbia Pike, Silver Spring, Maryland 20904. Phone: 301-680-6674.

1307. Shimizu, Teruo. 1990. Recent developments at Miyako Oriental Foods (Interview). *SoyaScan Notes.* April 17. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Miyako is presently making about 900 metric tons/year of miso, making them the largest miso manufacturer in America. This is up 30% compared with three years ago (when the dollar/yen exchange rate changed dramatically), but there has not been much increase during the past 2 years. About 80% of sales are to the Asian-American market (including small exports to Japanese in Mexico), and 20% to the natural foods market. Westbrae, a former customer, is now buying their miso from Canada. They are now trying to increase their sales to the Korean-American market. The younger generation of Korean-Americans finds the flavor of Korean miso to be too strong. They (and some Korean restaurants) like to mix equal parts of Miyako rice miso with Korean miso. Some Korean restaurants have switched to using only Japanese miso. One reason is that the quality of Korean miso is inconsistent.

They are selling quite a bit of dry koji to Grainaissance and to Cedarlane, both of whom use it to make amazake. Two years ago Miyako purchased an expensive, automatic, computer-controlled rotary koji fermenter from Nagata Brewery Machinery Co. (the biggest company; they also sold such a machine to Takara USA, the sake maker). It is working very well for them. The only other manufacturer of such fermenters is Fujiwara in Okayama. Address: Vice President, Miyako Oriental Foods Inc., 4287 Puente Ave., Baldwin Park, California 91706. Phone: 818-962-9633.

1308. Bates, Jonathan. 1990. West Coast tofu industry: Soybean market outlook for Malheur County, Oregon. Oregon State University, Corvallis, Oregon. 33 p. [12 ref]
• ***Summary:*** Contents: Introduction. Soybean market: World and domestic. The low technology soyfoods industry. Processor requirements. Assessment of producing soybeans in Malheur County. Conclusion. West Coast tofu and soyfood processors: California, Oregon, Washington. Bean warehouses and cleaners. Selected soybean brokerages and growers. Other information. Literature.

"There is interest in Malheur County, Oregon in introducing soybeans as an alternative rotation crop in place of wheat." Research is being done at the Malheur Experiment Station. These would be food grade soybeans destined for the West Coast soyfood processing industry. "The purpose of this report is to investigate the west coast food grade soybean market. Particular emphasis is placed on the tofu market in Portland and western Oregon, Seattle (Washington), and San Francisco (California). The main objectives of the study are: 1. To determine the requirements and/or preferences of soyfoods processors in regards to soybean quality, bean variety, growing regimes (organic or regular), packaging and delivery, and method of purchase. 2. To determine the economic feasibility of using soybeans as a rotational crop in the county in place of wheat. 3. To consider the competitive advantages, if any, of growing soybeans in Malheur county as opposed to the more traditional growing areas of the Midwestern and Southeastern United States.

Information on soybean consumption is given for the following tofu and soyfoods manufacturers, ranked here in descending order of soybean usage. All produce tofu and/or soymilk unless otherwise noted.:

Pacific Foods Inc., Tualatin, Oregon (57,700–77,000 lb/week [expressed as 3-4 million lb/year] of nonorganic and organic soybeans from midwest brokers, bulk and bagged, for soymilk. "Growth is expected to slow unless soymilk can be marketed to the general public").

Azumaya Inc., San Francisco, CA (48,000–60,000 lb/week of Vinton and Corsoy purchased from broker. Market growing at 3-4% annually).

House Foods & Yamauchi, Los Angeles, CA (54,000 lb/week of nonorganic Corsoy and Vinton purchased from broker-grower association. Steady growth. Expanded capacity in 1987).

Mighty Soy, Los Angeles, CA (11,000–12,400 lb/week of mainly Corsoy and Vinton, half organic and half not, purchased from brokers or growers associations).

Wy Ky, Los Angeles, CA (7,800–9,000 lb/week of nonorganic Corsoy, purchased from growers. 5% annual growth).

Island Spring and Soy Resources Inc., Vashon, WA (5,400–6,000 lb/week of organic Corsoy, purchased broker. 3-5% annual growth).

Surata Soyfoods, Eugene, Oregon (3,000–4,200 lb/week of organic Vinton and Corsoy purchased from broker-grower).

Silver Sprout, San Francisco, CA (3,000–3,600 lb/week of nonorganic Corsoy and Vinton purchased from broker, bagged or bulk).

Dae Han & Co., Portland, Oregon (2,400–3,000 lb/week of organic Vinton purchased from Midwest grower association. Steady growth).

Turtle Island Soy Dairy, Husum, WA (2,100–2,400 lb/week of organic Corsoy and Vinton purchased from Iowa broker for tempeh. 5% annual growth).

Arcata Soyfoods, Arcata, CA (1,200 lb/week of organic Corsoy purchased from grower).

Fuji Tofu Co., San Jose, CA (1,200 lb/week of organic varieties purchased from broker).

Ashland Soy Works, Ashland, Oregon (1,800 lb/week of organic Vinton and Corsoy, purchased from growers. Steady growth).

Hoven Foods Co., Seattle, WA (1,655 lb/week of Lee 74 purchased from Jacob Hartz Seed Co. 5% annual growth).

Tacoma Soyfoods, Tacoma, WA (1,200 lb/week of

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Vinton, Corsoy, Davis, Lee, and Holland, organic and inorganic, purchased from Midwest Soy International [grower assoc.]. 5% growth last year).

Kobayashi's Soybean Products, Ontario, Oregon (420–540 lb/week of Corsoy purchased from Midwest growers). Address: Graduate research asst., Oregon State Univ., Corvallis, Oregon.

1309. Cheigh, Hong-Sik; Park, K.S.; Moon, G.S.; Park, K.Y. 1990. [Antioxidative characteristics of fermented soybean paste and its extracts on the lipid oxidation]. *J. of the Korean Society of Food and Nutrition* 19(2):163-67. April. [16 ref. Kor; eng]

• ***Summary:*** "Antioxidative effects of soybean paste (SP) on the lipid oxidation were studied with the model systems of ground cooked meat (GCM)-SP or ground cooked fish (GCF)-SP and model systems of linoleic acid mixture (LA)-SP powder (SPP) or LA-SP extract fractions during oxidation reaction. SP played a role as an antioxidative substance in the system employed, especially in GCM-SP and the antioxidative activity was increased with the increase of SP addition in the system of GCF-SP during storage at 6ºC, SPP also exhibited some antioxidative activity during the oxidation reaction of LA. The activity was increased as the concentrations of SPP increased in the range from 0.1% to 0.5%. Considerable antioxidative activities have been observed in both water soluble and lipid soluble fractions from SP on LA reaction system." Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan 609-735, Korea.

1310. Fehlberg, Eric C. 1990. Re: List and activities of Seventh-day Adventist health food companies worldwide. Letter to William Shurtleff at Soyfoods Center, May 24. 6 p. Typed, with signature on letterhead.

• ***Summary:*** For each for the following companies is given the date of founding, date manufacturing started, and the soy products presently manufactured: Granovita, Spain (1985). Nutana, Holland (1986). Nutana, Norway (marketing agency for Nutana, Denmark). Nutana name changes. Austrian Food Company (a restaurant, 1976). DE-VAU-GE, West Germany. Sahm Yook Foods, Korea (1978->1981). Sanitarium Health Food Company, Australia (3 pages).

Lists (with addresses) the following companies: Sanitarium Health Food Company in Wahroonga, NSW, Australia; DE-VAU-GE Gesundkostwerk GmbH in Lueneburg, West Germany; San-iku Foods in Sodegaura-machi, Kimitsu-gun, Chiba-ken, Japan; Korean Food Factory (Sahm Yook Foods) in Choongchungnam-do, South Korea; Alimentos Integronaturales y Panificadora la Carlota in Montemorelos, N.L., Mexico; Produtos Alimenticios Superbom Industria e Comercio Ltda. in Sao Paulo, Brazil; Alimentos Granix in Florida, Buenos Aires, Argentina; Nutana Health Food Company in Bjaeverskov, Denmark; AB Svenska Nutana in Rimbo, Sweden; Granose Foods Ltd. in Newport Pagnell, Bucks, England; Pur-Aliment Food Factory in Clichy–Cedex, France; PHAG Food Factory in Gland, Switzerland (Note: PHAG is an acronym for Produits Hygièniques Alimentaires Gland); Egypt Food Factory in Heliopolis, Cairo, Egypt; Glaxo India Limited in Bombay, India; Westico Foods Ltd. in Mandeville, Jamaica; Industrias Covac S.A. in Alajuela, Costa Rica; South China Island Union Mission in Hong Kong (3 pages). Address: Director, International Health Food Assoc., Seventh-day Adventist General Conference, 12501 Old Columbia Pike, Silver Spring, Maryland 20904. Phone: 301-680-6674.

1311. Loh, Michael. 1990. An overview of export opportunities in the new markets. In: Ontario Ministry of Agriculture and Food, ed. 1990. Soybean Buyers Mission from New Markets, July 1-7, 1990. Tokyo, Japan: Ontario Ministry of Agriculture and Food. 61 p. July. See p. 10-12. [Eng]

• ***Summary:*** It has been almost 20 years since the first container load of soybeans grown in Ontario was shipped to Japan. By the end of 1989, Ontario was exporting more than $25 million worth of soybeans to Japan, Hong Kong, Malaysia, and Singapore. Now the new markets for Ontario soybeans are Korea, Taiwan, the Philippines, and Indonesia.

In Korea, trade restrictions have eased on soybeans and other agricultural products. With hefty trade surpluses, Korea is under pressure to balance trade. Korea soybean imports jumped from only 428,000 tons in 1979 to 1,100,000 tons in 1989. About 120,000 tons of the imported soybeans are for food use, as follows: Tofu 100,000 tons (83% of the total), soymilk 17,000 tons, and soy sprouts 2,000 tons. Nearly all of Korea's soybean imports come from the USA.

Taiwan ranks second, after Japan, in terms of best prospects for agricultural exports. The strong Taiwanese currency has made exports less expensive. Burgeoning trade surpluses have led to increasing pressures from trading partners, like the USA, to balance trade. So Taiwan has liberalized imports by lowering tariffs and eliminating non-tariff barriers. "U.S. soybean exporters took advantage of their dominant market position in Taiwan to expand sales. Backed by aggressive trade negotiators, the American soybean industry has enhanced its competitive position by securing a 5-year supply agreement contract with the Government of Taiwan. The agreement calls for the purchase of 5.7 million tons of U.S. soybeans over a five-year period from July 1, 1986 to June 30, 1991. As a result the United States has over 75% of the market share. Taiwan's annual requirements of food soybeans are estimated at 250,000–300,000 tons. With recent market opening measures announced by the Taiwanese government, direct sales of food soybeans to end-users are now permitted."

Philippines: In Feb. 1987 Michael led a mission to the Philippines, and contacted a buyer. Ontario soybeans were

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first shipped to that country later in 1987. The Philippines import about 10,000 to 15,000 tons/year of soybeans for food use, and this is expected to increase in the near future. Filipro, Inc., which is the Philippines' licensee for Nestle S.A., reported increasing market acceptance of its re-launched powdered soya milk product Vita (chocolate flavor), and a soy-based baby cereal named Ceresoy.

Indonesia: Ontario soybeans (worth $4.2 million) were first sold to Indonesia in 1980 after Canada's first mission there that year. 90% of the 1.7 to 2.0 million tons of soybeans required by Indonesia are used for food. Tempeh is a delicious Indonesian food and Indonesia requires over 750,000 tons/year of soybeans to make tempeh. Address: Senior Representative, Asia/Pacific Region, Ontario Ministry of Agriculture and Food (OMAF), Tokyo, Japan.

1312. Ontario Ministry of Agriculture and Food. 1990. Soybean buyers mission from new markets, July 1-7, 1990. Tokyo, Japan: Ontario Ministry of Agriculture and Food. 61 p. 30 cm. Saddle stitched. [Eng]

• ***Summary:*** This conference took place in Ontario, Canada. On the mission were two buyers each from Indonesia (P.T. Indofood Interna Corp., BULOG), Philippines (Universal Robina Corp., Paritas Trading Corp.), and Taiwan (Sun Ford Mfg. Corp, Great Wall Enterprise Co.). Michael Loh of OMAF/Tokyo was the mission leader. Contents: Background and purpose. Mission members. Itinerary. Seminar agenda. Canada's soybean industry, by Fred Brandenburg of OSGMB. An overview of export opportunities in the new markets (Korea, Taiwan, Philippines, Indonesia), by Michael Loh of OMAF, Tokyo. Role of Taiwan Soybean Importers, by Laurence Hsiao of Sun Ford Conglomerate Corp. Soybean market in Indonesia, by A. Saifullah of BULOG, Indonesia. The market prospective for tempeh in the year 2000, by Ms. Susani K. Karta, manager, P.T. Indofood Interna Corp. (Indonesia). Appendix: 1. Ontario soybean suppliers (directory of 15 exporters). 2. Useful contacts. 3. Ontario soybean oil crushers (ADM, Victory Soya Mills, Central Soya of Canada). 4. Role of the Ontario Soybean Growers' Marketing Board. 5. Development of soybean varieties (incl. Harovinton for tofu; Canatto, Nattawa, and Nattosan for natto). 6. Market trends in the development of traditional soyfood, by Susani K. Karta (ASA, Singapore; Originally presented at the ASEAN Food Conference, Oct. 1988, Bangkok, Thailand). 7. Reference materials for doing business in Asia/Pacific.

"Natto soybean variety development at Agriculture Canada in Ottawa has also received considerable support from the OSGMB. Ottawa's Dr. Harvey Voldeng has been extremely successful at breeding Canada's top natto varieties (Canatto, Nattawa, and Nattosan) as well as incorporating higher protein levels into other early maturing varieties."

"Soybean breeders are selecting for high protein and white hilum whenever possible" (p. 40). Address: Tokyo, Japan.

1313. Fehlberg, Eric C. 1990. Re: Seventh-day Adventist health food companies worldwide. Letter to William Shurtleff at Soyfoods Center, Aug. 17. 4 p. Typed, with signature on letterhead.

• ***Summary:*** "Nutana of Holland do not manufacture the five products that are listed in my letter of May 24. Each of the products does contain soya as an ingredient, and it is my understanding that they are manufactured by Nutana of Denmark.

"Nutana of Norway, established in 1970, and you are right, it was formerly known Dagens Kost, but was renamed Nutana Norge, in 1982. In Norway they are strictly a marketing branch and do not manufacture any foods at all."

Sahm Yook Foods is the official name of the Korean Food Factory.

Alimentos Colpac is the official name of the food factory in Navojoa, Sonora, Mexico; it was established in 1969. The Montemorelos Branch is known as Alimentos Integronaturales y Panificadora la Carlota; it was established in 1981.

Granose Foods Ltd. of England moved from Stanborough Park, Watford, Herts, to Howard Way, Newport Pagnell, Bucks., in Jan. 1989. The official opening date was 9 July 1989.

PHAG (of Switzerland) is written in all upper-case letters; it is not an abbreviation of anything.

Glaxo Ltd. India has nothing to do with the Seventh-day Adventist church.

DE-VAU-GE was primarily responsible for setting up the Adventist food industry in Spain and the Kolett's brand is packed specifically for the Spanish market. DVG has two brand names which are manufactured for the reform or natural foods market in Europe: Granovita and Bosen. The products under the Bosen label were originally made in their bakery.

Pan American Health Service in Honduras still produces soymilk. Mountain View College in the Philippines is still making meat analogues and perhaps soya milk–but only for their own use. Bandung College (now called Bandung Academy) in Indonesia is still in operation and they may be making soya products. Two years ago they wanted very much to start a food factory, but it did not happen. The Hong Kong Hospital is still operating and they still manufacture small amounts of food, basically for their own use. South China College has a long history. It was established in 1903 as Bethel Girls' School, but underwent several name changes and changes of location due to political turmoil and the Sino-Japanese war of 1937, followed by the violence of the Second World War.

"Eventually it was re-established at Clear Water Bay in Kowloon, in 1958 and a college curriculum introduced in 1962. Its name was changed to South China Union College

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in 1964. In 1981 they officially adopted its name and has been called Hong Kong Adventist College since then. It still operates today, and possibly manufactures small quantities of food, basically for their own use." Address: Director, International Health Food Assoc., Seventh-day Adventist General Conference, 12501 Old Columbia Pike, Silver Spring, Maryland 20904.

1314. Business Trend Analysts, Inc. 1990. The market for salad dressings, sauces and condiments. 2171 Jericho Turnpike, Commack, NY 11725. 275 p. Price: $895.
• ***Summary:*** This is an update of the 1988 edition. Sauces include the following table sauces: Ketchup, meat (incl. steak, worcestershire, vegetable, and seafood sauces), barbecue, Mexican (incl. chili, taco, enchilada, etc.), prepared mustard, and soy and teriyaki. Gravies, dips, and dry sauce mixes are not included. Ketchup is the largest segment. Address: Commack, New York.

1315. Takai Seisaku-sho. 1990. Modern soymilk plant: Makes delicious dairylike soymilk with no beany flavor. 1-1 Inari, Nonoichi-machi, Ishikawa-ken 921, Japan. 4 pages. Nov. Catalog. With 1-page color insert. 30 cm. [Eng]
• ***Summary:*** Page 2 is a flow chart of the modern soymilk production process. Page 3 shows modern soymilk plant layouts, floor plans, and specifications. The color insert, which is titled "Modern soymilk plant: Makes delicious dairylike soymilk with off-beany flavor," is printed on both sides. The front shows 3 packaged soymilk products: Ah Soy, Hai-Meeru Soyalac (Made by San-iku Foods in Japan), and Soya Bean Milk (made by Guilin Sweets and Food Factory, Guangxi, China). Companies that make soymilk using Takai equipment include: Chung's Foods and Nam Yang Industries in Korea. Jinan Huifeng Bean Milk Product Factory in China. "One of our plants makes 1,000 liters of 5,000 x 200 ml packs of soymilk; another makes 10,000 or 20,000 packs of soymilk per hour. EMUL is a healthy soy-based frozen dessert. Contact Takai for an EMUL production plant." On the back is a plant layout. Address: Kanazawa, Ishikawa-ken, Japan. Phone: 0762-48-1355.

1316. Bureau of the Census, U.S. Department of Commerce. 1990. The Asian population of the United States in 1990 (Overview). *SoyaScan Notes*. Compiled by William Shurtleff of Soyfoods Center. [1 ref]
• ***Summary:*** According to the 1990 census, the population of the United States was 248.7 million, up 9.8% from 1980. The Asian population is as follows: Total Asian and Pacific Islander 7.273 million (2.9% of the total, up 107.8% from 1980). Total Asian from traditional soy-consuming nations 5.524 million (2.2% of total, up about 100% from 1980!). Chinese 1.645 million (0.7%, up 104.1%). Filipino 1.407 million (0.6%, up 81.6%). Japanese 847,562 (0.3%, up 20.9%). Korean 798,849 (0.3%, up 125.3%). Vietnamese 614,547 (0.2%, up 134.8%). Hawaiian 211,014 (0.1%, up 26.5%).

1317. USDA Foreign Agricultural Service, Information Systems Management Div., Database Administration Branch. 1990. The world's leading soybean crushing countries: Statistics by country, 1964-1990. FAS USDA Oilseeds/ Products, Room 5638 South, 14th and Independence Ave. S.W., Washington, DC 20250-1000. 9 p. 28 x 38 cm computer printout.
• ***Summary:*** A search by Debby Pumphrey of the FACTS (Foreign Agricultural Commodity and Trade Statistics) database, for the amount of soybeans [commodity code: 2222000] crushed for domestic consumption by various countries worldwide, gives the following results, with all countries that crushed more than 500,000 tonnes ranked in descending order of amount of soybeans crushed. All figures are in metric tons (tonnes):

For the year 1990: USA 32,523,000, Brazil 13,700,000, Argentina 7,250,000, China 4,400,000, Japan 3,550,000, Netherlands 2,760,000, Germany, 2,550,000, Spain 2,300,000, Italy 2,025,000, India 1,785,000, Mexico 1,670,000, Taiwan 1,650,000, USSR 1,445,000, Belgium-Luxembourg 1,180,000, Canada 1,100,000, South Korea 840,000, Romania 789,000, Portugal 610,000, and United Kingdom 605,000.

In 1990 a total of 88,515,000 tonnes of soybeans were crushed worldwide. Of this total, the USA crushed 36.7%, Brazil crushed 15.5%, and Argentina crushed 8.2%.

For the year 1964/65: USA 13,036,000, Japan 1,460,000, China 1,304,000, West Germany 1,290,000, Canada 528,000. In 1964/65 a total of 21,357,000 tonnes of soybeans were crushed worldwide. Of this total, the USA crushed 61.0%, Japan crushed 6.8%, China crushed 6.1%, Brazil crushed 1.3%, and Argentina crushed 0.02%.

Note: At the top of the computer report is printed: Global Economic Data Exchange System [GEDES]. CP [Commodity Program] Subsystem–Commodity/Attribute Model. Crushing statistics are given for 175 countries from 1964/65 to 1990. Address: Washington, DC. Phone: 202-382-8232 or 202-447-4989.

1318. Chang, K.Y. 1990. [Old references related to agriculture in Korea. 10. Early references recording crops and varieties, and their places of preservation]. *Korean J. of Breeding* 22(3):280-85. [Kor; eng]*
Address: Gyeongsang National Univ., Chinju Coll. of Agriculture, South Korea.

1319. Cheigh, Hong-Sik; Lee, J.S.; Moon, G.S.; Park, K.Y. 1990. [Antioxidative characteristics of fermented soybean sauce on the oxidation of fatty acid mixture]. *Korean J. of Food Science and Technology* 22(3):332-36. [14 ref. Kor; eng]

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• ***Summary:*** Korean soy sauce, Ganjang, is a salty liquid.

"Antioxidative characteristics of freeze dried soybean sauce powder (SSP) on the oxidation reaction of linoleic acid mixture (LA) were evaluated by the determinations of peroxide formation, synergistic property, hydrogen donation and lipoxygenase activity. SSP was found to possess a considerable potentiality of antioxidant activity on the formation of hydroperoxides in the LA oxidation reaction system at 50ºC for 144 hrs." Address: 1. Dep. of Food Science and Nutrition, Pusan National Univ., Korea.

1320. Chung, Gyu Hwa; Kim, Jin Hygeong. 1990. Production of interspecific hybrids between *Glycine max* and *G. tomentella* through embryo culture. *Euphytica* 48:97-101. [14 ref. Eng]

• ***Summary:*** "Interspecific hybrids have been obtained in an incompatible cross between *Glycine max* and *G. tomentella* through the in vitro culture of hybrid embryos. The percentage of successful pod setting in the crosses averaged 12.8% but there were marked differences depending on the soybean cultivar used as the female parent." Address: 1. Dep. of Biology; 2. Dep. of Agronomy. Both: Gyeonsang National Univ., Gyeongnam, Chinju 660-701, Republic of Korea.

1321. Lee, Sung-Woo. 1990. [Study on the origin and interchange of dujang (also known as soy bean sauce) in ancient East Asia]. *Korean Journal of Dietary Culture* 5(3):313-16. [12 ref. Kor]

• ***Summary:*** "Soybean was originated from the regions of Manchuria where it was processed into Dujang, the fermented soybean sauce. It was not until the Han dynasty in China that 'Shi', one type of Dujang, was introduced. 'Shi', which is also known as 'Sanguk' (loose soybean Meju), is made by first boiling and then fermenting the kernel of cooked soybean. It was admitted by the Chinese scholars that the 'Shi' which was used in China was introduced from Manchuria, the neighboring people to China at that time and the ancestor of Korean. 'Maljang' is a form of caked-shaped 'Meju' which is made by fermenting cooked and mashed soybean. The 'Maljang' of Manchuria was introduced to China, where it was called 'Maldo'. This fact is stated in a book, 'Saminwolyong', written during the 2nd century. 'Maljang' is presently used in Korea, but China has abandoned the use of 'Maljang' since the 6th century. It was introduced to Japan from Korea around the 7th century, and is remained in a few local regions. Although the term 'Jang' is representing all sort of fermented soybean products, including 'Shi' and 'Maljang', today, the definition of 'Jang' differs between China and Korea. According to the Chinese definition of 'Jang'. it is fermented soybean mixed with other cereal Koji. 'Jang' was first mentioned in 'Jaeminyo sool' in China and it was later introduced to Japan However, in Korea, the Chinese type of 'Jang' was not commonly used due to the popularity of 'Maljang'." Address: 1. Dep. of Food and Nutrition, Hanyang University, Korea.

1322. Nagatsuma, Hiroshi. 1990. Kindai shôyu jôzôgyô to nôson [The way of brewing modern soy sauce and villages]. In: R. Hayashi, ed. 1990. Shôyu Jôzô Gyôshi no Kenkyû. Tokyo: Yoshikawa Kôbunkan. See p. 421-75. [Jap]*

1323. Park, Kun-Young; Moon, S.H.; Baik, H.S.; Cheigh, S.H. 1990. [Antimutagenic effect of doenjang (Korean fermented soy paste) toward aflatoxin]. *J. of the Korean Society of Food and Nutrition* 19(2):156-62. [23 ref. Kor; eng]

• ***Summary:*** "Antimutagenic effect of doenjang (Korean fermented soy paste) on mutagenesis induced by aflatoxin B1 (AFB1) in *Salmonella typhimurium* strains TA98 and TA100 was studied. AFB1 revealed maximum mutagenicity at dose level of 1 fig /plate with metabolic activation system in both strains. Strong antimutagenic activity toward AFB1 was observed in methanol extract of doenjang. The AFB1 mediated mutageneses in both strains were completely inhibited at the level of 50% of the doenjang extract..." Address: 1. Dep. of Food Science and Nutrition, Pusan National Univ., Pusan, Korea.

1324. **Product Name:** [Tofu].
**Foreign Name:** Tofu.
**Manufacturer's Name:** Hanyang Sojaprodukte GmbH.
**Manufacturer's Address:** Hermannstr. 31, D-6078 Neu Isenburg, West Germany. Phone: 06102/21956.
**Date of Introduction:** 1990?
**New Product–Documentation:** Letter from Bernd Drosihn. 1990. May 10. This is the biggest Asian-German tofu company in the south of Germany. Note: The company is probably run by Korean-Germans.

1325. Golbitz, Peter. 1991. Soyfoods consumption in the United States and worldwide: A statistical analysis. Bar Harbor, Maine: Soyatech, Inc. 26 p. *

• ***Summary:*** The National Cancer Institute, through Prospect Associates (a subcontractor), asked Mr. Golbitz to compile this report, largely from published sources. It contains 12 numbered pages of information and text summary and 14 unnumbered pages of tables. It contains retail soyfoods information for the past 10 years, FAO published data (Soybeans and Products Food Balance Sheets; published every 3 years), tons of soybeans used to make tofu in major Asian nations, number of U.S. manufacturers of soyfoods products 1984 and 1989, where the various soyfoods are sold in America (health/natural food stores, Asian-American food stores, supermarkets, institutional foodservice). It is not clear whether or not the report is in the public domain.

The estimated annual per capita consumption of soybeans, directly and indirectly as soyfoods, is as follows: Taiwan 13 kg, Japan 10.8 kg, Korea 9.0 kg, Indonesia 6.3 kg,

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and China 3.4 kg. Address: P.O. Box 84, Bar Harbor, Maine 04609.

1326. **Product Name:** Korean Style Vegetarian Potstickers.
**Manufacturer's Name:** Shin-Sun Foods.
**Manufacturer's Address:** 2551 W. Winton Ave. #6-0, Hayward, CA 94545. Phone: 510-887-6140.
**Date of Introduction:** 1991 January.
**Ingredients:** Filling: Cabbage, tofu, zucchini, onion, sesame oil, garlic, ginger, sea salt, black pepper. Wrapper: Unbleached flour, rice flour, water, egg.
**Wt/Vol., Packaging, Price:** 12.5 oz. for 10 potstickers.
**How Stored:** Frozen.
**New Product–Documentation:** Leaflet (8.5 by 11 inches, 3 color). "New! Shin-Sun Foods. Fresh, healthy, and delicious." "Each potsticker is individually hand wrapped in our kitchen. Hand wrapping takes a little longer than machine manufactured foods, but the appearance is greatly improved, and the product is more stable. All the ingredients used are fresh, and not frozen. Using fresh produce is more costly, but we think the taste and quality is well worth it."

Talk with Susannah Yang of Shin Sun. These potstickers were launched in Jan. 1991. They were the company's first product.

1327. Lesser, Peter; Elkin, Ed. 1991. History of Pacific Soyfoods in Olympia, Washington (Interview). *SoyaScan Notes.* Feb. 8. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Pacific Soyfoods was started by Peter Lesser in 1981. Initially it was run out of the kitchen a collective restaurant named Café a la Mode, located on 4th Avenue in Olympia, Washington. They made tofu from scratch, and used the okara from the tofu to make soysage, using a version of the recipe published in *The Farm Vegetarian Cookbook.* Initially these products were served in the restaurant (the okara was used in sandwiches), but by about June 1981, they had started delivering the Soysage to the local food co-op and to 1 or 2 local grocery stores in Olympia. When the restaurant was closed after a year of operation, the wholesale accounts still wanted Soysage, so Peter decided to keep the soy operation going and at that time, in Feb. 1982, he coined the term "Pacific Soyfoods."

Peter stopped making tofu and bought his okara from a Korean-American tofu manufacturer named Boo Han in Lakewood, Washington. In the spring of 1982, Pacific Soyfoods' landed its first wholesale account, Pacific Rim (formerly known as something like C.C. Grain), a collective wholesaler in Seattle, that delivered to the Puget Consumers Co-op (PCC) in Seattle. Soon thereafter he started selling to natural foods wholesalers, the first one based in Seattle and the second one based in Portland, Oregon. Then in 1983 he expanded his product line by adding to the Original Soysage, Italian and Mexican flavor, and changed from a fresh Saran wrap packaging to vacuum packaging. He expanded his distribution into the San Francisco Bay Area, first through Pacific Trading Co. (Mark Brawerman), then after he folded [sic, relocated], Ben Lee at Quong Hop & Co. took over the distribution. At one point, Quong Hop offered to set up at plant in the state of Washington with Peter overseeing it, in order to reduce freight to Washington. Island Spring also distributed Peter's products, and he would sometimes get okara from them.

In about Nov. 1985 he introduced his first tofu burger, the Earthling Tofu Vegetable Burger. He bought the tofu for this burger from Boo Han.

On 1 April 1988 Peter sold Pacific Soyfoods to Ed Elin. At that time the company made four soyfood products: three flavors of Soysage, and Earthling Tofu Vegetable Burgers. Peter left and started Northwest Natural Foods, which makes Medallions, salmon or halibut patties/burgers with wild rice. He tried many times to make a salmon & tofu burger but was unable to get the right texture. (His phone number is now 206-866-9681.) Elin purchased his tofu and okara from Boo Han's, just up the road in Tacoma, Washington. About 12-15 months ago Boo Han changed hands; it is now named Hang Yang, owned by Mr. Choy, a Korean-American, who does not speak English–although his brother does. Hang Yang is very aggressive and doing well; he just upgraded to a new system.

Ed continued to make the same four products, and will be getting new labels (with some color changes) next week for two new flavors of burgers. To the Original Earthling, they will add a Barbecued Earthling and a Teriyaki Earthling. The Barbecued flavor should be on the market in late Feb. and the Teriyaki in March. His business is "growing so fast I can't believe it." His bestselling product is the tofu burger. He has also become distributor for other companies outside the region; he brings up and distributes Quong Hop's entire Soy Deli line. He plans to take on some tofu wieners and the JSL line of egg roll wraps and won-ton skins. By mid-summer he plans to have three of his own styles of tofu (soft, medium, and firm) private labeled by Han Yang.

He fully services his own products in about 175 supermarkets on a weekly or bi-weekly basis. His big accounts are Q.F.C. [Quality Food Centers, the big market in Seattle], and Safeway. He sells only in supers, no natural/health food stores. But he does sell his products to companies that distribute to natural/health food stores, such as NutriSource and the Mountain People's Warehouse down south. The business in natural food stores is too small. Address: 2948 29th Ave. S.W., Building 2C, Olympia, WA 98502. Phone: 206-943-6234.

1328. *Toyo Shinpo* (*Soyfoods News*). 1991. Beikoku de daizu origo-to. Karupisu, Mitsubishi Shôji to kyôdô [Soybean oligosaccharides in the USA. Calpis and Mitsubishi joint venture with Central Soya]. Feb. 21. p. 13. [Jap]

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• ***Summary:*** It has been announced that Calpis Food Co. (Shokuhin Kogyo; maker of a very popular Japanese non-alcoholic beverage) and Mitsubishi Shoji are going to establish a jointly owned company with Central Soya (Indiana) to produce and sell soybean oligosaccharides in 3 of Central Soya's plants in America. Oligosaccharides, which have the ability to condition the intestines, have been produced by several food companies in Japan. But Calpis got safety approval from the U.S. Food and Drug Administration as the first company in Japan. They are planning to sell the product aggressively overseas, to Unilever in Europe, and also in Korea. They are trying to capture the growing awareness of health. They are hoping to reach 5,000 million yen [about $39.3 million] sales during the first three years, selling mainly to confectionery manufacturers as a sweetener. They hope to begin shipping to Unilever this year for use in boosting the nutrition of infant formulas.

In Korea, they plan to supply the largest tofu maker and food manufacturer, Purumuwon in Seoul, with a powdered soy oligosaccharide sweetener, private labeled.

Oligosaccharides promote the growth of Bifidus (Bifidobacterium; beneficial bacteria) in the intestinal tract. In Japan, the market for products that include oligosaccharides is estimated at 150,000 million yen ($1,195 million), growing at about 20% a year due to consumer health awareness. But this concept and the resulting products are not yet popular overseas. There are several types of oligosaccharides. The one Calpis developed from soybeans is widely available in these beans and is getting the most attention. Their product has about 20% of the Japanese market. Calpis established a company named Soya Oligo Japan (president, Mr. Kôkichi Sato) with Mitsubishi in 1989 and has been preparing for overseas expansion.

A shorter, similar, follow-up article was published in *Toyo Shinpo* on 21 March 1991, p. 3. Address: Japan.

1329. Fehlberg, Eric C. 1991. The sale of Granose Foods to the Haldane Foods Group and British Arkady Ltd. (Interview). *SoyaScan Notes.* April 30. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** The sale of Granose took effect from 1 Jan. 1991. At the time of the sale, Granose was doing very well financially. The only year that they didn't break even or make a profit was 1990. At the beginning of 1990 they moved from their old building into the new one; the expenses connected with the move took up most of their profits. In all other recent years they have been making good money, and a portion of that money has been contributed to the church. Mr. Fehlberg cannot understand why the church would sell such a thriving company.

But the board of the directors of the British Union of the Seventh-day Adventist church got an offer (which was a little bit of back-door work) that was too good to refuse, so they looked at it in their committee meeting and decided to accept it. They have a good understanding of all aspects of the company. This is the second long-established Seventh-day Adventist food company that has been sold by the church during the last 2 years. Loma Linda Foods was sold to Worthington Foods in Jan. 1990. Most of the employees of Granose have stayed with the company after the sale. Peter Archer, the former general manager, has stayed but is no longer the general manager. He is now marketing manager. The church no longer has any involvement with Granose at all.

We cannot say that these two sales are the start of a trend, but he is quite sure that the four Scandinavian Adventist food companies (Nutana in Denmark, Sweden, Norway, and Finland) will be the next to be sold. Nutana-Sweden is in considerably better financial shape than the other three, and Nutana-Finland is in pretty good shape. Nutana in Denmark and Norway are losing money and are very much in trouble. But he thinks that can easily be corrected if they get their costing straight and price their products based on their real costs. The man who has gone in to make these changes, Jan Paulsen, has as good a chance of succeeding as anyone, but he works out of London, England and does not have a much time for the health food work. He feels that the church should not be in the business of selling healthy foods. He influenced the board of the British Union in their decision to sell of Granose.

After the Scandinavian Nutana companies, the Egypt Food Factory, run by Mokhtar Nashed in Helipolois, Cairo, Egypt may well be the next to go, probably within the next few months. They used to make soymilk but he thinks they no longer are making it. Their products are "sub-standard" but still good. Superbom in Brazil is also having a hard time because of the adverse exchange rate and the desire to borrow money from the church. Superbom Chile is also having some problems.

But many of the Adventist food companies definitely will not be sold by the church in the foreseeable future. In fact, in the Far Eastern Division, a new food company in Hong Kong, run by Mr. Menzies, is scheduled to start selling products in early June of 1991. A new company is also starting in Thailand. Sahm Yook in Korea is also very successful, as is DE-VAU-GE in Germany and Sanitarium Foods in Australia. The food companies in Central America (Mexico, Costa Rica) and the Caribbean (Trinidad) are all doing well.

There are various administrative "Unions" within the Seventh-day Adventist Church. There are 4-5 unions in North America, 4 in Australia, many in South America, etc. The South American ones report to one central office in Brasilia, Brazil. The Central American food companies report to Miami, Florida. Sometimes a company manager and the head of the Union (a church official to whom he reports) have different ideas of what needs to be done at the company. These two men live in two different worlds, yet

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both have input in running the company. This can be a cause of business problems. The Mormon church owns some food companies and has the same type of problems. Address: Director, International Health Food Assoc., Seventh-day Adventist General Conference, 12501 Old Columbia Pike, Silver Spring, Maryland 20904. Phone: 301-680-6674.

1330. Shurtleff, William; Aoyagi, Akiko. comps. 1991. Bibliography of soy sprouts: 655 references from 3rd century A.D. to 1991, extensively annotated. Lafayette, California: Soyfoods Center. 185 p. Subject/geographical index. Author/company index. Language index. Printed July 12. 28 cm. [655 ref]

• ***Summary:*** This is the most comprehensive bibliography ever published on soy sprouts. It is also the single most current and useful source of information on this subject available today, since 71% of all references (and most of the current ones) contain a summary/abstract averaging 172 words in length.

This is one of more than 40 bibliographies on soybeans and soyfoods being compiled by William Shurtleff and Akiko Aoyagi, and published by the Soyfoods Center. It is based on historical principles, listing all known documents and commercial products in chronological order. It features: 27 different document types, both published and unpublished, every known foreign language publication on the subject, extensive translations of many Japanese and European works, and many original interviews Thus it is a powerful tool for understanding the development of this subject and related products from its earliest beginnings to the present, worldwide.

Compiled one record at a time over a period of 17 years, each reference in this bibliography features (in addition to the typical author, date, title, volume and pages information) the author's address, number of references cited, original title of all non-English publications together with an English translation, month and issue of publication, and the first author's first name (if given).

It also includes details on 40 commercial soy sprout products, including the product name, date of introduction, manufacturer's name, address and phone number, and (in many cases) ingredients, weight, packaging and price, storage requirements, nutritional composition, and a description of the label. Sources of additional information on each product (such as references to and summaries of advertisements, articles, patents, etc.) are also given.

Details on how to use the bibliography, a complete subject and geographical index, an author/company index, a language index, and a bibliometric analysis of the composition of the book (by decade, document type, language, leading periodicals or patents, leading countries, states, and related subjects, plus a histogram by year) are also included. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 510-283-2991.

1331. Ashraf, Hea-Ran Lee. 1991. Work with soyfoods in Zambia and Illinois (Interview). *SoyaScan Notes.* Aug. 14. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Hea-Ran is Korean. After 2 years studying groundnut flour in India at CFTRI on an FAO scholarship, she came to the USA in 1976. At Iowa State Univ., working under Dr. Harry Snyder, she wrote her PhD degree thesis on the flavor of soymilk.

While in Zambia, she worked with home economics extension people, teaching them how to fortify Nshima (pronounced "SHEE-muh; a popular thick non-fermented cornmeal mush that is often eaten with the fingers) with either roasted soy flour, or with okara from soymilk. She and Ellen Jayawardene from Sri Lanka also taught the local people to make and use soymilk. They did not teach about tofu, since no coagulant was readily available. The Lee Yeast Co., a bread company or bakery owned by Mr. Limbada, uses soy flour in their breads. Several other companies were in the process of buying Wenger- or low-cost extrusion cookers for processing soybeans. People from the University of Illinois were helping them to set up this equipment.

The key man working with soyfoods in Zambia is Fred Javaheri. He has worked in Zambia for about 20 years, initially with the USDA. An Iranian by birth, he and his family have permanent Canadian residence (but not citizenship) status but they live in Zambia. Because his religion is Baha'i, he fled from Iran after the Iranian revolution, when many of his non-Moslem faith were persecuted or killed. The Baha'i faith originated in Iran (Persia) in the 19th century and emphasized the spiritual unity of all human beings.

In 1979 she went to the Univ. of Illinois at Carbondale, where she now does mainly teaching; there is not much time or funds for research. Many of her students have do research on tofu. Address: Asst. Prof., Animal Science, Food & Nutrition, Southern Illinois Univ., Carbondale.

1332. Takai Seisaku-sho. 1991. [Takai corporate guide]. 1-1 Inari, Nonoichi-machi, Ishikawa-ken 921, Japan. 8 panels. Nov. 1. 30 cm. [Jap; eng]

• ***Summary:*** This color brochure, containing 5 color photos, is written in both Japanese and English. It notes that (as of 1 Nov. 1991) Takai has exported its tofu and soymilk equipment to 140 cities of 30 countries, including Bhutan, Bolivia, Brunei, Burkina Faso, Egypt, Finland, India, North Korea, Mexico, Nepal, Philippines, Spain, Sri Lanka, Sweden, Switzerland, and Thailand.

A chronology of the company states that in July 1917 Kamejiro Takai, a former president, founded Takai & Brothers Co. It was renamed Takai Sesakusho in Jan. 1946. Address: Kanazawa, Ishikawa-ken, Japan. Phone: 0762-48-1355.

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1333. Food and Agriculture Organization of the United Nations (FAO), Statistics Div., Basic Data Unit. 1991. FAO food balance sheets, bilans alimentaires, hojas de balance de alimentos, 1984-1986 average. 00100 Rome, Italy. xx + 384 p. No index. 30 cm. [Eng; Fre; Spa]

• ***Summary:*** This book is written in 3 languages: English, French, and Spanish. Prepared by the Statistics Div. of the Economic and Social Policy Dept. of FAO in Rome, it gives food balance sheets for 3-year periods (e.g. 1961-63, 1964-66, 1986-88, etc.) for 145 countries (including mainland China but not Taiwan). The introduction discusses: Food balance sheets–what they are and how to use them. Accuracy of food balance sheets. Concepts and definitions: Commodity coverage, supply and utilization elements (production, imports, stock changes, exports, processed trade, domestic supply, feed, seed, food manufacture, other uses, waste, food, per caput supply), Population coverage. Units and symbols. Country coverage: Statistics are given for the world, developed countries as a group, developing countries as a group, 34 individual developed countries, and 111 individual developing countries.

Soybeans are included under the heading "oilcrops" (*oléagineux, semillas oleaginosas*), along with 8 other individual oilcrops plus "others." Soybean oil is included under the heading "vegetable oils" along with 11 other individual vegetable oils plus "others."

For each country, two tables are given. In the first table, per capita food supply, foods are divided into the following commodity groups: grand total, vegetable products, animal products, cereals (excluding beer), starchy roots, sweeteners, pulses, nuts and oilseeds, vegetables, fruit (excluding wine), meat and offal, eggs, fish and seafood, milk (excluding butter), oils and fats (subdivided into vegetable oils, and animal fats), spices, stimulants, alcoholic beverages, miscellaneous. For each 3-year period the following statistics are given for each commodity group: kilograms/year, calories/day, protein (grams/day), and fats (grams/day). Thus, for the Japan (for example), we can see that grams of protein per day from "nuts and oilseeds" increased from 9.8 in 1961-63 to 10.3 in 1986-88. This is the closest we can get to a figure for soyfoods consumption from this table.

The second table gives average annual domestic supply for the period 1984-86 (broken down into production, imports, stock changes, exports, processed trade, total), domestic utilization (broken down into feed, seed, food manufacture, other uses, waste, food), and per caput supply (broken down into kg/year, grams/day, calories/day, protein [gm/day], and fat [gm/day]), for specific foods within each of the major commodity groups. Thus, for Japan, we see that for soybeans during 1984-86, production was 237,000 tonnes (metric tons), imports 4,747,000 tonnes, stock changes 35,000 tonnes, exports 0, processed trade 2,000 tonnes, total domestic supply 4,947,000 tonnes. For domestic utilization, 67,000 tones were used for feed, 8,000 tonnes for seed, 3,636,000 tonnes for food manufacture, 0 for other uses, 89,000 tonnes for waste, and 1,158,000 tonnes for food. The per capita supply was 9.6 kg/year or 26.3 gm/day. Each day this provided 98 calories, 8.9 gm of protein, and 3.7 gm of fat.

For many countries (including the USA and Brazil) no statistics are given for food use of soybeans or for any parts of per caput supply.

A ranking of the countries (not including Taiwan) with the highest per caput supply of soybeans (kg/year) and soybean protein (gm/day) is as follows: Japan 9.6, 8.9. North Korea 9.0, 8.5. Indonesia 7.2, 6.8. South Korea 6.4, 6.1, Hong Kong 3.9, 3.6. China (Mainland) 3.1, 2.0. Singapore 0.2, 0.1. Address: Rome, Italy.

1334. Lumpkin, T.A.; Konovsky, J. 1991. The vegetable soybean. In: G. Villanueva, J. Corven, and A. Campos, eds. 1991. Taller Regional Centroamericano y Consulta Sobre Planificacion de Investigacion Horticola, Programa II. AVRDC and IICA. See p. 297-306. Held 5-8 Nov. 1991 at Instituto Interamericano de Cooperation para la Agricultura (IICA), Costa Rica. [52 ref]

• ***Summary:*** Contents: Abstract. Introduction. History: China, Japan, Korea, North America. Quality. Variety selection. Production. Current research. Summary. Address: East Asian Crop Development Program, Dep. of Crop and Soil Sciences, Washington State Univ., Pullman, WA 99164-6420.

1335. Packaged Facts. Subsidiary of FIND/SVP. 1991. The Oriental foods market. 581 6th Ave., New York, NY 10011. Nov. *

• ***Summary:*** "The Oriental Foods Market covers the $1 billion retail market for prepared Oriental foods, which is broken down into four categories–canned / packaged,... frozen, dry soups, and tofu.

Tofu is discussed briefly on page 16, and in depth on pages 180-205. Soy sauce is discussed in numerous places (incl. p. 54-57, Kikkoman, La Choy, Chun King, p. 102).

Talk with David Weiss, president of Packaged Facts. 1991. Nov. 26. This is an update of the Feb. 1989 edition of this company's market study of the same title. It was "completely rewritten by a different author, Linda Linton." They have added new statistics and even went back and changed some sales figures from the previous report. He does not know how the author gathered statistics on U.S. tofu production and sales, but he knows that she did not contact individual companies, one by one. "That is a very difficult way to get the information because (1) you don't know if you're getting the right information and (2) there may be something you are missing. We don't use SIC codes. Our figures are undoubtedly guesstimates. A little of it came from the Public Relations Dept. of Nielsen Marketing Research; they don't cover it all but they are good on packaged goods.

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A little also came from SAMI. There is nobody measuring the tofu market. This study only covers tofu sold as tofu, not including second-generation products. Some figures may have come from a tofu association, if there is one. Most of our reports are written from secondary published data. We just compile the figures. We are planning to do a report on the whole soy market–not just tofu." Address: New York. Phone: 212-627-3228.

1336. Chung, Gyu Hwa; Kim, Kwang Sik. 1991. Obtaining interspecific hybridization between *Glycine max* and *G. latifolia* through embryo culture. *Korean J. of Plant Tissue Culture* 18(1):39-45. [22 ref. Eng; kor]
• ***Summary:*** Spraying 100 ppm of gibberilic acid on the pollinated buds was found to prevent early abcission of the pod resulting in a success rate of 5.9%.

"Wild relatives of crop plants have been effectively employed in various breeding programs as additional sources of genetic diversity (Stalker, 1980). In fact, the best hope for future crop improvement lies in the exploitation of abundant gene pools of crops' wild relatives (Feldman and Sears, 1981)." Address: Korea Agri. Product & Seed Co, Ltd. 600 Karak-Dong, Songpa-Ku, Seoul 138-701; Dep. of Biol. Eng., Yosu National Fisheries College, Chunnam, 550-749.

1337. Kwon, Chung Sook; Chang, Kwon Yawl. 1991. [*In vitro* germination of young hybrid embryos between *Glycine max* and *G. tomentella*]. *Korean J. of Breeding* (*Han'guk Yukchong Hakhoe Chi*) 22(4):379-83. [16 ref. Kor; eng]
• ***Summary:*** "Embryo and ovule culture was carried out to investigate a suitable condition for growth and germination of young hybrid embryos between soybeans as female and a wild perennial relative *G. tomentella.* Hybrid pods and ovules were readily distinguished from the selfed in their small, wrinkled appearance." Address: 1. Graduate School; 2. College of Agriculture. Both: Gyeongsan National Univ., Chinju 660-701, Korea.

1338. Hymowitz, T.; Bernard, R.L. 1991. Origin of the soybean and germplasm introduction and development in North America. In: H.L. Shands and L.E. Wiesner, eds. 1991-1992. Use of Plant Introductions in Cultivar Development: Proceedings of a symposium sponsored by Division C-1 of the Crop Science Society of America in Las Vegas, Nevada, 19 Oct. 1989. 2 vols. Part 1. CSSA Special Publication Number 17. Madison, Wisconsin: Crop Science Society of America (CSSA). 164 p. See p. 147-64. Chap. 9. Crop Science Society of America Special Publication No. 17. [34 ref]
• ***Summary:*** Contents: Introduction. Origin of the genus *glycine.* Origin of the soybean. Introduction of the soybean to North America (by Samuel Bowen in 1765). Experiment stations and technology. Introduced soybean germplasm. Cultivar development. *Glycine soja.* Wild perennial *glycine* species.

"The genus *Glycine* Willd is divided into two subgenera, *Glycine* and *Soja* (Moench) F.J. Herm. The subgenus *Glycine* contains 15 wild perennial species (Singh et al., 1988; Tindale and Craven, 1988). Thirteen of the species [*G. albicans* Tind. and Craven, *G. arenaria* Tind., *G. curvata* Tind., *G. canescens* F.J. Herm., *G. clandestina* Wendl., *G. curvata* Tind., *G. cyrtoloba* Tind., *G. falcata* Benth., *G. hirticaulis* Tind. and Craven, *G. lactovirens* Tind. and Craven, *G. latifolia* (Benth.) Newell and Hymowitz, *G. latrobeana* (Meissn.) Benth. and *G. microphylla* (Benth.) Tind.] are indigenous to Australia. All carry 2*n* = 40 chromosomes (diploid) except for *G. hirticaulis* which is tetraploid, 2*n* = 80.

"*Glycine tabacina* (Labill.) Benth. with 2*n* = 40 or 80 chromosomes, has been found in Australia, Taiwan, south Pacific Islands (New Caledonia, Fiji, Tonga, Vanuatu, Niue) and west central Pacific Islands (Mariana, Ryukyu). All accessions of *G. tabacina* collected outside of Australia are tetraploid (2*n* = 80) and even within Australia, tetraploids predominate over diploid forms. *Glycine tomentella* Hayata has been found in Australia (2*n* = 38, 40, 78, or 80), Papua New Guinea (2*n* = 40, 78 or 80), Indonesia (2*n* = 80), Philippines (2*n* = 80), and Taiwan (2*n* = 80). Singh et al. (1987, 1989) demonstrated that the complexes of *G. tabacina* and *G. tomentella* evolved through allopolyploidization in Australia."

"The soybean was first introduced to North America in 1765 by Samuel Bowen, a seaman employed by the East India Company. Bowen brought soybean from China via London to Greenwich, his residence in the province of Georgia. Situated a few kilometers east of Savannah, the 180 ha of Greenwich (now a cemetery) became the center of his farming and manufacturing enterprises.

"By the late 1850s, soybean was evaluated for forage potential by many farmers throughout the USA (Hymowitz, 1987). However, the scientific approach for evaluating the crop had to wait until the emergence of the agricultural experiment stations at land grant institutions during the latter part of the nineteenth century."

Table 9-1 (p. 154-57) shows "Ancestral cultivars and their occurrence in pedigrees of U.S.- Canadian publicly developed grain-type soybean cultivars (excluding backcross-developed isolines covered in Table 3). Part A of this table is a summary by maturity group and part B is a summary by decade of release. Each part is divided into number of descendant cultivars, northern ancestors, southern ancestors, ancestors chosen for pest resistance, other, and number of ancestral cultivars. The ten most important northern ancestors (in descending order of importance with the number of occurrences in pedigrees in parentheses) are: Mandarin (143), Manchu (121), Richland (119), A.K. (108), Dunfield (83), Mukden (73), No. 171 (30), Pakota (27), L37-1355 (25), and Manitoba Brown (14). The 13 most important

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southern ancestors are: CNS (118), Tokyo (109), PI54610 (108), S-100 (82), Roanoke (42), Haberlandt (40), Arksoy (40), Palmetto (34), Biloxi (9), PI 60406 (7), Otootan (7), Laredo (4), Mammoth Yellow (5).

Table 9-2 (p. 158-59) shows the "Origins of major ancestral cultivars of the 221 cultivars developed at public institutions in the USA and Canada." For each cultivar is given: Descendant cultivars, maturity group, year of introduction, country and locality of origin, and original cultivar name.

Table 9-3 (p. 161) shows "Sources of genes backcrossed into domestic public soybean cultivars." The named varieties are Kanro, Mukden, Arksoy, Higan, Kingwa, and CNS. All 8 of the most important northern cultivars originated in China. Of the 12 most important southern cultivars, 9 originated in China, 2 in Korea, and 2 or 3 in Japan. Address: Univ. of Illinois, Urbana, Illinois.

1339. Loewen, Nancy. 1991. Food in Korea. Vero Beach, Florida: Rourke Publications, Inc. 32 p. Illust. (color photos). Index. 26 cm. Series: International Food Library.

• ***Summary:*** Juvenile literature: An introductory book for junior high school students. Text by Nancy Loewen. Recipes compiled by Judith A. Ahlstrom.

Contents: 1. An introduction to Korea. 2. A common heritage. 3. North and South Korea. 4. Agriculture and industry. 5. Holidays in Korea. 6. Food customs in Korea. 7. Korean foods. 8. A festive meal. 9. A red-meat meal. 10. A white-meat meal. 11. An everyday meal. Glossary of cooking terms. Korean cooking.

The Japanese took control of Korea in 1910 and remained in power until 15 Aug. 1945, when the country was liberated by allied forces. That didn't make Korea a free country, however. After 35 years of Japanese rule, Korea's political system was weak and the northern half of Korea was soon occupied by communist forces. The country was divided and in 1948 two new governments–one for the North and one for the South, were established. Then in 1950 North Korea invaded South Korea; the Korean War had begun; it lasted until 1953 with Korea still divided at Panmunjom–as it is today.

Korea still uses two calendars: the Gregorian calendar (used in the USA and in most other countries) and the ancient Chinese lunar calendar. Korea's older holidays are still observed based on the lunar calendar.

Common foods in Korea include rice, soy sauce, tofu, kimchi, and soybean sprouts.

1340. Passmore, Jacki. 1991. The encyclopedia of Asian food and cooking. New York, NY: William Morrow. 320 p. Illust. by Jan Smith. Index. 24 cm. [44 ref]

• ***Summary:*** The most complete book of its type seen to date (May 2010), with many helpful cross references (although sometimes flawed). Soyfoods are mentioned throughout. Unfortunately, for Chinese foods, the author does not distinguish between Mandarin and Cantonese, or between pinyin (newer) and Wade-Giles (older) styles of romanization. For some of the "Also known as" it is not clear to which of several previous entries this refers (see "Soybean"). Sometimes she gives standard transliterations (azuki, miso, tofu, yakidofu) yet at other times she writes phonetically (ah meh)–as an aid to correct pronunciation.

Ame (ah meh, Japan): A sweet jelly made from millet.

Azuki bean (*Phaseolus angularis*). Native to China; used in China since the Han Dynasty (206 BC–AD 220): An [or anko] (Japan): A sweetened paste of ground azuki beans available in smooth (koshi-an) and crunchy [chunky] (tsubu-an or tsubushi-an). Sarashi-an: A flour of ground azuki beans. Also known as hong dow (China), dried red beans, red beans [adzuki beans, aduki beans]. See also: Red bean paste, sweet.

Bean curd: Also known as dou-fu, dow foo (China); tahu (Indonesia), momen tofu, tofu (Japan); ta hu, ta hua (Malaysia); tahure ([fermented tofu] Philippines); tauhu kau (Thailand); dau hu, dau hu chung (Vietnam); bean custard, soybean cake.

Note 1. This is the earliest English-language document seen (April 2013) that uses the term *ta hu* to refer to Malaysian-style tofu.

Illustrations of: Fried bean curd, pressed bean curd. Almond bean curd (non-soy). Bean curd "brains": Also known as doufu nao (China); taho (Philippines). "Cotton" bean curd: Also known as momen tofu (Japan). Freeze-dried bean curd [dried-frozen tofu]: Also known as koya tofu (Japan). Fried bean curd: Also known as char doufu, doufu pok (China); agedofu, atsu-age, nama-age (Japan); tauhu tod (Thailand), dau hu chien (Vietnam). Fried bean curd pouches: Also known as aburage, usuage (Japan). Gan modoki. Grilled bean curd: Also known as doufu kan [sic], gone (China); yakidofu (Japan). Instant bean curd. Okara. Pressed bean curd: Also known as doufu kan (China), taukwa, tauhu kuning (pressed yellow bean curd) (Indonesia, Malaysia); tokwa (Philippines); tauhu leong (Thailand); dau hu ki (Vietnam). Silk bean curd: Also know as kinugoshi tofu (Japan), shui doufu (China), taho (Philippines).

Note 2. The author seems to be confused about "Silk bean curd." Japanese kinugoshi is made from relatively thick soymilk, which is "set" using a coagulant but without any separation of curds and whey. Yet on page 26 we read: "In China the name [for silk bean curd] translates as 'water bean curd,' It has a very smooth, delicate texture achieved by straining the coagulated liquid through fine mesh, then allowing the strained curds to settle without pressing." This is not a description of silken tofu, but rather of Japanese regular tofu (*momen-goshi*) made without any pressing weights.

Contains a recipe for homemade "Bean Curd" plus 3 bean curd recipes.

Bean curd by-products: Bean curd skin [yuba], bean

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curd sticks: Also known as fu jook pin, gee jook (China), yuba (Japan), forng ta ohu [tauhu] (Thailand); rolled bean curd, second bamboo.

Fermented bean curd: Also known as foo yu, fu-ru, narm yu (China), tahoe, tahu (Indonesia, Malaysia), tausi (Philippines), bean curd cheese, Chinese cheese, pickled bean curd, red bean curd, soybean cheese.

Moldy bean curd. Bean curd cheese: See bean curd by-products (fermented).

Bean pastes and sauces: Shih and jiang from China: (1) Bean sauce (jiang) also known as taucheo or tau sa (Malaysia, Nonya and Singapore cooking), mien see [mian shi] (China), taoco [Pron. = tao-cho] (Indonesia), tuong ot (Vietnam), bean paste, brown bean sauce, yellow bean sauce. (2) Black bean sauce (a recent addition to the family of Chinese sauces. A major ingredient is puréed fermented black beans with a hint of garlic and star anise. It tastes best when freshly made). (3) Chili bean paste (in addition to chopped dried chilies, it sometimes contains fermented black beans): Also known as lat chu jeung, as lat chu jeung yau (Garlic) (China); kochujang (Korea); bean paste with chili; hot bean paste; Sichuan hot bean paste. (4) Dhwen-Jang (Korea). See also miso. (5) Hoisin sauce (China): A sweet, thick, reddish brown sauce. One ingredient is fermented soybean paste. Not to be confused with the Chinese barbecue sauce called sha cha jang. Also known as hoi sin cheung (China); barbecue sauce. (5) Soybean paste. Also known as mean see jiang (China). (6) Sweet bean paste. In this context it is not the sweet bean paste made from azuki beans, but rather a sweet, thick, dark brown sauce made of ground fermented soybeans and sugar. Its salty-sweet flavor is used in marinades and roast meats. Also known as tim mean jiang (China).

Bean sprout: Mung bean sprouts, silver sprouts (mung bean sprouts with the roots and seed pods removed), soybean sprouts (They "are large, up to 5 inches {12.5 cm} in length, a deep, almost yellow color and strong in flavor..."). Also known as: Daai dau nga choy (soybean sprout), ngunn nga choy (silver sprouts), nga choy, sai dau nga choy (mung bean sprout) (China); tauge (Indonesia); moyashi (Japan); kacang ijo, kacang djong, kacang padi (Malaysia); togue (Philippines); taun gawk (Thailand); gia (Vietnam); bean shoots.

Beijing duck sauce (recipe with ½ cup sweet bean paste). Vietnamese-style Beijing duck sauce (with ½ cup sweet soy sauce–kecap manis).

Black bean: See Fermented black bean. Black bean sauce: See Bean pastes and sauces. Fermented black bean sauce. Black soybean: See soybean.

Broad bean paste. Broad bean sauce: "The best is made in Pixian, a city in Sichuan province, where it is used instead of soybean-based seasoning sauces."

Brown bean sauce: See Bean pastes and sauces.

Che hau sauce (Che how, China): See Bean pastes and sauces (Hoisin). Chick-pea.

China: Has the "oldest and most well-documented cuisine in the world." Chinese cheese: See Bean curd by-products (fermented). Chinese hot bean paste: See Bean pastes and sauces.

Dau hu (Dow hoo, Vietnam): See bean curd. Dau hu chien (Dow hoo chee-ian, Vietnam): See Bean curd, fried. Dau hu chung (Dow hoo chee-ung, Vietnam): See Bean curd. Dau hu ki (Dow hoo kee, Vietnam): See Bean curd, pressed.

Dengaku (plus recipe).

Dhwen-jang (Dwen-jang, Korea). Similar to Chinese soybean paste or Japanese akadashi miso. Also known as Korean bean paste. Doufou Kan [doufu gan], China: Bean curd (grilled, pressed). Dou-fu (Dau-fu, China). See Bean curd. Doufu nao (Daufu-nou, China): See Bean curd "brains." Doufu pok (daufu pork, China). See bean curd, fried. Dow foo (dau fu, China): See Bean curd.

Edamame (e dah ma meh, Japan): See soy bean.

Fermented bean curd: See Bean curd by-products. Fermented bean curd cake. See Bean curd by-products; tempe.

Fermented black beans (Shih, China). With recipe for "Fermented black bean sauce" (p. 106). Also known as dau see (China), black beans, dried black beans, preserved back beans.

Fermented red rice. Flours and thickeners: Kuzu (Japan). Mung bean flour. Soy flour (incl. kinako, which "is used in confections and to make noodles... In China, a thick, nutty-tasting noodle is made from soy flour"). Foo yu (Fu you, China). See Bean curd by-products (fermented). Forng Tao Hu (Fong tao huu, Thailand). See Bean curd by-products, bean curd sticks. Fu jook pin (Fu juk pin, China): See bean-curd by-products, bean curd skin. Fu-ru (Fu yue). Gee Jook (Ji Juk, China): Bean curd sticks.

Gluten: Kau fu, kohana fu, matsutake fu, mein jin pau, nama fu, su tang, yaki fu. Also known as: Kau fu, mianjin, mein jin pau, su tang (China), kohana fu, yaki fu (Japan).

Gochujang (Korea). See also: Chili paste, chili sauce. Korean barbecue sauce.

Grilled bean curd: See Bean curd, grilled.

Hatcho miso: See miso, Hatcho. Hot bean paste. Hot black bean sauce. Inaka miso: See miso.

Japan: "Japanese cooks revel in the artistry of their craft. The Japanese love of nature is a challenge to present each ingredient as reminder of its origins: to bring nature to the table...," Regional cuisines are not of great importance in Japan; cooking methods (incl. Dengaku), salting (incl. Teriyaki), cutting and slicing techniques.

Kecap asin (Ket-chup a-seen, Indonesia): See Soy sauce, sweet and salty. Kecap cair (cha-ear, Malaysia): See soy sauce, light. Kecap hitam (Indonesia): See soy sauce, sweet and salty. Kecap ikan (Indonesia): See Fish sauce. Kecap manis (mah-niece, Indonesia): See Soy sauce, sweet and salty. Kecap petis (pet-is, Indonesia): See fish sauce.

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Kinugoshi tofu (Japan): See Bean curd, silk.

Kochujang (go-choo jang, Korea): See Bean pastes and sauces; chili pastes.

Koikuchi shoyu (Japan): See soy sauce. Continued. Address: Author of several books on Asian cuisine.

1341. Passmore, Jacki. 1991. The encyclopedia of East Asian food and cooking (Continued–Document part II). New York, NY: William Morrow. 320 p. [44 ref]

• ***Summary:*** Continued from p. 153: Korean bean paste: See Dhwen jang. Koshi-an (Japan): See Azuki beans (an). Koya tofu (Japan): See Bean curd, freeze-dried [sic].

Kuzu (Japan): See Flours and thickeners. Lentil (*Lens esculenta*)*:* Red lentil, Red mung beans.

Light soy sauce: See Soy sauce.

Lu soy (lo shui, China): See soy sauce.

Maltose: Made by fermenting germinated grains of barley. When used to glaze foods, may have soy sauce and red food coloring added. Also known as: Malt sugar, [barley malt syrup].

"Ma-po" dofu [Mabo-dofu]: See beef.

Mean see jiang [mian shi jiang] (min see jiang, China): See Bean pastes and sauces.

Mein jin pau [mien jin pau] (China): See Gluten.

Mianjin (China): Gluten.

Mien see (mien-si [mian shi], China): See Bean pastes and sauces.

Miso (Japan): (1) Hatcho-miso. (2) Inaka miso or Sendai miso. Also known as Red miso. (3) Shinshu miso. (4) Shiro miso.

Mochi. Monosodium glutamate. Also known as: Mei jing (China); aji-no-moto (Japan); servuk perasa (Malaysia); ve tsin (Vietnam), M.S.G., taste essence, taste powder.

Moyashi (Japan): See Bean sprout.

Mung bean. Also known as moong ke dal (India); kacang djong, kacang eedjo [hijau, katjang idjo] (Indonesia); kacang hiau (Malaysia); tau ngok (Thailand); dau xanh (Vietnam); green gram.

Nama-age (nah-mah ah-geh, Japan): See Bean curd, deep fried.

Nama fu (Japan): Raw / uncooked wheat gluten.

Natto (Japan). See soybean.

Noodles: (1) Bean curd noodles (China). Also known as Soy noodles, soy vermicelli.

Oils and fats: Soybean oil. (2) Bean curd skin noodles (China) [yuba noodles].

Peanut (with many foreign names and recipes).

Preserved black beans: See Fermented black beans. Pressed bean curd: See Bean curd (pressed).

Red bean paste, sweet: "An important ingredient in Chinese and Japanese cooking, sweet red bean paste is made by boiling the red azuki bean and mashing it to a paste with lard or oil, then cooking it until it is fairly dry or thick. In Japan, red bean paste is made in two textures: the smooth purée is koshi-an and the chunky version, with the beans only partly crushed, is tsubushi-an. It is a filling for cakes and sweet buns, and is used in several desserts." Also known as hong dow sar (China), an (Japan). Contains a recipe for Sweet red bean paste.

Red rice: See Fermented red rice.

Rice: Many type of glutinous and non-glutinous.

Rolled bean curd: See Bean curd sticks [dried yuba].

Seaweed: Many different types. Seaweed gelatin or Seaweed jelly: See agar agar.

Sendai miso (Japan): See miso.

Sesame seed: Black sesame seed, sesame oil, sesame paste, white sesame seed.

Shinshu miso (Japan). Shui doufu (China): See bean curd (silk). Silk bean curd: See Bean curd (silk).

Soybean (*Glycine max*)*:* (1) Black soybeans. (2) Fresh soybeans [edamame]. (3) Yellow soybeans. Soybean cheese: See Bean curd, fermented [fermented tofu]. Soybean condiment: See Bean pastes and sauces. Soybean milk. Also known as tau cheing, tau ni (China). With homemade soymilk recipe. Soybean noodle: See Noodles, bean curd. Soybean oil: See fats and oils. Soybean paste: See Bean pastes and sauces. Soybean sprout: See bean sprout. Soy flour: See Flours and thickeners.

Soy sauce: "An ancient seasoning, first used in China more than 3,000 years ago. Known in its original form as *shih*, it was a thin salty liquid in which floated fragments of fermented soybeans." "Soy sauce is to Chinese and Japanese cooking what the pungent, salty fish sauce known as nam pla or nuoc mam is to Thailand and Vietnam respectively." (1) Dark soy sauce. Also known as jang yau, see yau (China); koikuchi shoyu, tamari (Japan), kecap pekat (Malaysia); mushroom soy. (2) Light soy sauce: Thinner, saltier, and lighter in color and flavor. It is used in cooking where its light color will not spoil the color of the ingredients. Also known as sang chau, see yau (China), shoyu, usukuchi shoyu (Japan), kecap cair (Malaysia), toyo (Philippines), nam siew (Thailand), xi dau (Vietnam), thin soy sauce. (3) "Lu soy (China) is a 'master sauce' based on soy sauce with sugar, ginger, and five-spice, It is used for simmering poultry and other meats to give a rich flavor and to color the food a deep brown. Also known as lu shui (China)."

Soy sauce, sweet and salty: (1) "Kecap asin (Indonesia) is a thick, salty, dark soy-based sauce used to impart a strong color and flavor. Its sweet counterpart is *kecap manis.* It is similar to, but thicker than, several dark soy sauces used in Chinese cooking." (2) Kecap hitam (Malaysia) is a sweet dark soy sauce. Slightly less spicy than kecap manis. (3) Kecap manis (Indonesia) is a sweet, dark, thick, aromatic soy sauce, especially widely used with satay. "It is similar to, though finer in flavor than, Chinese sweet soy sauce" [tian mian jiang]. Also known as kecap bentang manis (Indonesia); sweet soy sauce. (4) "Sweet soy sauce (China) is a dark, sweet sauce combining soy sauce, sugar, and malt

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sugar. Its distinctive malt-like taste goes well as a dip for fried snacks, poultry, and seafood." It appears frequently on the table in homes and restaurants in Fukien province, opposite Taiwan on the coast of south-eastern China. For a recipe, see Sweet soy sauce pork (p. 230). Note: This is not generally a commercial product. (5) Tim cheong (Malaysia) is a thick, sweet, black soy sauce, similar to that used in China. In Malaysia it is served with poh pia. Its flavor is closer to that of kecap hitam than to kecap manis.

Sprouts, soybean. See Bean sprout, soybean. Sushi (describes many types, with recipes). Sweet bean paste or Sweet bean sauce: See Bean pastes and sauces.

Taho (Philippine bean curd brains). Tahoe (Indonesia or Malaysia, fermented bean curd). Tahu (Malaysia bean curd). Ta hua (Malaysia bean curd). Tahure (Philippine bean curd).

Tamari (Japan): See soy sauce. Taucheo (Malaysia or Singapore, bean pastes and sauces). Tauge (Indonesia bean sprout). Tauhu kao (Thailand bean curd). Tauhu kuning (Indonesia and Malaysia bean curd pressed). Tauhu leong (Thailand bean curd, pressed). Tauhu tod (Thailand bean curd, fried). Taukwa (Indonesia and Malaysia bean curd pressed). Tau sa (Malaysia bean paste and sauces). Tausi (Philippines, bean curd products [sic, fermented black soybeans], fermented).

Tempe (Indonesia, Malaysia): Fermented soybean cake [tempeh]. Oncom [Ontjom]. Tokwa (Philippine bean curd pressed).

Tosa soy sauce (Japan): The classic sashimi accompaniment. Recipe given.

Tsukemono: Takuan, umeboshi.

Usu-age (Japan): See Bean curd (fried) purses.

Winged bean. Yuba (Japan).

Brief biography: "For more than twenty years she has been professionally involved with Asian food as a writer, teacher, publicist, researcher, consultant, and, of course, cook. She has traveled extensively in Asia and lived in Hong Kong for more than ten years, working as a food writer on a number of newspapers and magazines, which led to a career as a food consultant. Her most recent book, *Asia the Beautiful Cookbook* was listed by *Publishers Weekly* as one of the best books of 1987." Address: Author of several books on Asian cuisine.

1342. Yokotsuka, Tamotsu. 1991. Proteinaceous fermented foods and condiments prepared with koji molds. In: Dilip K. Arora, K.G. Mukerji, and E.H. Marth, eds. 1991. Handbook of Applied Mycology. Vol. 3: Foods and Feeds. New York, NY: Marcel Dekker, Inc. x + 621 p. See p. 329-73. Chap. 11. [118 ref]

• ***Summary:*** Contains a great deal of very interesting information. Contents: 1. Introduction. 2. Fermented soybean foods in East and Southeast Asia: A. Douchi (China), Hama-natto (Japan), and in-yu (Taiwan). B. Shuidouchi (Shandong province, China), thua-nao (Thailand), kinema (Nepal), and natto (itohiki natto) (Japan). C. Tempe [Tempeh] and Oncom [Onchom] (Indonesia) (Making soybean tempe, volatile flavor of tempe, chemical composition and nutritional value of tempe, tempe bongkrek). D. Fermented tou-fu (soybean curd) products: Sufu (China and Taiwan), Tofuyo (Okinawa, Japan).

3. Fermented salty condiments in a slurry or paste made from soybeans and cereals: A. Doujiang (touchiang) (China) and Tauco [taucho] (Southeast Asia). B. Doubanjiang (Toupanchiang). C. Tianmianjiang (Tienmienchiang). D. Gochujiang and Doenjang (Korea). E. Hishio (Japan). F. Miso (Japan) (Production and consumption of miso, making rice miso and barley miso).

4. Fermented salty liquid condiments made from soybeans and cereals: A. Japanese shoyu (Manufacture of koikuchi and usukuchi shoyu, manufacture of tamari shoyu). B. Soy sauce produced in east and southeast Asian countries other than Japan (Korea, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, Thailand, People's Republic of China {the process, acid hydrolysis, was illegal until recently}, chijhi or whole soybean soy sauce still made in the basins of the Zhujiang {Pearl} River and the Huanghe {Yellow} River).

5. Biochemistry involved in shoyu and miso manufacture: A. Selection of raw materials. B. Contribution of improved cooking methods of raw materials to increase the enzymatic protein digestibility. C. Selection and improvement of koji molds. D. Improvement in koji making. E. Microbial and chemical control of salty mash fermentation. F. Flavor evaluation of koikuchi shoyu. G. Stability of color of pasteurized shoyu. H. Nutritional concern about shoyu and miso (salt content). Safety of koji molds and shoyu (aflatoxins).

6. Conclusion.

Tables show: (1) Chemical composition of kinema, thua-nao, and douchi. (2) Changes in nitrogenous compounds during natto fermentation. (3) Changes of nitrogen compounds in sufu making. (4) Constituents of some types of miso. (5) Chemical composition of various kinds of genuine fermented shoyu in Japan. (6) Effect of cooking conditions of thoroughly moistened defatted soybean grits on the enzymatic digestibility of protein. (7) Differences between *A. oryzae* and *A. sojae* used for shoyu fermentation. (8) Proteinases produced by *Aspergillus sojae.* (9) Enzyme composition of koji as influenced by the difference of material. (10) Various metabolic patterns by lactobacilli in shoyu mash. (11) Digestiblilities of protein in shoyu, miso, natto, and tempe fermentations. (12) Results of quantitative analysis of flavor constituents in koikuchi shoyu.

Figures show: (1) Flow sheet of tempe making. (2) Flow diagram of sufu making from 1 kg soybeans (with all quantities of ingredients, temperatures, and times). (3) Flow diagram of rice-miso fermentation from 1,000 kg soybeans and 600 kg milled rice. (4) Flow diagram of koikuchi

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shoyu fermentation from 330 kg defatted soybean meal (or 400 kg whole soybeans) and 340 kg wheat kernels. (5) Flow diagram of tamari-shoyu fermentation from 800 kg defatted soybeans, 346 kg wheat, 20 kg roasted barley flour, and 439 kg NaCl. (6) Microflora changes in shoyu mash fermentation. (7) Classification of Aspergilli. (8) Fermented foods and condiments made from soybeans mixed with or without cereal grains or flour.

Hama-natto in Japan (p. 332): The Taiho Laws, which took effect in 701, mention an office in Japan's imperial court that dealt with several fermented soyfoods including *"douchi* [2 Chinese characters given] or *kuki* (1 Cc): in Japanese, miso and jiang (1 Cc) or hishio (1 Cc)..." "The method of preparing salted and unsalted *douchi* [fermented black soybeans] is described in the book *Yoshufushi* (1686) and elsewhere. According to the oldest record about douchi in Korea, in 683, the product apparently was not an important food commodity in that country.

Salted douchi [fermented black soybeans, which originated in China] appeared in Central Japan with names such as "Hama-natto, Daitokuji-natto, and others, and in Taiwan as *In-si."*

Concerning *shuidouchi* (*Chinese salted natto with minced ginger. p. 332-35*)*:* This unusual product can be considered an intermediate form between *douchi* (salted fermented soybeans / fermented black soybeans) and the itohiki-natto family of foods; unlike *douchi* it is fermented with a *Bacillus* bacterium rather than with an *Aspergillus* mold, but unlike natto it is a salted product and has ginger added. To make *shuidouchi:* Boiled soybeans are naturally inoculated with *Bacillus subtilis* and incubated at high humidity and at 30-40ºC. This preference for a high temperature may be why the *Chi-min yao-shu* (6th century China) recommended that, when making douchi [fermented black soybeans], the temperature during incubation be kept rather low. In Shandong, China, *shuidouchi* are made as follows: Clean, soak, and boil soybeans until soft. Place in a cloth bag and cover with straw, which is the best natural source of *B. subtilis.* After incubation for 1-2 days at 25-30ºC the soybeans will be covered with viscous substances. Mix the sticky soybeans with minced ginger and salt, then pack tightly into jars, and age for one week. They are now ready to consume (See references 5 and 6). Address: Research Div., Kikkoman Corp., Noda City, Chiba prefecture, Japan.

1343. Roller, Ron. 1992. The U.S. soymilk market (Interview). *SoyaScan Notes.* Feb. 26. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** During the past 3-4 years, the U.S. soymilk market seems to be growing at about 10% a year. Sales slowed during and after the Gulf War, but overall the current recession has had little effect on Edensoy, soymilk and on the natural foods industry as a whole. There has been a proliferation of new products and package sizes. Most of Edensoy's volume is sold in liters. The ASP plant is now nearing capacity. Many people who used to have no interest in soymilk are now showing a strong interest. Concerning the size of the market, American Soy Products does not try to keep statistics, but he doubts that it is any larger than Soyatech says it is.

In terms of market share by volume of soymilk sold, Ron thinks that Edensoy has the largest share, Vitasoy is second (including their sales to the Asian-American market), Westbrae is third, and Pacific Soy is a distant fourth. No other companies have significant sales.

One interesting product is a soy & azuki milk, which Marusan launched in about 1982; Ron is not sure if it is still on the market.

Ron has heard from a fairly reliable source that a company has purchased soymilk equipment (he does not know from whom) to build a soymilk plant somewhere in the United States. It might be Vitasoy. Someone from Dr. Chung's in Korea (makers of Vegemil and Woorean) is planning to come to the USA to look for companies to market their Korean soymilk or for potential co-packers. Address: President, American Soy Products, 1474 N. Woodland Dr., Saline, Michigan 48176. Phone: 313-429-2310.

1344. Whiteman-Jones, Michael. 1992. Soyfoods poised for growth: New mass-market interest, product development and consumer interest are driving sales higher than ever. *Natural Foods Merchandiser.* Feb. p. 18-19.

• ***Summary:*** Last year soyfoods were introduced to mass-market consumers by two of America's corporate giants. (1) Archer Daniels Midland Co. (ADM of Decatur, Illinois) introduced the vegeburger to show that a delicious food product could be made from soy. ADM marketing specialist Lee Lensch says the soy burger is doing very well in test markets in Indiana, Illinois, and Minnesota. Versions of the product are being advertised nationally in corporate TV spots and on local TV in test markets. Buyers who gave the products shelf space at chains such as Kroger, SuperValue and Cub Foods now report brisk sales. (2) Protein Technologies International in St. Louis, Missouri, a subsidiary of Ralston Purina, is test marketing a soy-based beverage named First Alternative in Phoenix, Arizona.

Peter Golbitz, president of Soyatech Inc., a consulting company in Bar Harbor, Maine, notes that since the 1980s, Japanese companies (such as Nichii Co.) have invested at least $50 million in soyfoods manufacturing plants in the U.S.

"Retail sales of soyfoods are growing in America by about 5 to 7 percent a year, increasing to about $657 million in 1990, Golbitz says. The most rapid expansion is for soy milk, which is growing at a rate of about 20% a year, and second-generation soyfoods which are growing at a rate of about 15%... Soy milk consumption in Australia, where it is

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sold in grocery stores like milk, is about 10 times what it is in this country."

Worldwide, consumption of soyfoods now averages about 1.7 kg/person/year, and is expected to rise to 2 kg or more by the year 2000. Taiwan is the world leader with 15.5 kg/capita/year of soy, followed by Japan at 11.1 kg. A world map and table (largely compiled from FAO Food Balance Sheets) shows "Soyfood consumption: Yearly average per capita (Amount of change from 1979 to 1988)." The following countries are listed in descending order of consumption in kg/capita: Korea 17.1 kg (2.4%). Taiwan 13.0 (37.0%). Japan 10.8 (6.7%). Indonesia 6.3 (57.4%). Hong Kong 3.8 (-22.0%). Saudi Arabia 3.6 (342.9%). China 3.4 (-5.6%). Paraguay 2.8 (50.0%). Malaysia 2.3 (102.2%). Thailand 1.6 (162.5%). Zimbabwe 1.6 (22.2%). United States 1.4 (33.3%).

1345. Monaghan, Charles. 1992. At Koreana at the Mall at IV, Paramus. *Record* (*The*) (*Hackensack, New Jersey*). March 13. p. 91.

• ***Summary:*** "Historically Korean culture was much influenced by China, but a Japanese occupation lasted from 1910 to the end of World War II, so the food bears some resemblance to both Chinese and Japanese cuisine."

At the mall in Paramus: "The star of the evening was the *doen jang*, based on a rich broth (probably beef), enhanced with a chili-flavored bean paste, and containing tofu and vegetables. It had a dense, lingering, unforgettable flavor."

There is no area for non-smokers.

1346. Yamawaki, Teijirô. 1992. Edo jidai shôyu no kaigai yushutsu [Exports of shoyu from Japan during the Edo Period]. In: 1992. Noda Shishi Kenkyu (Studies of Noda History), Vol. 3. Noda, Japan: Shishi Hensan (Noda City History Editorial Committee). See p. 63-93. March. 30 cm. [50 ref. Jap]

• ***Summary:*** This is one of the best sources known on the subject, which includes much information on the export of shoyu from Japan to other parts of Asia and to the Netherlands by the Dutch East India Company (VOC).

Chronology and basic concepts: Almost all shoyu (soy sauce) exported from Japan during the 1600s and 1700s (and all soy sauce exported officially or legally) was exported from a tiny man-made island named Dejima in Nagasaki Harbor. Most of it was exported by the Dutch East India Company (VOC), which was the only European company allowed to trade with Japan during this period of isolation from 1600 to 1854. The Japanese government classified all soy sauce exported from Deshima into two basic types: (1) Official trade freight (*motokata nimotsu*, also called *compania nimotsu*), and (2) Private trade freight (*waki nimotsu*, also called *yakusha / sojya* {staff / sailor} *nimotsu*). Official trade freight was the kind engaged in by the Dutch East India Co.; this freight was recorded in the Nagasaki Trading Firm Journal. Private trade freight referred to the goods traded privately by Dutch sailors and by the chief and staff working at the Nagasaki Trading Firm.

Note: In about 1600 the Chinese obtained an official trade permit and settled in Nagasaki. At the peak of Chinese activity there, about a century later, as many as 190 Chinese ships a year were visiting Nagasaki, and one-sixth of the town's population hailed from the East Asian mainland.

1609-1641–The Dutch East India Co. (VOC) maintains a trading post at Hirado, a small island off the northwest coast of Kyushu.

1634–Dejima (literally "protruding island," also spelled Deshima), a small artificial island in Nagasaki Harbor is constructed as ordered by shogun Iemitsu; it originally accommodated Portuguese merchants.

1638-1639–The Portuguese (and other Catholic nations) are expelled from Japan for suspected complicity in the Shimabara Revolt of 1637.

1641 May–The Dutch East India Co. is moved from to Hirado to Dejima, where they were kept almost like prisoners on the tiny island. For 200 years, Dutch merchants were generally not allowed to cross the little bridge from Dejima to Nagasaki, and Japanese were likewise banned from entering Dejima. From 1641 to 1853 the Dutch are the only Western nation allowed to trade with or to enter Japan, but solely on Dejima. Chinese and Korean traders are still welcome, but their movements are restricted.

Dutch ship arrivals: From 1641 to 1671 an average of 7 ships per year. From 1671 to 1715 about 5 per year. From 1715, only 2 ships were permitted each year; this was reduced to 1 ship in 1790 and again increased to 2 ships in 1799.

1647–Exporting of shoyu (soy sauce) to Asia from Japan (as official trade freight) began. The first shipment was 10 kegs (*taru / balien*) sent to Amping, on today's Taiwan, by the VOC's Taiwan Trading Firm. From 1647 to 1720, this shoyu was exported from the Nagasaki Trading Firm to each regional trading firm in Asia, including today's Hanoi, Vietnam (1652); Ayuthaya, Thailand (1657), Jakarta, Indonesia (1659), Malacca, Malaysia (about 1660), 250 km northwest of Phnom Penh, Cambodia (1665), Paliacatta, 40 km north of Madras, India (1666), Bengal region. India (1666), Colombo, Sri Lanka (1670), Surat, northwest coast of India (1672), Amboina, Banda, and Ternate, in the Moluccas, Indonesia (1693), Sulawesi Island (Celebes), Indonesia (1693).

Note: This document contains the earliest date seen (March 2021) for soybean products (shoyu) in Cambodia (1665); soybeans as such had not yet been reported by that date.

1685–The Shogunate at Edo limits the amount of "private trade freight" to 400 *kan* (1 kan = about 3.75 kg), or about 1,500 kg or 3,300 lb.

1669 March 31–20 kegs of shoyu are shipped from

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Japan to Batavia on a Chinese ship (Source: Diary of Casteel Batavia). This is the earliest document seen (March 2021) showing a Chinese ship exporting shoyu from Japan.

1687–20 kegs of shoyu made in Kyoto (1 keg = about 29.104 liters) is shipped to the Ceylon (today's Sri Lanka) trading headquarters. It is believed to have been made by a sake brewer in Kyoto. At that time, Sakai city, a southern suburb of Osaka city, was located on the edge of Osaka Bay at the mouth of the Yamato River. It is one of the largest and most important seaports in Japan during the Medieval era, and is also famous in the Kyoto/Osaka area (along with Kyoto) for its soy sauce production. During the period 1764-1780 shoyu was made in Sakai by 4 manufacturers, including Shobei Hosoya. Soy sauce made in Sakai was transported by ships along the Inland Sea (north of Shikoku), through the narrow straight between northern Kyushu and Shimonoseki, around the north and west sides of Kyushu, to Nagasaki. These ships from Sakai were called the "Sakai Raw Silk Carrier Boat" or *Sakai Bune.* They had been authorized to ship imported silk from Nagasaki since the Keichô period (1596-1611) of Edo era. The ship was empty going back from Sakai to Nagasaki and the space was used for soy sauce exports. Much of the shoyu exported from Japan to the Netherlands is thought to have been made in the Kyoto / Osaka area. It was probably made mainly in Sakai, while that made in Kyoto was exported in small amounts for special occasions. Extremely low priced shoyu is thought to have been made in Kyushu, and exported to China. None of the shoyu exported during the Edo / Tokugawa period (1600-1867) was made in the Edo / Tokyo (*Kanto*) area.

1711–In the Chinese and Western Freight Log it is recorded that 61 kegs of shoyu (56 large kegs and small kegs) as well as 40 kegs of miso were exported as "official trade freight," whereas 867 kegs were exported as "private trade freight." Thus, the private freight (in this rare year where records exist) was about 8 times as much as the official freight.

1712–Some 999 kegs of shoyu and miso are exported as "private trade freight," Unfortunately we are not told how many of these contained shoyu and how many contained miso.

1721-1792–The VOC exports Japanese shoyu only to its trading headquarters at Batavia (today's Jakarta, Indonesia); from there it is transferred to each regional trading firm.

1737–The VOC first exports Japanese shoyu to the Netherlands, from its Batavia headquarters. Thus, Japanese soy sauce first arrived in the Netherlands (and in Europe) in 1737. All this shoyu was exported as "official trade freight." This export route was used until 1760. During the 24 years from 1737 to 1760, approximately 46,000 liters of soy sauce were exported from Dejima to the Batavia headquarters, and 15,600 liters (about 1/3 of the total) were then shipped from Batavia to the Netherlands. In 1742 and 1743, no shoyu was transshipped from Batavia to the Netherlands. Thus, during the 22 years that shoyu was transshipped from Batavia to the Netherlands as "official trade freight" was about 707 liters/year. The amount exported was calculated based on the capacity of the "large keg" (29.104 liters); the small keg held exactly half this capacity (14.552 liters). In addition, a substantial amount of shoyu was presumably exported from Batavia to the Netherlands as "private trade freight."

Also in 1737 the limit of 400 *kan* on "private trade freight" is abolished, so that any amount can be exported in this way.

1790–Shoyu is first exported from Japan in comprador bottles; these bottles, made of grey / white porcelain, were recorded as "sterilized soy sauce" and 550 of them were used this year to export shoyu.

1795–The book titled *Travels in Europe, Africa, and Asia, Made between the Years 1770 and 1779...*, by Charles Peter Thunberg (a Swede) is published in English. An entry from about the year 1776 (Vol. 4, p. 107), in the chapter on Commerce, reads: The traffic in *Soy* [sauce]... is more considerable [than that of tea. Japanese] soy is much better than that which is brewed in China. For this reason, soy is not only exported to Batavia [Jakarta], in the wooden kegs in which it is made, but likewise sold from thence to Europe and to every part of the East Indies. In some places in Japan too the soy is reckoned still better than in others; but, in order to preserve the very best sort, and prevent its undergoing a fermentation, in consequence of the heat of the climate, and thus being totally spoiled, the Dutch at the Factory [at Desima / Dezima / Dejima] boil it up in iron kettles, and afterwards draw it off into bottles, which are then well corked and sealed [by applying bitumen / coal tar to the stopper]. This mode of treatment renders it stronger and preserves it better, and makes it serviceable for all kinds of sauce.

Note: This early discovery of pasteurization and sealing in porcelain bottles explains how the Dutch were able to keep this soy sauce from spoiling or becoming overfermented while it was being shipped from tropical Japan, to Batavia [Jakarta], across the Equator, around the Cape of Good Hope (south of Africa), then all the way to the Netherlands.

1799–The Dutch East India Co. (VOC) is dissolved.

1804-1829–A total of 2,672 kegs of shoyu is exported in Chinese ships during most of these 26 years from Japan. About 153 kegs/year are exported (range: 12 to 322 kegs, but with no exports in 1805, 1816-18, 1824-28).

1854–Japan's policy of self-imposed national isolation is abolished / ended. Shoyu can be exported freely, without limits.

Some 670 liters a year went to Holland. The soy sauce to be sent to Holland was put in a special container with special outside packaging. The shoyu that was exported was made mostly in Kyoto. In 1765 the famous French-language *Encyclopedia*, by Denis Diderot, had a section on soy sauce.

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Brief biography of Teijirô Yamawaki: 1914–Born in Japan. 1950–Graduated from Tokyo University, Dep. of Literature, Faculty of Japanese History. 1954–Awarded his doctorate (PhD) in history from Tokyo Univ. Between 1960 and 2002 he was the author of at least 8 books in Japanese including: (1) *Smuggling* (*Nukeni*) (1965, Nikkei Shinsho). (2) *Trading with Chinese Merchants in Nagasaki* (1964, Yoshikawa-kobunkan). (3) *Nagasaki Trading Firm of Dutch Merchants* (1980, Chiokoron). (4) *Encyclopedia of Silk and Cotton during the Edo Period* (*Jiten Kinu to Momen no Edo Jidai*) (2002, Yoshikawa-kobunkan, Tokyo, 230 p.).

Note: See also the excellent 16-page English-language summary of this report prepared and published by Kikkoman Institute for International Food Culture (KIIFC) in Noda, Japan. Address: Japan.

1347. **Product Name:** Toffle (Eggless Tofu Waffle).
**Manufacturer's Name:** Dae Han, Inc.
**Manufacturer's Address:** 737 S.E. Alder St., Portland, OR 97214. Phone: 503-233-8638.
**Date of Introduction:** 1992 April.
**New Product–Documentation:** Talk with Judy Krizmanic of *Vegetarian Times*. 1992. May 27. She saw this product at the Natural Foods Expo in Anaheim, April 1992. Spot in Vegetarian Times. 1992. Aug. p. 82. Tofu, a main ingredient, holds the waffle together, so eggs are unnecessary.

1348. Gemignani, Janet. 1992. Pancakes for the serious diner: smart dining. *Record* (*The*) (*Hackensack, New Jersey*). May 16. p. 28.
• ***Summary:*** At The Koreana there is a no-smoking section. "Three types of omeletlike pancakes arrive with The Koreana combination, which also includes... an incredibly good *doen jang* (a beef broth enriched with chili-flavored bean paste, tofu, and vegetables),..."

1349. **Product Name:** Tofu, and Soy Sprouts.
**Manufacturer's Name:** Manna Foods Inc.
**Manufacturer's Address:** 2030 Will Ross Court, Chamblee, GA 30341. Phone: 404-454-7569.
**Date of Introduction:** 1992 July.
**New Product–Documentation:** Talk with James Kim, owner. 1993. Nov. 18. He bought this company in May 1993 from Mr. Wang of Manna Foods at the same address. He currently makes tofu, soy sprouts, and mung bean sprouts. Mr. Wang started the company about two years ago at the same address and he made the same foods.

Talk with an employee at Calco of Atlanta. 1993. Nov. 18. Mr. Wang was a Chinese-Korean who was born in Korea. He first/given name in Chinese was something like Wei-Gan. He closed his business (without filing for bankruptcy) in about the summer of 1992 after he had been in business for only about 3 months. He sold or tried to sell his equipment. He definitely did not run the business for 2 years. The people at Calco (which has been in business for 10 years) know him well and feel strongly that he was a sneaky man with no integrity. He developed a bad reputation in Atlanta, where he was widely known in the Korean community. For example, he posed as a real estate agent and said that he had a client who wanted to buy Calco for a very high price. Then he said before he could finalize the sale he wanted a list of customers, statistics on how much Calco sold to each account, credit references, etc. Calco gave him that information before they found out that he was an imposter. Then Mr. Wang took 6 of Calco's employees to establish his own business. After Mr. Wang went out of business, most of these employees came back to Calco because they had not been properly paid. They wanted their jobs back, but Calco was able to hire only 2 of them.

1350. Krizmanic, Judy. 1992. Savvy new soyfoods. *Vegetarian Times*. Aug. p. 82-83.
• ***Summary:*** Highlights, with color photos, Living Lightly non-dairy soy ice cream from Turtle Mountain, Toffle (eggless tofu waffle) from Dae Han, Tofutti Better than Cream Cheese, Westsoy Lite Non Dairy Creamer, Pita Melts from Health in Wealth, Meatless Tofu Steaks from White Wave, Ken & Robert's Veggie Pockets.

"Soy much to learn. Want to learn more about soy? Send a self-addressed, stamped, business envelope to the Soyfoods Center..."

1351. Yang, Sung-Ho; Chung, Y.J. 1992. [Optimization of the taste components composition in traditional Korean soybean paste]. *J. of the Korean Society of Food and Nutrition* 21(4):449-53. Aug. [13 ref. Kor; eng]
• ***Summary:*** "In order to optimize the taste of traditional soybean paste, the constitution of taste components was analysed by multiple regression between the original data transformed with square root sensory scores of the soybean paste. This way explained the sensory evaluation best score." Address: Dep. of Food Science and Technology, Shinil Junior College, Taego 706-060, Korea.

1352. Housman, Bob. 1992. Mainland Express now makes only 360 lb/week of tofu (Interview). *SoyaScan Notes*. Sept. 11. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Several years ago the FDA came into supermarkets and surrounding states and found that the temperature at which tofu was being stored was too warm. The supermarkets said that they could not keep the temperature in the refrigerated cases low enough, so virtually all dropped Mainland's tofu and switched to Mori-Nu, which is aseptically packaged. Hinoichi also sells a little tofu in the area. Mainland still has a large tofu factory but they use it only one day a week to make tofu.

Note: The above call was based on a talk with Jim Skiff of Minneapolis. 1992. July. Prof. William Breene at the

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University of Minnesota in St. Paul told him that Eastern Foods no longer makes tofu. Address: P.O. Box 405, Spring Park, Minnesota 55384. Phone: 612-471-8034.

1353. Griffis, Gil; Wiedermann, Lars. 1992. Marketing food-quality soybeans in Japan: A manual on how to profit from the niche market in Japan for value-added soybeans. 5th ed. St. Louis, Missouri: United Soybean Board. 25 p. Nov. 28 cm.

• ***Summary:*** Contents: Introduction. Japan: Desired soybean characteristics, tofu (procedure for making tofu, desired soybean characteristics, color of hilum, seed size {the larger the better, preferably more than 20 grams/100 beans}, color of cotyledons, hull, composition, special notes, American interpretation), miso (same categories of information as tofu), natto (ditto; seed size: The smaller the better, with a maximum of 5.5 mm diameter. Round shape is preferred to oval in order to limit swelling during the soaking and boiling processes), food quality soybean varieties (name or code-name of 42 varieties, maturity zone, release year, used to make what soyfoods), distribution channels, marketing channels, protocol, pricing, organically-grown soybeans.

Taiwan: Introduction, list of 4 major buyers, users, and trade associations. Korea. Southeast Asia. United States.

Appendix I. Distribution systems for soybeans used for food in Japan: Tofu (23,000 tofu shops of which 13,000 are members of the Tofu Association), natto, miso.

Appendix II. Food soybean imports by country of origin, 1984-1991. USA is the largest supplier (845,000 tonnes in 1991), followed by China (279,000), then Canada (28,000). Total imports, which have stayed about constant during this period, were 1,152,000 tonnes in 1991.

Appendix III. Distribution by usage of soybeans used for food–1991, direct use only in tonnes (metric tons). Tofu: 607,000 tonnes total, of which 562,000 come from the USA and Canada, 25,000 from China, and 40,000 from Japan. Up 2% from 1989.

Miso: 171,000 tonnes total, of which 38,000 come from the USA and Canada, 121,000 from China, and 12,000 from Japan. Up 0.5% from 1989.

Natto: 147,000 tonnes total, of which 87,000 come from the USA and Canada, 50,000 from China, and 10,000 from Japan. Up 9% from 1989.

Other: 39,000 tonnes total, of which 20,000 come from the USA and Canada, none from China, and 19,000 from Japan. Total food use of 964,000 tons is up 2% from 1989. Source: Japanese trade newspapers and trade associations. These figures do not include a estimated 492,000 tonnes of soybeans used indirectly (in the form of defatted soybean meal) for soy sauce, 222,000 tonnes used for soy protein, and 20,000 tonnes for other indirect uses.

Appendix IV. Directory of direct importers of food-quality soybeans for each is given: Home office in Japan. Representative office in the U.S.

Appendix V. Traders of food-quality soybeans (3 companies).

Appendix VI. Soy food organizations in Japan (tofu, miso, soymilk, packaged tofu, natto). Appendix VII. Helpful contacts.

Food quality soybean varieties (with maturity group / zone, and year released; table, p. 5): Chico (00, 1983), Grande (0, 1976), Proto (0, 1989), Minnatto (0, 1989), NattoKing [Nattoking] (I, 1988), Disoy (I, 1967), Vinton (I, 1978), Vinton 81 (I, 1981), King Natto (I, 1985), Kato (I, 1989), Magna (II, 1967), Prize (II, 1967), Marion (II, 1976), LS201 (II, 1989), Provar (II, 1969), Beeson (II, 1969), Kanrich (III, 1956), Kim (III, 1956), LS301 (III, 1989), Verde (III, 1967), IL2 (III, 1989; from Illinois), Hawk (III, ?), Emerald (IV, 1975), Vance (V, 1986), Camp (V, 1989), Hartz 936X (VI, 1981), Hartz 914 (VI, 1989), Hartz 922 (VI 1989), Merrimax (?, 1986).

Note: This report was originally published in Sept. 1989, mainly for use by the American Soybean Association office in Tokyo. Address: 1. Division Director for Asia; 2. Country Director for Japan. Both: American Soybean Assoc.

1354. Kolak, Ivan; Henneberg, R.; Milas, S.; Radosevic, J.; Satovic, Z. 1992. Soybean breeding and seed production in Croatia–Current status and perspectives. *Eurosoya* No. 9. p. 76-84. Dec. [31 ref]

• ***Summary:*** "Soybean seed was introduced from China by sailors from Dubrovnik for the first time in 1800 and, the same year it was planted in Dubrovnik, Konavle, Slano and Ston under the name 'Chinese yellow beans' (p. A. Buconjic 1804 cit. according to fra. I. Simic, 1826). Soybean was spread from Dubrovnik to the Neretva Valley (Opuzen, Metkovic, Caplijna, Mostar) and the seeds were used for human consumption and as poultry feed. The Franciscans from Dubrovnik selected the best plants from crops and the seed was sold on markets. As early as 1804 the seed selected within soybean population was sold under the name "Dubrovnik yellow beans" and since then individual selection of soybean population began. During the 19th century, by constant selection of the best and healthiest plants, soybean production began to be based upon domesticated and well adapted indigenous populations and selected lines. Soybean was grown mainly in gardens and rarely as a major crop. It was used for human consumption and as feed for livestock.

"A planned introduction of soybean to Croatia was initiated by the Austrian biochemist Friedrich Haberlandt (lived 1826-1878) after the seed exhibition in Vienna in 1873. He introduced about 20 cultivars from China, Japan, Korea, Tunisia and Transcaucasia and carried out several multicultivar adaptation trials from Bohemia to Dubrovnik. Unfortunately his intentions were misunderstood and that was the main reason why soybean did not spread significantly in Croatia at that time.

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"More comprehensive work on the introduction of soybean in Croatia was carried out by Stjepan Cmelik in Korija near Virovitica. The lack of cattle feed in 1921 stimulated him to import several cultivars from China and Manchuria. He tested them and selected only those plants which reacted favourably to agroecological conditions. In this way he started soybean selection in Croatia and after several years the so-called 'Cmelik's soybean' was developed and largely extended over the regions of Posavina and Slavonija region (maturity group 1). Friedrich Reiner continued to grow 'Cmelik's soybean' on his farm near Osijek selecting the best plants and he created his own improved cultivar named 'Osjecka'. Between 1931 and 1934 seed yield of the cultivar 'Osjecka' varied from 1.6 to 2.2 tons/hectare and that was the reason why it was extended over Podunavlje, Posavlje, Romania and Bulgaria.

"Academician Alois Tavcar brought Manchurian soybean populations from Prague [Czechoslovakia] in 1918 and began his research work at the Faculty of Agriculture and Forestry in Zagreb. By individual selection of the best plants from introduced populations he released the first domestic soybean cultivars M 7, M 14 and M 60 (M stands for Maksimir, experimental field near the Faculty of Agriculture in Zagreb). These cultivars had shorter vegetation than Cmelik's and Osjecka and were spread in the production of the northwest region of Croatia, as well as in Slavonia and Srijem.

"During the second world war the old genotypes were saved. After the war more intensive soybean introduction and breeding started in Croatia. The new young generation of plant breeders–Tavcar's successors–continued to work on soybean breeding and seed production: V. Milinlkovic (1946-1950) and Ruzica Henneberg (1952-1953 and 1958-1992)–Tavcar's assistants at the Faculty of Agriculture in Zagreb; D. Palaversic (1946-1950) at the Institute for Plant Breeding and Crop Production in Botinec near Zagreb; M. Budisic (1945-1970), Marija Vrataric (1970-1992) and M. Krizmanic (1973-1978) at the Institute of Agriculture in Osijek; I. Vicic (1960-1980), F. Satovic (1960-1980) and I. Kolak (1973-1987) in the Croatian Agricultural Centre in Zagreb–Sesvete. During this period a considerable number of cultivars and lines were released...

Note: As of Sept. 2015, Osijek is the 4th largest city in Croatia.

"The world-wide gene-collections were established at the Faculty of Agriculture in Zagreb–Maksimir (Milinkovic, Henneberg), Zagreb–Botinec (Palaversic), Zagreb–Sesvete (Satovic) and Osijek (Vrataric). In the 1950s D. Palaversic started to work on maize breeding and the soybean gene-collection from Botinec was transferred to the Faculty of Agriculture, Zagreb–Maksimir. The same thing happened in 1987 with the gene-collection of the Croatian Agricultural Centre when I. Kolak came to work at the Faculty of Agriculture from the Centre. In 1982 Jasna Radosevic started to work on the soybean breeding programme at the Faculty of Agriculture.

"From 1950 to 1980 many introduced and domestic cultivars were examined in a network of small-plot multicultivar trials at various locations arranged in conjunction with the Agricultural Extension Service. From 1979 to 1989 the Faculty of Agriculture in Zagreb and Institute of Agriculture in Osijek joined the European network on soybean."

Graph 1 shows soybean area and yield from 1947 to 1990. Prior to 1981 soybean area was less than 5,000 ha; it reached about 5,000 ha in 1949, 1950, and 1973. During the 1980s soybean area grew rapidly from about 2,000 ha in 1980 to 27,000 ha in 1990. Yield rose steadily from about 600 kg/ha in 1947 to 2,000 kg/ha in 1959 to 2,750 kg/ha in 1989. Table 1 shows cultivars released in Croatia from 1804-1991, including the breeder's name, cultivar name, maturity group, year of release, production region, and range of yields. The earliest variety was Chinese Yellow Beans, Maturity Group 1, in 1804, grown in Dubrovnik and Hercegovina.

Table 3 shows minimal and maximal yields of Croatian soybean cultivars in small plot trials from 1980 to 1990. The record yield of 4.5 tonnes/ha was attained by the cultivar named Tisa at Darda in 1988.

Note: This document contains the 2nd earliest date seen (June 2015) for soybeans in Croatia, or the cultivation of soybeans in Croatia (1800). The source of these soybeans was China. Address: Faculty of Agriculture, Univ. of Zagreb, Svetosimunska 25, 41000 Zagreb, Croatia.

1355. Chung, K.W.; Hong, B.H.; Seong, R.C.; Lee, J.I. 1992. [Varietal difference in chemical composition of summer type soybean seed]. *Korean J. of Breeding* 24(1):22-27. *
• ***Summary:*** Reported that the range of sugar content for 53 summer-type soybean lines was 6.1 to 10.0%.

1356. **Product Name:** [Korean Soybean Miso].
**Foreign Name:** Doen Jang.
**Manufacturer's Name:** MSB Food Enterprises, Inc.
**Manufacturer's Address:** 430 Casanova St., Bronx, NY 10474. Phone: (212) 617-6700.
**Date of Introduction:** 1992.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Michael Lee, V.P. Gomé Tofu Inc. 1996. Nov. 14. His father, John Lee, a Korean-American, started MSB Food Enterprises in 1986 in the Bronx to make different foods from soybeans using all natural processes. In 1992 they introduced *doen jang* (pronounced TEN-jang, Korean Soybean Jang, like miso). In December 1995 the company moved to a new address: 710 Longfellow Ave., Bronx, New York 10474. Phone: (718) 617-4105.

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1357. Shon, B.Y. 1992. Variation of sugar content and its relation with some major characteristics of collected colored-soybean strains. MSc thesis, Seoul National University, Korea. *
• ***Summary:*** Reported that the range of sugar content for 1,087 local soybean lines was 8.3-12.5% with a mean of 10.1%.

1358. Asian Vegetable Research and Development Center. 1992. Annotated bibliography of soybean rust (*Phakopsora pachyrizhi* Sydow). Shanhua, Taiwan: AVRDC. 160 p. Author index. Subject index. Geographical index. 26 cm. AVRDC Library Bibliography Series No. 4-1. [480 ref]
• ***Summary:*** This publication supersedes an earlier edition published by AVRDC in 1987. It includes an additional 160 citations covering the period 1985 to May 1991.

Compiled by P.L. Hwang, F.C. Chen, and C.C. Wei, this bibliography contains abstracts of documents about soybean rust which are available in the AVRDC Library. Contents: Explanatory note, general information, pathogen morphology and taxonomy, physiology and biochemistry, epidemiology, pathogenic specialization, etiology, yield loss, and disease management (incl. general, chemical control, biological control, host resistance, cultural control).

Countries or continents mentioned in the index at geographical distribution of soybean rust: Africa, Asia, Australia, Brazil, Cambodia, China, Columbia, Costa Rica, Cuba, Guatemala, India, Indonesia, Israel, Japan, Korea, Latin America, Malaysia, Nepal, Papua New Guinea, Philippines, Puerto Rico, Soviet Union, Sri Lanka, St. Thomas, Suriname, Taiwan, Thailand, Togo, United States, West Indies, Venezuela, Vietnam, Zambia. Address: P.O. Box 42, Shanhua, Tainan 74199, Taiwan.

1359. Buswell, Robert E., Jr. 1992. The Zen monastic experience: Buddhist practice in contemporary Korea. Princeton, New Jersey: Princeton University Press. xiii + 264 p. + [8] p. of plates. See p. 120-21. Illust. Index. 25 cm. [190+* ref]
• ***Summary:*** The section titled "Meals" (p. 120-25) notes that there are many similarities between the diet in the monasteries and that in the homes of the local agricultural peasants. "The major difference is that all meals served in the monasteries are vegetarian [actually vegan]. The bodhisattva precepts of the Mahayana branch of Buddhism forbid monks from eating the flesh of any sentient being." Cereal grains provide 70-80% of the caloric intake. "In addition to steamed rice, meals always include some kind of soup (*kuk*)... The soup is generally based on toenjang, a fermented bean paste like Japanese miso and flavored with soy sauce (*kanjang*) and sesame salt."

"Bean products constitute one of the largest components of the monastic diet during all seasons. The basis of many bean products is *meju*, a fermented bean paste somewhat like the Japanese *nattô* [more like the Japanese *miso-dama*, or soybean koji]. *Meju* is used as a major ingredient in producing soy sauce, red-pepper paste, and *toenjang*. Cooked black [soy] beans, seasoned with soy sauce, sugar, and white sesame, are served at least once a day. Tofu (*tubu*), or bean curd, frequently appears on this menu, but this is always purchased from a professional maker, who delivers it to the monastery on the back of his motorcycle. When the tofu is especially fresh, it is served steamed in whole blocks, to be dipped into a sauce made of soya, sesame oil, and red-pepper sauce."

Because of Mahayana Buddhism's dietary restrictions, monks don't eat garlic or onions, so widespread in the diets of regular Koreans. Those foods are considered "to be mild aphrodisiacs, something celibates can do without. To compensate for the blandness of the food, the kitchen staff replaces the garlic and onions with lots of red pepper (*koch'u*), along with red-pepper paste (*koch'ujang*)," brown sesame and white sesame. At the ceremonial dinner on festive days, white rice is replaced by glutinous rice and special dishes such as fried tofu and nori (*kim*) are served.

Note: The author was privileged to spend five years as a Buddhist monk in Korean monasteries between 1974 and 1979, primarily at Songgwang-sa. He made two additional trips to Songgwang-sa in Nov. 1987 and July 1988. The monastery is in Suncheon near the southern coast of Korea.

1360. Crawford, Gary W. 1992. Prehistoric plant domestication in East Asia. In: C. Wesley Cowan and Patty Jo Watson, eds. 1992. The Origins of Agriculture: An International Perspective. Washington, DC: Smithsonian Institution Press. xvi + 224 p. See p. 7-38. [154* ref]
• ***Summary:*** Contents: Introduction. Environment. Chronology and prehistory: China, Korea, Japan. Initial speculations (Japan). Archaeobotany and recent research. Northeast spread of plant husbandry. The cultigens: Barley (*Hordeum vulgare*), barnyard millet (*Echinochloa utilis*), broomcorn or common millet (*Panicum miliaceum*), foxtail millet (*Setaria italica* ssp. *italica*), rice (*Oryza sativa* [*Oryzae sativa*]), wheat (*Triticum aestivum*), adzuki and mung beans (*Vigna angularis* and *Vigna radiatus*), hemp (*Cannabis sativa*), melon (*Cucumis melo*), (), beefsteak plant and *egoma* (*Perilla frutescens*), other cultigens (incl. buckwheat, soybean, pea). Discussion and directions for future research. Acknowledgments.

The time span covered by this chapter ranges from about 8500 B.P. to 100 B.P. The origin of agriculture in China can be dated from about 7000 B.P. "The prevailing view is that agriculture began in Korea and Japan in the third millennium B.P. with the initiation of rice-based agrarian societies by both the diffusion of crops and ideas and the migration of people. Evidence is mounting, however, for earlier archaeological origins in these two areas" (p. 7).

In China, any cite with ceramics and no evidence of

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metallurgy is considered Neolithic. Pottery-bearing sites before 8500 B.P. are termed early Neolithic (p. 13). During the Neolithic, dependence on food production gradually increased.

Illustrations show: (1) Map of 10 vegetation zones of East Asia. (2) Diagram summarizing Northeast Asian chronology in northern China, Korea, southwest Japan, and Northeast Japan, from 8000 B.P. to 500 B.P. Arrow width is roughly proportional to the degree of dependence on food production. (3) Map showing location of 59 East Asian sites [archaeological, in China, Korea, and Japan] mentioned in the text. Address: Assoc. Prof. and Chair of the Dep. of Anthropology, Univ. of Toronto, Canada.

1361. Hong, E.H.; Kim, S.D.; Ko, M.H.; Lee, Y.H.; Lee, S.Y.; Kim, H.S. 1992. Research on the exportable vegetable soybean production and marketing system. *

1362. Increasing soybean production in Asia: Proceedings of a workshop held in Phitsanulok, Thailand, August 21-24, 1990. 1992. CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia. vii + 187 p. Illust. Author index. 25 cm.
• ***Summary:*** Contents: Foreword by Peirre Rondot, SYGAP Regional Coordinator, CIRAD/CGPRT Centre. Map of study sites in Thailand and Indonesia. Thailand (3 papers). Indonesia (4 papers). Country papers: China. Korea. Philippines (2 papers). South Viet Nam. Sri Lanka. Appendices: Directory of Participants and observers. Authors.

"These proceedings are the results of the Soybean Yield Gap Analysis Project in Thailand and Indonesia with country papers from China, Korea, the Philippines, South Viet Nam and Sri Lanka.

"Soybean production and utilization, socio-economic constraints on the grower, and the transfer of research results and the adoption of new technology by farmers are aspects covered in both Thailand and Indonesia.

"China's problems of production, and consumption prospects, the intensive cultivation practices of Korea and the private and company production of soybean in the Philippines provide interesting contrasts. The status of soybean in South Viet Nam contrasts in turn with the Yield Gap Analysis of Soybean in Sri Lanka." Address: Indonesia.

1363. Kim, Hong Sig. 1992. Cultural practices and varietal improvement to bridge the soybean yield gap in Korea. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 107-17. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [5 ref]
• ***Summary:*** Contents: Introduction. Improvements in varieties and cultivation practices: Soybean varietal improvements, soybean cultivation practices. Address: Soybean Breeding Research Section, Upland Div. (I), Crop Experiment Station, Rural Development Administration, Korea.

1364. Tamang, Jyoti P. 1992. Studies on the microflora of some traditional fermented foods of Darjeeling hills and Sikkim. PhD thesis, University of North Bengal, Darjeeling, India. 224 p. *
• ***Summary:*** Products closely resembling kinema include: *Hawaijar* (Manipur in North-East India [NEI]). *Bekang-um* (Mizoram in NEI). *Troombai* (Meghalaya in NEI). *Akhoni* (Nagaland in NEI). *Itohiki-natto* (Japan). *Tooa-nao* [*Thua-nao*] (Northern Thailand). *Chungkook-jang* (Korea).

Note 1. This is the earliest document seen (Jan. 2012) that uses the word "Akhoni" to refer to a fermented soyfood from Nagaland and a close relative of Nepalese kinema and Japanese natto.

Note 2. This is the earliest document seen (Oct. 2010) that mentions "Bekang-um" (also called "bekang"), a close relative of Nepalese kinema and Japanese natto.

Note 3. This is the earliest document seen (Oct. 2010) that mentions "Troombai," a close relative of Nepalese kinema and Japanese natto.

Note 4. This is the earliest document seen (Jan. 2012) that contains the word "Tooa-nao," an alternative spelling for *thua-nao,* a close relative of Nepalese kinema and Japanese natto, or the alternative spelling "Chungkook-jang" for Korean-style natto. Address: Univ. of North Bengal, NBU 734430, District of Darjeeling, West Bengal, India.

1365. Badani, Bernard. 1993. Edible soybean mission report, Korea, Indonesia, Taiwan, February 1993. Ottawa, Ontario, Canada: Agriculture and Agri-Food Canada. iii + 14 + 17 p. 28 cm. Spiral bound.
• ***Summary:*** Contents: Foreword. Acknowledgements. Mission members: Tino Breuer, Ron MacDougall, Dr. Gary Ablett, Jim Lowe, Bernard Badani. 1. Visit to Korea: Executive summary, report, conclusions, recommended follow-up. 2. Visit to Indonesia: Executive summary, report, background, price structure, quality requirements, conclusions, recommended follow-up. 3. Visit to Taiwan: Executive summary, report, background, price structures, conclusions, recommended follow-up. Appendix A. List of contacts (photocopies of business cards of people met on the trip). List of 26 invitees for Canadian soybean seminar in Seoul (15 Feb. 1993), including academic researchers, government, soybean crushers, soysauce association, tofu association, food-related media, soybean milk manufacturers (Kwangja General Foods Co., Namyang Dairy Co., Lotte-Chilsung Beverage Co., Samyuk Foods Co., Dong-A/Otzka Co., Dr. Chung's Foods, See Joo Industry Co.). List of participants for Indonesia and business cards from Indonesia (incl. Primkopti, Sarpindo, Ikapti, Yeo's-P.T. Salim Graha). Business cards from Taiwan. Address: Oilseeds Div., Grain Marketing Bureau, Grains and Oilseeds Branch, Agriculture

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Canada, Ottawa.

1366. Ontario Soybean Growers' Marketing Board. 1993. [Canadian soybean seminar]. 32 p. Held 15 Feb. 1993 in Seoul, Korea. [Kor]
• ***Summary:*** Contains Korean translations of papers presented by Tino Breuer and Gary R. Ablett, plus a statement about soybean grading and grades in Canada.

1367. *SoyaScan Notes.* 1993. The world's most active countries with respect to soybeans and soyfoods, as of 1 April 1993 (Overview). April 1. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** A tally by country on the SoyaScan database (which currently contains 42,087 bibliographic references relating to soybeans and soyfoods) shows the following countries to have the largest number of listings relating to soya (over 200): United States of America 21,459, Japan 5,599, Germany 2,053 United Kingdom 1,986, China 1,844, France 1,601, India 1,222, Canada 1,112, Indonesia 993, Brazil 873, Netherlands 809, Manchuria 733, USSR 665, Italy 596, Australia 467, Korea 463, Taiwan 460, Belgium 400, Austria 375, Mexico 371, Switzerland 353, Sri Lanka 341, Philippines 323, Yugoslavia 321, Nigeria 312, Sweden 289, Argentina 244, Israel 240, Czechoslovakia 237, Denmark 225, Bulgaria 219, Malaysia 214, Thailand 214, South Africa 207, Spain 204, Russia 203.

1368. Leneman, Leah. 1993. 365 plus one vegan recipes: Delicious meals and ideas for every day of the year. Hammersmith, London, England: Thorsons–An imprint of HarperCollins Publishers. 144 p. April. Index. 24 cm.
• ***Summary:*** Chapter 1 of this book, titled "The Vegan Dairy," gives recipes for homemade soya milk, mock cream (from soya milk), soya flour cheese, yogurt cheese (from soya yogurt). There are also recipes for cashew or almond milk, cashew cream, and cashew cottage cheese.

Chapter 11 (p. 85-100), titled "Tofu and other Soya Foods," contains a long introduction plus the following recipes: Home-made tofu. Tofu and onions. Sweet and sour tofu and vegetables. Sea-flavored crisp tofu slices. Mushroom stroganoff. Tofu kebabs. Tofu casserole. Warming winter stew (with tofu). Korean-style kebabs (with tofu and miso). Tofu and green pea bhajia. Tofu 'scrambled eggs.' Scrambled tofu and mushrooms. Tofu piperade. Spicy tofu scramble with red pepper and tomato. Tofu knishes. Tofu and pea curry. Tofu burgers. Swiss steak (with frozen tofu). Savoury tofu 'mince' (with frozen tofu). Crispy fried sea-flavoured frozen tofu. Tofu goulash. Smoked tofu stew. Smoked tofu, courgette and sweetcorn risotto. Smokey duvec (with smoked tofu). Pease pudding and smoked tofu bake. Smoked tofu pasties. Steamed savoury smoked tofu pudding. Smoked tofu charlotte. Lek and smoked tofu au gratin. Smoked tofu and mashed potato cakes. Tempeh croquettes with mushroom sauce. Tempeh hash with potatoes. Indonesian-style tempeh. Tempeh stroganoff. Japanese-style tempeh kabobs. Tempeh burgers. Tempeh chilli. Mock 'ham' (with dried bean milk sheets [yuba]). Mock 'chicken' (with yuba). Mock chicken cooked Indonesian style.

Chapter 13 is entirely about sea vegetables, and a number of the recipes contain tofu, tempeh, miso, or soya milk. A number of other recipes throughout the book also use soyfoods as an ingredient. Address: 19 Leamington Terrace, Edinburgh EH10 4JP, Scotland.

1369. **Product Name:** Tofu, and Soy Sprouts.
**Manufacturer's Name:** Lotte Oriental Foods Inc.
**Manufacturer's Address:** 2030 Will Ross Court, Chamblee, GA 30341. Phone: 404-454-7569.
**Date of Introduction:** 1993 May.
**New Product–Documentation:** Talk with James Kim, owner. 1993. Nov. 18. He bought this company in May 1993 from Mr. Wen Wang of Manna Foods at the same address. He currently makes tofu, soy sprouts, and mung bean sprouts. He plans grow shiitake as well. Mr. Wang started the company in about Nov. 1991 at the same address and he made the same foods.

Talk with James Kim. 1998. July 30. He is no longer making tofu or soy sprouts or any other soyfoods. His business is now retail.

1370. Goh, H.G.; Choi, J.S.; Uhm, K.B.; Choi, K.M.; Kim, J.W. 1993. [Spatial distribution pattern of beet armyworm, *Spodoptera exigua* (Hubner), larvae in the Welsh onion field]. *Korean J. of Applied Entomology* 32(2):134-38. June. [9 ref. Kor; eng]
• ***Summary:*** Host plants include soybean, adzuki bean, and peanut. Address: 1, 3-4. Agricultural Science Inst., RDA, Suwon 441-707, Korea.

1371. Executive Committee Secretariat. 1993. The Roots of Biotechnology in Monsoon Asia: The Third Asian Symposium on Non-Salted Soybean Fermentation and International Soybean Food Fair. Akita Cultural Center, Akita City, Japan: 4-6 June 1994 (Leaflet). Akita, Japan. 2 p. July.
• ***Summary:*** The executive committee for this event is: Chair: Prof. Tadao Watanabe. Vice-Chair: Prof. Fumio Yamauchi. Indonesia Advisor: Dr. Darwin Karyadi. United Nations University (UNU) Food and Nutrition Programme Advisor: Dr. Abraham Besrat.

The symposium hopes to focus on South-South cooperation for technical transfer of soybean technologies (koji, tempe, natto) to Africa in order to alleviate an impending protein crisis beyond the year 2000.

Program outline: Part I: International Soybean Food Fair–Industrial/commercial exhibition and cooking demonstration of ethnic cuisine using soybean products.

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Part II: Public Symposium–World soybean overview with perspectives for international technical cooperation in Africa. Part III: The Third Asian Symposium on Non-Salted Soybean Fermentation. Session 1. Koji for fermented soybean (Kikkoman, Nagano Miso Institute, China, Korea, Akita). Session 2. Natto in Asia–Microbiology, enzymology, health-medical studies. Kinema of Nepal, Tuanao [Thua-nao] of northern Nepal, Bhutan. Session 3. Tempe (Overview by Dr. Darwin Karyadi, contributions from Indonesia, Germany, USA, Japan and others–on microbiology, biochemistry, nutrition, physiology, medical studies, cooking, and industrial development). Part IV: The Role of Soybeans in Africa–The Perspective beyond 2000 (organized in cooperation with UNU Food and Nutrition Program). Sessions: Agriculture of Sub-Saharan Africa and soybean development (World Bank, IITA, JICA). Tofu technology adapted to West Africa (Dr. Nakayama, IITA). Indigenous fermented legumes in West Africa. Introduction of soy into Sub-Saharan African diet. Achievements of UNU Tempe Training Program (Indonesia/UNU; with Poster presentation of UNU funded research). Proposal on South-South cooperation.

Technical tours will be organized from three participating countries: Indonesia, USA, Germany. Address: c/o Akita International Assoc., Aidex Building 8th floor, 2-1-60 Sanno, Akita City, Japan 010. Phone: 0188-64-1181.

1372. Tenuta, Albert. 1993. Soybean cyst nematode. *Ontario Soybean Growers' Marketing Board Newsletter.* Aug. p. 2.
• ***Summary:*** "The soybean cyst nematode (SCN) has been a major pest of soybeans for at least a century and maybe much longer. It was first reported in Japan in 1915 and since has been found in Egypt, Korea, China, Taiwan, Columbia, Argentina, Brazil (unconfirmed), the United States and Canada. In 1954, the nematode was found for the first time in North America in Hanover County, North Carolina. This particular area has a history of growing flower bulbs imported from Japan. The first report of soybean cyst nematode in Canada occurred in two fields in Kent County in 1987 and has since been identified in five other counties."

"What is soybean cyst nematode?... It is called a cyst nematode because the swollen, egg-filled adult female (200-600 eggs) is referred to as the 'cyst stage'." Address: Ridgetown College of Agricultural Technology, Ridgetown, ONT, Canada.

1373. Todd, Daniel; Zhang, Lei. 1993. Political and technical factors impinging on port operations: The case of Manchuria. *GeoJournal* 30(4):441-54. Aug. [28 ref]
• ***Summary:*** "Five key events have shaped port-hinterland relations in Manchuria, and accordingly, have dictated the scale and scope of port operations. They are, in chronological order: (1) The Treaty of Tientsin and the attendant opening of Newchang (Yingkou) to foreign trade in 1862. (2) The lease to Russia in 1898 of the tip of the Liaodong peninsula and the founding thereon of the port of Dalny (Dalian). (3) The seizure of Dalian by Japan in 19O5. (4) The closure of Manchuria's ports to foreign trade with the accession of communist rule in China in 1949, and (5) The reversal of that policy in no uncertain terms during the 1980s consequent upon China's conversion to "open port" thinking.

"Scarcely acknowledged because less perceptible, changes in the technology governing the characteristics and employment of ships have been equally critical in regulating port operations in this part of northern China. In particular, the twin driving forces leading to ship enlargement and specialisation have induced fundamental reorganisation of both waterfront and inland transfer facilities."

In 1907, the Japanese opened two ports on the Yalu river: Dandong and its outport of stillborn Tatungkow. Dandong, by far the larger of the two, was designed to take small steamers of 2,000 tons and as a transshipment point for Yalu River junks. Yet it was constrained from the outset by its location 40 km from the mouth of the Yalu. By 1917 it exported mostly [soy] beans and bean cake.

Figures show: (1) Map of contemporary Manchuria with major ports, cities, railroads, provincial boundaries, and mineral-rich areas. (2) Early port trade of Yingkou and Dalian. Dalian trade began in 1907 and passed Yingkou in about 1912. (3) Today's port facilities of Dalian. (4) Port throughput of Dalian and Yingkou after 1952; Dalian has grown rapidly to 49.5 in 1990, compared with 2.37 for Yingkou. (5) Map of hinterlands of Dalian and Yingkou ports. Address: Dep. of Geography, Univ. of Manitoba, R3T 2N2 Winnipeg, Manitoba, Canada.

1374. Richardson, Al. 1993. Companies using Nichii Soy Flakes, and new developments (Interview). *SoyaScan Notes.* Oct. 14. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The main American user of Nichii's soy flakes is White Wave of Boulder, Colorado, which uses the flakes in only one product–its reduced fat tofu. White Wave also makes a private label reduced fat tofu for Tree of Life in Florida. Other users are: Ashland Soy Works (Ashland, Oregon), which will be introducing a reduced fat tofu, made from 100% soy flakes, this month; Sacramento Tofu uses soy flakes only in their firm-style tofu; Calco of Dallas, Texas, uses flakes in their firm-style tofu. They buy a truckload about every 5 months. They also use whole soybeans; Dorothy Hwang, a PhD chemist, of Michigan Soy Products Co., Inc. (in Royal Oak, Michigan) uses both soy flakes and soybeans. Dr. Les Wilson made the very valuable discovery that soy flakes can be used to make reduced fat tofu.

Quong Hop recently put a sticker on their Nigari Firm Tofu that says "The original reduced fat tofu," which is in violation of FDA regulations. At the new Whole Foods Market store in Palo Alto, Al recently saw Wildwood's firm tofu with a little sticker on the front that said "Low fat," also

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a violation. The real problem is that Wildwood's tofu retails for $0.99, Quong Hop's is $1.29, and White Wave's tofu, the only real reduced fat tofu is $1.49.

Nichii has just landed a big agreement with Korea and is now shipping them about 60 tons/month of soy flakes from the plant in Iowa. They are expected to be buying 100 tons/month at the end of this year. Those flakes are being used entirely to make tofu and soymilk. They are buying it for the convenience in dealing with rush orders, and the water and space savings–not for the reduced fat properties.

Nichii's plant in Iowa is now producing a little less than 1,000 tons/month. 95% of this is non-organic soybeans and 5% is organic. There is an increase in demand from Japan for organic flakes. The plant runs a little less than 4 days a week, 10 hours a day.

95% of all soy flakes make in this plant are sold outside America, mainly to Japan and Korea. Al visited Japan earlier this year. All of the flakes in Japan are used for making tofu; none is used in meat products. Nichii/Mycal has about 250 retail stores but just a few of them make fresh tofu in the store using Mr. Chikaarashi's tofu-making machine; yet that number is increasing. 90% of the tofu sold is purchased from outside tofu manufacturers, many of them very large. Nichii sells three types of tofu, each clearly labeled: That made soybeans, that made from a mixture of soybeans and Nichii soy flakes, and that made entirely from Nichii soy flakes. Nichii says "We'll buy your tofu if you use our flakes." None of tofu sold in Japan and made from flakes is promoted for its low fat content. Address: Nichii Company of America, Inc., 23440 Hawthorne Blvd., Skypark 2, Suite 140, Torrance, California 90505. Phone: 310-791-0010.

1375. Lukoskie, Luke. 1993. Some history of and update on activities at Island Spring (Interview). *SoyaScan Notes.* Oct. 16. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** David Sucher was one of the original investors in Island Spring. He has been a close friend of Luke's for 20 years, and it was his investment that got the company going at its original location.

Luke now works half time with Island Spring; he and his wife, Suni, literally make tofu. Suni manages the people and products. Yvonne Kuperberg is still there. He lets other people run the business side of things. The company has a solid base of consumers in the northwest who support its products. Though sales are still strong, Island Spring is not yet out of the hole on the debts it incurred when the principals at Pacific Soy said "either give us complete control of the company or we're going to leave." At that time, Luke had accounts payable of $485,000, and he lost $300,000 in extracting the company from the position it had been in. He had raised $110,000 before the fire with the help of Harold Hopkins, who knows a lot about capital in the Pacific Northwest.

He soon realized that the only way to get out of the $300,000 hole was to tighten the belt at Island Spring. He cut his and Suni's salary to zero for 3 years. They got personal income from personal investments, such as 4 housing units that they rent. They have worked the debt down to $60,000 and they are now starting to pay themselves. In one more year they will be competitive again.

Their competition is Azumaya, Nasoya (from time to time), White Wave, Ohta Tofu, Sea Asia, Boohan (of Tacoma), and Tacoma Tofu. Island Spring's main products are now tofu burgers, soymilk in quarts and half gallons, traditional firm tofu (Korean-style, water pack), and extra firm tofu (vacuum pack).

Talk with David Sucher. 1993. Oct. 20. One day Luke called David from Los Angeles, California, to ask if he could borrow (or exchange for stock) about $1,000 to $1,500 to buy a grinder/mill for making tofu. At the time Luke's company was in its original small building near the ocean and had not yet started commercial tofu production. At a later date Luke asked David to invest in the company, which he did; he now owns about 5% of the company's stock. Address: P.O. Box 747, Vashon, Washington 98070. Phone: 206-622-6448.

1376. Wilson, Don. 1993. The pioneering work of Aqua Agra in Florida with sprouts and soyfoods. Part I (Interview). *SoyaScan Notes.* Nov. 24. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Don is a Seventh-day Adventist who was a sergeant with a type of special forces (Force Recon) for 2 years in the U.S. Marine Corps during the Vietnam War. He joined the marines in 1964, several years before the U.S. got involved in Vietnam. He lived in a Vietnamese village with the local people for 18 months as part of his assignment, and he learned to speak Vietnamese. After he returned to America, many Vietnamese refugees came into the Orlando, Florida, area. The company for which he was working sponsored 10 families and because he spoke Vietnamese he "got volunteered" to help the refugees. He got irritated because the woman who owned the one Oriental food store in Orlando was selling nuoc mam at an exorbitant markup, buying it for $0.50/bottle and selling it for $5.00 a bottle. "I tried to persuade her to lower her prices, and when she wouldn't do it, I got mad and opened a store named the Oriental Grocery store. I sold everything at cost. We finally signed a peace treaty and I sold the store to her, on the agreement that she wouldn't gouge these Vietnamese refugees. My wife is Korean. I met her in Atlanta, Georgia, after Vietnam, where she was a nurse in a hospital. We have been married for 21 years.

"While we were running our Oriental Grocery, my wife and her mother decided they could grow mung bean sprouts in the bathtub and sell them in our store. One day a man from Superfoods (the Albertson's buying arm for fresh produce) called and said he wanted to buy bean sprouts from us. I

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went and talked to the buyer whose name was Tom Kern. Their offices were 60 miles away. They wanted 15 x 10 lb bags 3 times a week. I talked to my wife and we decided that I should turn our garage (at 1521 Avalon Blvd., Castleberry, Florida), into a bean sprout growing room. In Oct. 1976 we started growing mung beans in our garage and 2-3 weeks later he asked us to start growing soybean sprouts. One day the city came by and informed me that we must have a huge water leak on our property because we used 190,000 gallons of water. I got nervous and let them walk all around the outside of the house looking for the leak. They never found it. I was running the water off into a shallow well."

Next Don got his sprouts into Winn Dixie, a huge chain. In Orlando he visited Bill Bowman, who was a typical Winn Dixie produce buyer at that time. Don took him a sample of bean sprouts to which Bowman responded, "My God, them look like white worms. There's times when my huntin' dog gets them things crawlin' out his butt, and I take him to the doctor." Having taken enough abuse, Don was about to leave when Mr. Bowman said, "I'll tell you what. I figger anybody's got enough guts to come into my office with something this damn weird, I'm gonna have to order from you just one time. But you ain't gonna get no second orders. That way it won't be a waste of your time. We've got 120 stores out of this division so I'll want one 10-pound bag for every store. How many weeks do you need to get ready for this? You've got to grow the damn things don't ya?" It was Friday and Don replied he'd have the sprouts ready in about 3½ days. "He looked at me like I was totally crazy. Then he said, 'Do you mean to tell me you can deliver a crop to me next Wednesday and you haven't even got it planted yet?" Don said, "Yes sir." Bowman replied, "This is gonna be worth the price of admission 'cause there ain't nobody gonna plant no damn crop and have it ready by Wednesday." When Don delivered the sprouts at the agreed time, Bowman was out waiting on the dock. He said, "They ain't never gonna sell. Don't you dare expect no extra orders." Two days later Don got an enthusiastic phone call: "Don, this is R.D." "R.D. who?" asked Don. "R.D. Bowman, you know, Winn Dixie. Don, can you bring me some more of them white things over here?" Apparently Asian-Americans and hippies were surprised and delighted to find fresh sprouts at a local supermarket in Florida. Thus were sprouts (mung bean, soy and alfalfa) introduced into mainstream American supermarket chains–one of Don's pioneering contributions. Don needed more space to grow his sprouts, so they moved into a 4,000 square foot commercial location on Seminola Blvd., Castleberry, Florida. Then they introduced alfalfa sprouts. Soon they were sprouting just about everything that would sprout. In the beginning, the company was mainly a sprouting company.

Soon Don got a call from Winn Dixie's national buyer in Jacksonville, who said Mr. Bowman had spoken very highly of Don and his products. By this time he was selling the Orlando division's 120 stores in central Florida about 300 ten-pound bags a week of mung bean sprouts and 150 to 175 ten-pound bags a week. Don had no idea how big Winn Dixie was. While Don was waiting in the buyer's office in Jacksonville, the man ordered 35 railroad carloads of potatoes and 20 carloads of onions. "I began thinking. I am in trouble. There is no way I can grow this amount of sprouts. But he told me that my company and Winn Dixie could grow together, adding on divisions one at a time. You couldn't ask for a better company to do business with than Winn Dixie. They paid every bill before it was due. They even sent their trucks by to pick up the sprouts. Soon we were shipping our sprouts to all the different Winn Dixie divisions." Continued. Address: 2321 Virginia Dr., Altamonte Springs, Florida 32714.

1377. Kim, Jong-Kyu; Chang, H.G.; Seo, J.S.; Lee, S.T. 1993. Character impact compounds in flavors of Korean soy sauce manufactured with the traditional and improved meju. *J. of Microbiology and Biotechnology* (*Korea*) 3(4):270-76. Dec. [20 ref. Eng]

• ***Summary:*** "Traditionally, Korean soy sauce has been manufactured with a traditional Meju which was molded with the cooked and crushed soy bean in a global or hexahedron form and then exposed to natural strain conditions. From 1960 to 1970, there has been a trend toward making soy sauce with improved Meju made with Aspergillus oryzae and other strains."

"We characterized the character impact compounds of flavors of the fermented Korean soy sauce manufactured with both the traditional and the improved Meju made with different strains. The whole flavor samples were obtained by extracting each volatile flavor phase from both the traditional and the improved soy sauce. To get more detailed information, each whole volatile flavor was further fractionated into the basic, acidic, phenolic and neutral fractions. Each separated peak from the whole and fractionated flavor samples on gas chromatogram was identified by GC/MS and Kovat's retention index, and likewise the aroma of each peak was investigated by a sniffing test with the exercised panel. We were able to identify 15 groups of ingredients with the characteristic soy sauce aroma from the soy sauce made with the traditional Meju and 6 groups from the soy sauce manufactured with the improved Meju made with *Aspergillus oryzae.* The character impact compounds the two soy sauces were different from each other." Address: Dep. of Applied Microbiology, Yeungnam Univ., Kyongsan 712-749, Korea.

1378. Bok, J.Y. 1993. [Changes in chemical composition of steamed soybean during fermentation and in alkylpyrazines during aging of chungkookjang]. PhD thesis, Chungang University, Seoul, Korea. [Kor; eng]*

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1379. Kim, Y.S. 1993. [Studies on the changes in physicochemical characteristics and volatile flavor compounds of traditional Kochujang during fermentation]. PhD Dissertation. King Sejong University, Seoul, Korea. [Kor; eng]*

1380. Bensky, Dan; Gamble, Andrew; Kaptchuk, Ted. comp. and trans. 1993. Chinese herbal medicine–Materia medica. Revised ed. Seattle, Washington: Eastland Press. xxv + 556 p. Illustrations adapted by Lilian Lai Bensky. Index. 29 cm. [112* ref]
• ***Summary:*** The soybean is discussed and illustrated on p. 45-46. The illustration shows several clusters of fresh soybean leaves, with flowers and pods. The pharmaceutical name of the preparation is Semen Sojae Preparatum Chinese: *dan dou chi.* Japanese: *tantôshi*. Korean: *tamdugo.* English: Prepared soybean. Properties: sweet, slightly bitter, cold or warm (depending on preparation). Channels entered: Lung, Stomach. Text in which first appeared: *Treasury of Words on the Materia Medica* (*Ben Cao Hui Yan*). [Ming dynasty (1368-1644)].

Note: Ted Kaptchuk was born in 1947 and Andrew Gamble in 1946. Address: 1. Seattle, Washington.

1381. Chang, Jihyun. comp. 1993. Hankookjeonrae Daeduiyongeumsikeu Jorigagongsajeok Yoengu [A study on the cooking and processing history of traditional soybean foods in Korea]. Seoul, Korea. 359 p. [58 ref. Kor]
• ***Summary:*** See next page. Dr. Cherl-Ho Lee of Korea says this is the earliest known book written in Korean that is only about soybeans. It discusses each of the major Korean soyfoods. Dr. Lee adds: The Korean alphabet, Hangul, was invented in King Sejong's period in the 15th century, but used mainly by women. Scholars in the Joesun Kingdom preferred to use Chinese characters, much as European scholars preferred to use Latin in medieval times. The Korean alphabet has been used as the official way of writing only since the Republic of Korea was founded in 1948. Address: Professor of food science at Seongsim Womens Univ., and Director of Kimchi Museum in Seoul, Korea.

1382. Chomchalow, Narong; Laosuwan, Paisan. eds. 1993. Soybean in Asia: Proceedings of the planning workshop for the establishment of the Asian Component of a global network on tropical and subtropical soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. Held 2-7 March 1992 at Chiang Mai, Thailand. RAPA Publication (FAO), No. 1993/6. Illust. No index. 25 cm. [76 ref]
• ***Summary:*** Preface. List of contributors. Acronyms and abbreviations. Part I–Opening session: Welcome address. Remarks, Inaugural address.

Part II–Endorsement and recommendations: Endorsement of network. General recommendation.

Part III–Country reports: Australia, Bangladesh, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand, Vietnam.

Part IV–Institutional Parts: AVRDC, CGPRT Centre, FAO, INTSOY.

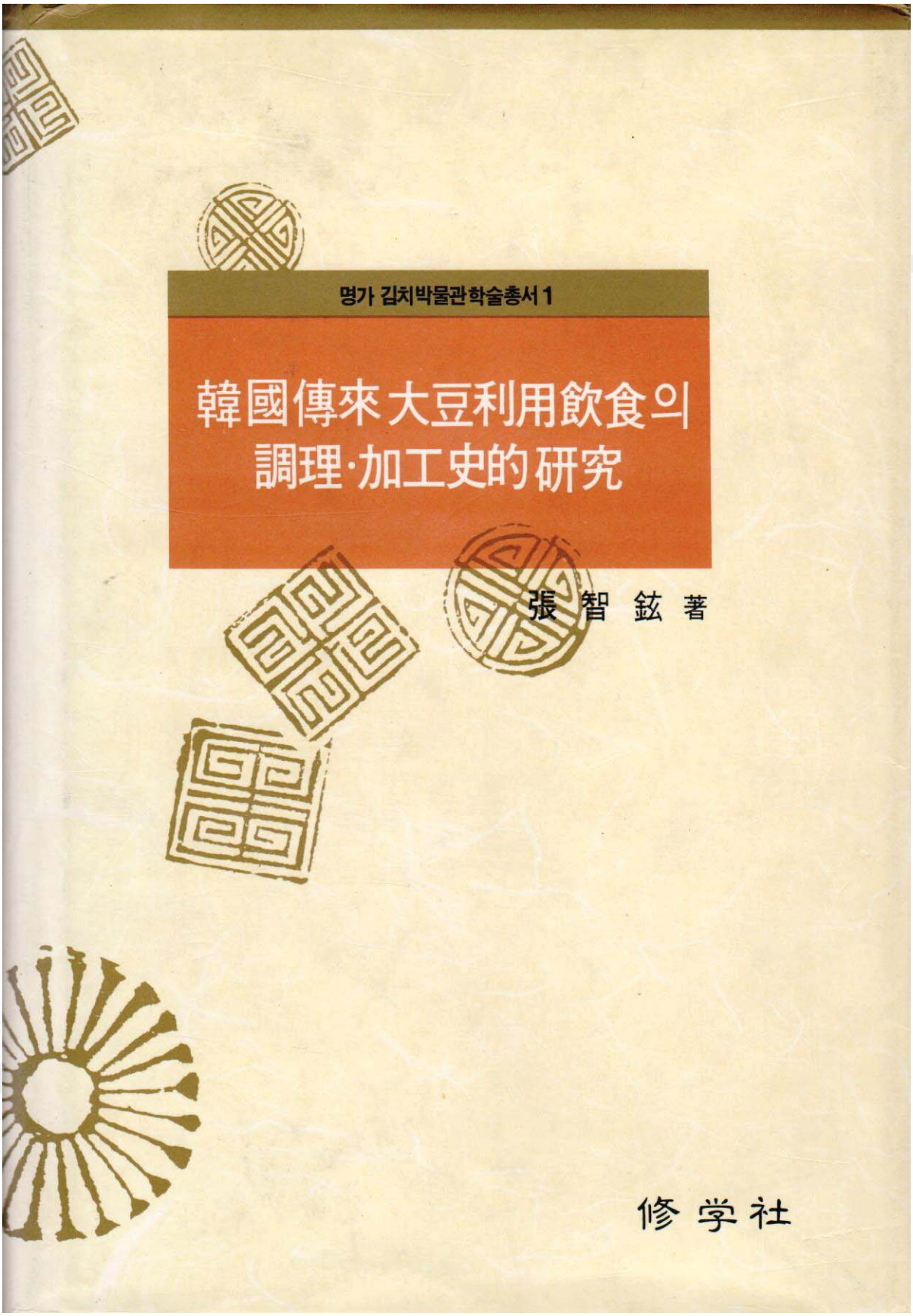
Part V–Special Reports: Oilseed crops development project, achievements on soybean research and development. The history of soybean in the Orient. Soybean processing, utilization and marketing in the Philippines. Soybean production, utilization, research and development in Taiwan. Biotechnological research on soybean at Kasetsart University. Address: 1. Regional Plant Production Officer (Industrial Crops); Both: FAO / RAPA (Regional Office for Asia and the Pacific), Bangkok, Thailand.

1383. Chomchalow, Narong; Kueneman, E.A.; Hicks, P.A. 1993. Institutional report 3–FAO. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 164-172. RAPA Publication (FAO), No. 1993/6.
• ***Summary:*** Contents: (1) Introduction. (2) FAO's involvement in soybean research and development in Asia. (3) The FAO-executed projects: National projects (Sri Lanka, Vietnam, Philippines), regional projects. (4) Other FAO-supported activities: Networking (Global Soybean Research Network, Asian Soybean Network), evaluation (Buhler's Full-fat soybean processing technology, Plenty's soymilk production in Sri Lanka, Danish Turnkey Dairies' soymilk plant).

Tables: (1) Soybean production, area harvested, and yield in developing and developed countries in Asia: Developing countries: Bhutan, Cambodia, China, DPR Korea (north), India, Indonesia, Iran, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Rep. of Korea (south), Sri Lanka, Thailand, Vietnam. Developed countries: Australia, Japan, New Zealand. (2) Activities involving soybean sponsored by RAS/82/002 (1983-89). (3) Activities involving soybean sponsored by RAS/89/040 (1990-93).

Regional projects RAS/82/002: "During the period of 1983-89, an FAO-executed and UNDP-funded project, RAS/82/002, entitled "Research and development of Food Legumes and Coarse Grains {FLCG} in the Tropics and Sub-Tropics of Asia" was operated. This project involved Bangladesh, Indonesia, Lao PDR, Nepal, Pakistan, the Philippines, Republic of Korea, Sri Lanka, Thailand, and Vietnam. The project was planned in two phases; the duration of Phase I was 2 years, and activities began in September 1983. The proposed UNDP contribution for this phase was US $450,000 and the actual expenditure was

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US $454,394. Phase II was approved in August 1985 but implemented in July 1987 and concluded in June 1989. Total UNDP contribution for both phases was US $1,331,453.

"The long-term objective of the project was to increase production of FLCG in the participating countries in order to bridge the gap between the demand for protein-rich food for domestic needs and export markets and the actual production. One of the main goals of the project was to establish a network of national institutions, linked with international institutions capable of advancing the relevant development objective of participating countries through coordinated research and extension activities."

RAS/89/040: "A follow-up project of RAS/82/002, entitled 'Regional Cooperative Programme for the Improvement of Food Legumes and Coarse Grains in Asia', funded by UNDP, is being executed by FAO. It became operational in April 1990 and has a termination date of December 1993. Four more countries (China, India, Myanmar, and Malaysia) joined the network in this follow-up phase. The Government of Indonesia continues to provide the Secretariat."

Table 1: Bhutan: Soybean production increased from 900 tonnes (metric tons) in 1981 to 1,300 tonnes in 1991.

Cambodia: Soybean production increased from 1,100 tonnes in 1981 to 16,000 tonnes in 1991–growing at 28.0% a year on average.

North Korea: Soybean production increased from 350,000 tonnes in 1981 to 460,000 tonnes in 1991–growing at 2.5% a year.

Iran: Soybean production increased from 62,000 tonnes in 1981 to 105,000 tonnes in 1991–growing at 0.8% a year.

Laos: Soybean production increased from 3,900 tonnes in 1981 to 4,200 tonnes in 1991–growing at 1.3% a year.

Papua New Guinea: Either had no soybean production or no information was available.

New Zealand: Soybean production decreased from 300 tonnes in 1981 to 100 tonnes in 1991–decreasing at -11.0% a year. Address: 1. Regional Plant Production Officer (Industrial Crops), 2. Regional Agricultural Engineering and Agro-Industries Officer: Both: FAO/RAPA, Bangkok, Thailand; 3. Senior Officer, Plant Production and Protection Div., FAO, Rome, Italy.

1384. Ebrey, Patricia Buckley. ed. 1993. Late Shang divination records. In: Chinese Civilization: A Source Book. 2nd ed., rev. and expanded. New York, NY: Free Press. xix + 524 p. See p. 3-5. [1 ref]

• ***Summary:*** Page 5. Under "Orders" we read: "It should be Lady Hao whom the king orders to campaign against the Yi."

Note: The Yi are the Dongyi who inhabited the Korean peninsula, were good archers, and were non-Chinese (Lee 2016, p. 2). Address: Prof. of East Asian Studies and History at the Univ. of Illinois at Urbana-Champaign.

1385. Kim, Seok-Dong. 1993. Country report 12–Republic of Korea. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 109-118. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** (1) Introduction. (2) Production: Status, major growing seasons and cropping systems, constraints, resolving constraints. (3) Processing, utilization and marketing: Status, supply and demand, constraints, resolving constraints. (4) Resources: Personnel, seeds. (5) Ongoing research projects. (6) Information: List of relevant publication, Information required.

Tables: (1) Soybean production trend in Korea. (2) Trends in processing and utilization of soybean in Korea. (3) Trends in the national soybean supply and demand in Korea. (4) Number of soybean scientists in governmental research institute in Korea. (5) Number of soybean scientists in the university in Korea. (6) Pedigree and area harvested in 1989 of major soybean varieties in Korea. (7) List of single publications on soybean production and breeding available in Korea.

Figures: (1) Major soybean-based cropping systems in Korea.

Area planted to soybeans in Korea decreased from 275,000 ha in 1975 to 120,000 ha in 1991. Soybean production decreased from 311,000 tonnes (metric tons) in 1975 to 183,000 tonnes in 1991. Soybean yield increased from 1,130 kg/ha in 1975 to 1,540 kg/ha in 1991.

Korean soyfoods include soy paste, soy sauce, bean curd, bean sprout, etc. Note that Korean natto is not mentioned. Per capita consumption of soyfoods in Korea remained constant [or declined slightly] from 1975 to 1991. Address: Leader, Upland Crop Div. I, RDA, Suwon, Republic of Korea.

1386. Kitamura, Keisuke. 1993. Country Report 6–Japan. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 64-69. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Production and uses. (2) Research activities. (3) Germplasm.

Germplasm: "Soybeans were introduced from abroad since the old days. Genetic resources of landraces were continuously collected and surveyed since the beginning of this century. In recent years, a number of soybean varieties were introduced from many foreign countries and international institutions, including Korea, China, Nepal, Thailand, USA, AVRDC, etc. Today the total soybean

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accessions are about 6,000 including wild soybeans. They are conserved and managed in the National Center of Genetic Resources within the National Institute of Agrobiological Resources."

Figures: (1) Scheme of domestic soybean price in Japan. (2) Geographical distribution of soybean varieties according to their ecotypes and location of soybean breeding stations in Japan.

Tables: (1) Planted area, production and yield of soybean in Japan. Total planted area has decreased from 306,000 ha in 1960 to 146,000 ha in 1990. Production has decreased from 418,000 tonnes (metric tons) in 1960 to 220,000 tonnes in 1990. Yield has increased from 1,360 kg/ha in 1960 to a peak of 1,790 kg/ha in 1990. (2) Trends of soybean supply and demand. Japan's imports have increased from 3,244,000 tonnes in 1970 to 4,330,000 tonnes in 1991, when 97.3% of the soybeans used in Japan were imported. Uses of soybeans in 1990: Oil 3,630,000 tonnes–up from 2,505,000 tonnes in 1970. Food 725,00 tonnes–up from 522,000 tonnes in 1970. Fermented products (miso, shoyu, natto) 196,000 tonnes–down from a peak of 208,000 tonnes in 1980. Animal feed 95,000 tonnes–up from 10,000 tonnes in 1970. (3) Trends of soybean price. (4) Trends of seed production. (5) Soybean research activities in Japan. (6) Objectives of the respective breeding stations for soybean. (7) Characteristics of the leading and some unique soybean varieties in Japan. For each of 15 varieties gives: Name, year registered (1928-1991), breeding method (crossing, pure line, mutation, back-crossing), ecotype, weight of 100 seeds, seed color, hilum color, characteristics. Address: National Agricultural Research Centre, Tsukuba City, Japan.

1387. Marks, Copeland; Kim, Manjo. 1993. The Korean kitchen: Classic recipes from the land of the morning calm. San Francisco, California: Chronicle Books. 236 p. Illust. Index. 23 cm. [8 ref]

• ***Summary:*** Korea is a peninsula surrounded by water (including the Yalu River that marks the border between China and Korea). There an estimated 200 varieties of kimchi such as cabbage, cucumber, eggplant, white radish, turnip, etc. The glossary (p. 7-13) includes: Denjang paste (a fermented soybean paste and flavor enhancer). Gochu Jang (hot fermented chili paste; Gochu means chili). Seaweed: Kelp (*Ulva conglobata*, laver (*Porphyra umbilicalis*, sold in very thin sheets [nori]), *miyuk* (*Undaria pinnatifida* [wakame]). Soy sauce (with directions for making it at home). Soybean curd (Two types: Chinese is a firm square about 4 inches on a side and 1 inch thick; Japanese is soft and creamy, about 2 inches thick).

Concerning Gochu Jang: This is the main seasoning in Korean cooking. It has been prepared at home for centuries and stored in the many black pottery pots so conspicuous on Korean rooftops or gardens. Each year on March 3, an auspicious date, the householder starts to prepare enough gochu jang to last all year. Ingredients: Glutinous rice (cooked to a pudding consistency), fermented soybean cake (*meju*), hot red chilis, salt, and barley malt syrup mixed with water. These are mixed and allowed to ferment [outdoors] in a pottery jar for at least 3 months. In early May, as the weather warms, the [woven conical bamboo] cover of the storage jar is removed early each day "so that the sun can strike and warm the contents to accelerate fermentation. At night the cover is replaced." The fermentation process eventually reduces gochu jang to a smooth, jamlike consistency with a many-dimensional flavor; it adds a lively sting and rich red color to any food with which it is used. "Korean cooking without this indispensable condiment is unthinkable."

Recipes include: Beef shreds in soy sauce (p. 48). Fried spiced bean curd (p. 57, *Tubu choerim*). Stuffed bean curd (p. 58, *Tubu gui*). Crushed bean curd salad (p. 70, *Tubu sang she*). Bean curd and pork patties (p. 96). Assorted stuffed fritters (p. 100-01, *Jon*). Seasoned dipping sauce (p. 109, *Yang yeum kanjang*). Simple bean curd soup p. 117, *Tubu kook*). Bean curd soup with clams (p. 125, *Sundubu*). Vegetable soup with soybean curd (p. 135, *Tubu jigae*). Soybean sprout soup (p. 136, *Kongnamul kook*). Address: 1. Food historian; 2. Dr. (Mrs.), expert on history, science, and preparation of kimchi.

1388. Nahm, Andrew C. 1993. Introduction to Korean history and culture = Sin Han'guksa immun. Elizabeth, New Jersey: Hollym. xii + 391 p. See p. 359. The Yalu Flows: A Korean Childhood. 1956, by Ilhan New. Illust. (some color). Maps. 23 cm. *

1389. Napitupulu, T.A. 1993. Institutional Report 2–CGPRT Centre. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 158-163. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) CGPRT centre's activities in soybean: Completed or nearly completed projects in 1991, planned projects for 1992, planned projects for 1993 onwards. (3) Publications.

From Sept. 1988 to Dec. 1991 CGPRT Centre did a Soybean Yield Gap Analysis Project, Phase II, in Indonesia and Thailand.

"Planned projects for 1992: Regional co-operative programme for the improvement of food legumes and coarse grains (FLCG) in Asia (RAS/89/040). Duration: Three years from 1991 to 1993. Countries: Fourteen countries including Bangladesh, China, India, Indonesia, Republic of Korea, Lao PDR [Laos], Malaysia, Myanmar [Burma], Nepal, Pakistan, the Philippines, Thailand, Sri Lanka and Vietnam."

"Planned projects for 1993 onward: Changes in

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the soybean economy in Asia: Impact on production, marketing, processing, and trade (SYRED). Duration: Three years. Countries: Thailand, Indonesia, Vietnam, and the Philippines." Address: Consultant, CGPRT Centre, Bogor, Indonesia.

1390. Shanmugasundaram, S. 1993. Remarks. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 4-5. RAPA Publication (FAO), No. 1993/6.
• ***Summary:*** "One half of the world's poor live in Asia. The total population of Asia is around 2.8 billion and it is increasing unabated. Agriculture is the mainstay for the livelihood in most countries in Asia. Agriculture in many of the countries is at the mercy of the monsoon. A preponderance of vegetarians depend on plants for their protein source. Protein, calories, vitamin and mineral deficiencies in the diet predominate in the Region. Soybeans with diverse, direct and processed products could help alleviate nutritional deficiencies by complementing the carbohydrate diet.

"Soybean is native to Asia. However, it is ironic that Asia imports substantial quantities of soybean for food, feed and fat uses. Can Asian countries produce enough soybeans to be self-sufficient? Is there a potential? Based on the area, production, and import the Asian countries can be broadly divided into at least three groups; the first group is the major soybean producers which have substantial research effort but some of them still import limited quantities of soybean or meal or oil. They are China, India, Indonesia, Thailand and Australia. The second group of countries import millions of tons of soybean but still produce some for domestic food uses. In this category are Japan, Republic of Korea and Taiwan. The last group of countries uses soybean or tries to promote soybean but production and research are yet to make any significant progress. The Philippines, Nepal, Bangladesh, Bhutan, Myanmar, Sri Lanka, Pakistan, Malaysia and Vietnam belong to this group.

"In the past two decades, AVRDC has partnered with many countries in the Region and assisted in sustaining soybean production through development of improved varieties and facilitated them to undertake research efforts to improve soybean production. Trained human resources have also been increased. Other centres in the Region such as ACIAR and ESCAP/CGPRT Centre have also contributed to strengthening research capability.

"In Asia, AVRDC, IRRI and IITA with the participants from Asian countries expressed their interest to establish an Asian Soybean Improvement Network (ASDIN) in 1987. Again in 1989 at the IV World Soybean Research Conference in Argentina, the participants from various countries expressed a need to organize a Global Network for Soybean. FAO has been asked to catalyse the establishment of such Network. FAO has already organized consultations in Africa and Latin America and has developed the project document for those regions.

"Asia is different from Africa and Latin America. I am sure the background papers that all of you have prepared will bring out the strengths, weaknesses, constraints, national priorities, policies, resource availability and resources needed. Utilizing the background information by the end of our six-day deliberations, we should be able to come up with a draft project document for an Asian Soybean Network.

"AVRDC is represented by plant breeders, plant pathologist, entomologist and economists to show our commitment, interest and willingness to work jointly with all of you in the region. We hope that AVRDC will be strengthened through this Network so that AVRDC can serve the region better on behalf of the Network in the specific sub-region. On behalf of our Director-General, Dr. Javier and my colleagues, I extend you a warm welcome and wish successful deliberations to come up with a meaningful project document." Address: Director, International Cooperation Program, The Asian Vegetable Research and Development Center (AVRDC), Shanhua, Tainan, Taiwan, Republic of China.

1391. Gervais, Marc; Theriault, Sylvana; Bernard, Eric. 1994. Oilseed sector profile [Canada]. Ottawa, Ontario, Canada. [iv] + 23 + 1 + 12 p. Jan. 28 cm. Spiral bound.
• ***Summary:*** Contents (each accompanied by tables and charts; each section covers the years 1991-1994): Imports of soya beans for sowing (almost all come from the USA, followed by Chile and Japan). Imports of soya beans for oil extraction (almost all come from the USA). Imports of soya beans, nes [meaning unclear] (almost all come from USA, followed by Taiwan, China, and Japan).

Imports of soya-bean oil crude, whether or not degummed (almost all comes from the USA, followed by France). Imports of soya-bean oil and its fractions, refined but not chemically modified (almost all comes from the USA, followed by Singapore). Imports of veg fats & oils & fractions hydrogenated, inter or re-esterified, refined or not (almost all comes from the USA followed by UK and Netherlands). Imports of animal or veg fats & oils...

Imports of soya bean flour and meals. Imports of soya sauce (main suppliers are: USA, China, Japan, Hong Kong, Taiwan, Philippines, South Korea). Imports of protein concentrates and textured protein substances (almost all comes from USA). Imports of Soya-bean oil-cake and other solid residues, whether or not ground or pellet (almost all comes from USA). Imports of bran, sharps and other residues of leguminous plants, pelleted or not (almost all comes from USA).

Exports of soya beans for sowing (most goes to USA,

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followed by France, Germany and Austria). Exports of soya beans, for oil extraction (most goes to Netherlands, followed by France, Portugal and Spain). Exports of soya beans, nes (most goes to USA, followed by Hong Kong and Singapore). Exports of soya bean flour and meals (almost all goes to USA). Exports of soya-bean oil crude, whether or not degummed (almost all goes to the USA). Exports of soya-bean oil and its fractions, refined but not chemically modified (almost all goes to Pakistan, followed by USA). Exports of veg fats & oils & fractions hydrogenated, inter or re-esterified, refined or not (almost all goes to the USA). Imports of animal or veg fats & oils... (almost all goes to USA).

Exports of soya sauce (main buyers are UK, Japan, United States, Finland, Cuba).

Exports of protein concentrates and textured protein substances (almost all goes to USA). Exports of Soya-bean oil-cake and other solid residues, whether or not ground or pellet (almost all goes to USA). Exports of bran, sharps and other residues of leguminous plants, pelleted or not (almost all goes to USA). Address: Trade Evaluation and Analysis Div., International Markets Bureau, Markets and Industry Services Branch, Agriculture Canada, Ottawa, Ontario, Canada.

1392. *Agri-Book Magazine* (*Exeter, ONT, Canada*). 1994. Far East market can double. 20(5):29. Feb.

• ***Summary:*** Canada is selling more and more soybeans for food uses to East Asia. Thailand is the only country in the region that is self-sufficient in soybean production. Japan (population 123 million) imports more than 1 million tonnes per year, Taiwan imports 250,000 tonnes, Indonesia 150,000 tonnes, Korea 120,000 tonnes, and Malaysia 100,000 tonnes. Singapore and Hong Kong import all the soybeans they use.

In 1993 Ontario produced a record 1.7 million tonnes. Only 500,000 tonnes of this (29.4%) was exported, and only a fraction of that was suitable for making soyfoods such as tofu, natto, soymilk, Taiwanese fermented tofu (*foo yee*), etc. A large color photo shows ladies in Taiwan packing fermented tofu in jars.

Ontario has captured 56% of the Hong Kong market, and about 14% of the Malaysian market. But the Asian market is becoming more competitive because exporters from the USA are beginning to offer soybeans in bags as well as bulk shipments. Michael Loh, the OSGMB coordinator for export development, thinks Canada can achieve its goal of doubling soybean exports by the year 2000.

1393. Badani, Bernard. 1994. Edible soybean mission report, Indonesia, Taiwan, Korea, February 1994. Ottawa, Ontario, Canada: Agriculture and Agri-Food Canada. 23 p. 28 cm. Spiral bound.

• ***Summary:*** Contents: Foreword: Mission objective, countries visited, main goals, conclusion. Acknowledgments. Names of the 8 mission members. Visit to Indonesia (Jakarta): Background, visits (Nestle soymilk plant in Surabaya, BULOG), conclusions, market potential (short, medium, and long term). Visit to Taiwan (Taipei, Taichung, Tainan, Kaohsiung): Background (the pro-American soybean lobby), visits (Taiwan Tofu Manufacturers Assoc., Tet Union Corp., Great Wall Enterprises, Herng Yih), conclusions, market potential (short and medium term). Visit to Korea (Seoul): Background, visits (Hyosung Corp., AFMC, Korean and Seoul Tofu Manufacturing Co-operatives, conclusions, market potential (short and medium term). List of contacts by country (photocopies of business cards). Note: Mr. Badanai works for this federal organization in Ottawa.

This mission, whose coordinator was Michael Loh, took place between Feb. 25 and March 10, 1994; it was organized by OSGMB with assistance from the Canadian Embassies in Jakarta and Seoul, and the Canadian Trade Office in Taipei. The overall objective of the mission was to open these 3 markets to the sale of Special Quality White Hilum (SQWH) soybeans from Canada for use by their soy food industries.

Indonesia imports about 700,000 tonnes of soybeans each year, mostly grade #1 from the USA, to supplement its local production of about 1.3 million tonnes. About 250,000 tonnes of the imports are used to make soyfoods such as tempeh (which accounts for about 80% of the total), tofu, taucho (Indonesian miso), and soybean milk. The majority of their domestically grown soybeans are also used to make soyfoods. All Indonesian soybean imports are handled by BULOG, a government agency which determines yearly requirements and allocates the resulting imports to various companies under a complex price structure formula apparently designed to maintain the competitiveness and full utilization of the domestic crop whose internal prices are very high by international standards. Sarpindo is the largest Indonesian soybean crusher. Nestle operates a soymilk plant in Surabaya that makes 12,000 tonnes/year and is completing a second one of 20,000 tonnes capacity in Jakarta. Much of Nestle's production, especially for the new Jakarta plant, is oriented toward the export market, with the Philippines as their top priority.

Taiwan grows only 12,000 tonnes of soybeans domestically, but they import 2,400,000 tonnes per year. Their main suppliers are the USA (1,938,000 tonnes, 80.8% of the total), China, 297,000 tonnes), and Argentina (6,000 tonnes). Imports are handled mostly by a small number of major crushers, which then select a portion of the #2 soybeans imported, bag them, and sell them to Taiwanese soyfood manufacturers. About 8% of the total imports (200,000 tonnes) are handled in this way. Tofu is by far the most important soyfood in Taiwan, with consumption of 49.79 kg/capita/year. Most tofu is made by very small companies. The main problem facing Canadian exporters is the almost total control that the pro-American soybean lobby has shown so far in Taiwan. This lobby includes the

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main local crushers/importers of U.S. soybeans (which have a strong interest in maintaining the present import and distribution systems that make local tofu manufacturers dependant on them), and the American Soybean Association (ASA) office (with a staff of 15) in Taipei. Tet (Ttet) Union Corp. in Tainan is the largest crusher in Taiwan. Fwusow (Fwu Sow) is a large edible oil company. Taiwan's largest tofu manufacturer is Herng Yih Food Industrial Co. of Kaohsiung. The 13 year old company has two plants, 14 minutes drive apart.

Korea imports between 1 and 1.1 million tonnes of soybeans a year to supplement domestic production of about 200,000 tonnes. Approximately 200,000 tonnes of the total imports and 20,000 tonnes of domestically grown soybeans are used to make soyfoods, mostly tofu. All soybeans destined for this purpose are purchased by AFMC, the Agricultural and Fisheries Marketing Corporation, a state-owned corporation and government monopoly under the Ministry of Agriculture. that resells soybeans to food processors according to their needs, charging a very high markup over the import purchase price. This markup, in turn, allows AFMC to subsidize purchases of domestic soybeans which it buys at prices close to 5 times the international price but which it resells to tofu manufacturers at the same price as the imported soybeans. It is expected that AFMC will loose its importing monopoly on food grade soybeans by 1997 due to the GATT agreement. An immediate market potential for Canadian soybeans seems to exist for sprouting soybeans, of which Korea purchases about 6,000 tonnes a year. Address: Grains and Oilseeds Div., International Markets Bureau, Agriculture and Agri-Food Canada, Ottawa.

1394. *Canadian Export Soybeans* (*OSGMB, Chatham, Ontario, Canada*). 1994. Export market development. 7(2):1. May.
• ***Summary:*** "Ontario's soybean exporters are reaching into new markets in the Asia / Pacific region in an effort to expand sales for food use. Three Ontario companies traveled with representatives of the Ontario Soybean Growers' Marketing Board and Agriculture Canada to Indonesia, Taiwan and Korea, February 27-March 8, 1994.

"Ontario companies have been exporting food quality soybeans to Japan, Hong Kong, Malaysia and Singapore for almost 20 years. Soybean exporters are optimistic about prospects of doing business in the region since the economies of these new markets are booming and showing a willingness to lower trade barriers and thereby improve our access to their markets."

A photo shows OSGMB's Second Vice Chairman Tom Lassaline making a presentation to Canada's ambassador to Indonesia Mr. Larry Dickenson.

1395. *Ontario Soybean Growers' Marketing Board Newsletter.* 1994. Korean soybean curd manufacturers visit. Aug. p. 3.
• ***Summary:*** "Eleven representatives of the Korean Soybean Curd Manufacturers Federation toured southern Ontario in late May to get a first-hand look at the soybean industry. The group included the chairman of the federation, Mr. Chang Ye-Kyu and representatives of regional associations."

"Korea imports over 1,000,000 tonnes [metric tons] of soybeans annually, mostly from the United States. Approximately 130,000 tonnes or 5,000,000 bushels are used to manufacture tofu. All imports are handled through a government agency which has made a practice of buying crush quality soybeans and re-cleaning for sale to soyfoods manufacturers. Soyfood manufacturers would like to be able to buy higher quality soybeans but they have not been available in the Korean marketplace.

A large photo shows four Koreans comparing samples of #1 grade white hilum soybeans and #2 crush quality soybeans during their tour of the Sarnia grain terminal. Address: Box 1199, Chatham, ONT, Canada N7M 5L8.

1396. Soft Tofu Restaurant. 1994. August. New soyfoods restaurant or deli. 9542 Chapman Ave., Garden Grove (near Los Angeles), California.
• ***Summary:*** Article by Max Jacobson. 1994. Los Angeles Times (Orange County edition). Aug. 18. "There's no tofu like Soft Tofu." This Korean restaurant, which has a menu printed almost entirely in Korean, aims for a Korean clientele. The author described his meal there as "our best Orange County meal of the year." His favorite dish was the soft tofu ("delicate little clouds of tofu"). Address: Garden Grove, California. Phone: (714) 539-4511.

1397. Han, Sallie. 1994. Korean Thanksgiving is here: for centuries, it has been the biggest day on their national calendar and this Sunday it will be the festive event at Flushing Meadows. *Daily News* (*New York, New York*). Sept. 21. p. 522.
• ***Summary:*** It is called "Chusok" in Korean. Two recipes are given. One, "Kalbi Gui (Broiled Rib Steak)" states: "Serve warm, with white rice or wrapped in romaine or Boston lettuce leaves, with *denjan* [also spelled doenjang] or *gochu jan* (Korean hot sauces, available at Korean grocery stores)." Address: News editorial staff.

1398. Mann, Sue. 1994. Tempeh, tofu, and soymilk in Ecuador (Interview). *SoyaScan Notes.* Sept. 23. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Sue, who has lived in Quito for 6 years, is interested in making tempeh commercially in Ecuador, South America. She went to Ecuador originally as a teacher in an American school. Some people at Ambato Votec College [a Vocational-Technical College about 3 hours bus ride from Quito] in Ecuador are making quinoa tempeh, supposedly on a commercial scale; they sell it mostly in Quito.

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Also some Chinese or Korean people make tofu in Quito and sell it at one stall of an outdoor Oriental foods market. They make the tofu somewhere else and sell it twice a week fresh, from a bathtub, at the stall. They also make a pressed tofu. A lot of the health food stores in Quito occasionally sell fresh tofu; she has never asked where it is made.

She also knows a Baha'i person who makes soymilk in Ecuador. Address: c/o Donna Lewen, Cassilla 17-12-578, Quito, Ecuador. Phone: 593 2-570-600.

1399. Park, K.Y.; Moon, S.H.; Rhee, S.H. 1994. [Antimutagenic effect of doenjang (Korean soy paste)–inhibitory effect of doenjang stew and soup on the mutagenicity induced by aflatoxin B1]. *Environmental Mutagens and Carcinogens* 14:145-52. Sept. [Kor]*

1400. Gupta, Rajendra ("Raj") P.; Daller, Frank. 1994. Update on ProSoya Inc. and the SoyaCow Centre (Interview). *SoyaScan Notes.* Nov. 21. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** ProSoya Inc. (named ProSoya Foods International until late 1993) is the company that developed and owns SoyaCow, which is a machine that makes soymilk. The name SoyaCow was intended originally for smaller machines for developing countries, but now it is used also for the larger, more expensive systems.

In 1985 ProSoya had no manufacturing capability, so Raj talked with APV about developing equipment for ProSoya. APV did some research and development work for ProSoya but no money changed hands. ProSoya was considering giving APV a license to manufacture the machine, but APV found eventually that there are not many companies in the soyfoods market that are big enough to afford APV equipment, and most who could afford a large system might buy it from STS, which APV acquired in 1986. STS also looked at making the SoyaCow, but decided that the market was too small. APV has never owned ProSoya, and ProSoya never licensed any technology or equipment to APV.

The hard part was finding the right people. Once ProSoya found the right people, they chipped in some money, got some bank financing, and some small money from some shareholders. Only 15% of the company is owned by outsiders. So ProSoya is a corporation with about 8 shareholders, of which 4 are principal shareholders; the rest are relatives, accountants, etc. Raj still has the controlling interest. Frank Daller has raised all the outside capital within the last 1-2 years but most of it came in early in 1994. This has allowed ProSoya to construct a building where they do final manual assembly of SoyaCows, to publish a newsletter, and to market its SoyaCow very effectively. Most of the new funds have been used to build this assembly building, which does not have an assembly line and does not manufacture any of the SoyaCow's component 200 parts; they are custom fabricated by various other companies. ProSoya has 15-30 SoyaCows made at a time–built to order; each takes only 2-3 hours to assemble, and they inventory only a few at a time. In the building there is also a pilot plant, where potential customers can see how the SoyaCow works and taste the finished product.

ProSoya has not gone to any large companies for capital, and has not had to make any compromises as to its goals. In fact, they have been very selective about bringing in capital, desiring only investors who share Raj and Frank's views and goals. Frank invested money, and they have brought in outside money from only one other significant source, which is their West Coast licensee. This is a new entity in Vancouver, British Columbia, named Pacific ProSoya, which has acquired the license to produce soymilk in bulk, using ProSoya technology, for the western part of Canada and the northwest USA. The milk, made in a plant which ProSoya is building for them, will be sold to food processors. It is sort of joint venture and licensing deal. ProSoya holds equity in their company and they hold equity on ProSoya. The relationship began about 2 months ago, though they have been discussing this for the last 9 months.

Another new development is that ProSoya in Ottawa is starting to make bulk soymilk for food processors. They will be serving cow's milk dairies which will be test marketing Pure-Pak cartons of soymilk, as well as an ice cream company and a yogurt company and a Tetra Pack filler.

ProSoya is aggressively looking for a company to manufacture their SoyaCow assembly-line style in East Asia (especially in China, Taiwan, or Korea) for about half the price they can make it for in Canada. They see a large potential market in China and throughout the less developed countries if they can reduce the price to end users.

How much does a SoyaCow cost? The SC-20, the smallest machine which makes 20 liters of soymilk per batch, is extremely compact, uses a patented airless cold-grind process to produce a very good-tasting soymilk, and retails for US$7,000. The SC-100, which can produces 100 liters per batch and can make up to 400 to 500 liters/hour, retails for a minimum of US$175,000, not including the boiler, chiller, and clean-in-place system. They are about to introduce a continuous-process machine.

People learn about the SoyaCow mostly through word of mouth and from the *SoyaCow Newsletter,* which is written mostly by Raj and Frank. It goes out to several hundred people.

The Russians have translated Mark Messina's book, *The Simple Soybean and Your Health* into Russian. They want to print 10,000 copies. Address: The SoyaCow Centre, 9 Veery Lane, Ottawa, ONT, K1J 7W7, Canada. Phone: 613-745-9115.

1401. Lee, H.J.; Hwang, I.K. 1994. [Textural characteristics and microstructure of soybean curds prepared with different

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coagulants]. *Korean J. of Food Science* 10:284-290 [Kor; eng]

1402. Lee, J.H. 1994. Medicinal effects of black seed-coat soybeans. *Korea Soybean News Letter* No. 96. pp. 6-7. *

1403. Monma, M.; Ito, M.; Saito, M.; Chikuni, K. 1994. Carotenoid components in soybean seeds varying with seed color and maturation stage. *Bioscience, Biotechnology and Biochemistry* 58:926-930. [Kor; eng]

1404. Freiman, Jane. 1995. Flatiron's mini-Amerasia: dining in New York. *Record* (*The*) (*Hackensack, New Jersey*). Jan. 15. p. 93.
• ***Summary:*** "Special from Newsday. A restaurant review of Aja, 937 Broadway at 22nd St., Manhattan.

Chef Gary Robins, age 29, "combines ingredients as diverse as barley and 'gochu jang' (a Korean red chili paste) is cross-cultural food that may be exotic but makes sense."

1405. *Ontario Soybean Growers' Marketing Board Newsletter.* 1995. 1994 Annual Meeting highlights. Feb. p. 3.
• ***Summary:*** More than 300 soybean growers, industry and government representatives, and suppliers attended the Dec. 1994 Annual Meeting of the Ontario Soybean Growers' Marketing Board. Bernard Leung (photo shown) of Harcan Kingsoya spoke on soyfood opportunities. Garth Baxter of Maple Leaf Foods expressed his belief that the miso market holds the best potential for expansion of Canada's food soybean exports to Asia. New markets with good potential include Taiwan, South Korea, Indonesia, and the Philippines.

"Frank Daller of ProSoya reported that his company is setting up soymilk production facilities in several locations across Canada. Their strategy is to sell bulk soymilk to dairies for processing and packaging."

The Board reported a financial operating surplus of $311,225 for the year ending 31 August 1994, and a reduction in Board fees from 90 cents per tonne to 80 cents for the 1994 crop. Address: Box 1199, Chatham, ONT, Canada N7M 5L8.

1406. Azevedo, Chris; Gallagher, Paul. 1995. Trends in Japan's soybean market. Paper presented at a conference titled "Producing Soybeans for the Soyfoods Market." 8 p. Held 2 March 1995 at Ames, Iowa. [6 ref]
• ***Summary:*** The pages and most tables in this report are unnumbered. One table shows per capita annual consumption (in lbs) of soybeans in selected Pacific Rim countries in 1974, 1984, and 1994, as follows, in descending order of pounds consumed per capita in 1994: Indonesia: 9.2, 14.0, 23.2. South Korea: 21.4, 18.8, 20.1. Japan 11.0, 15.3, 16.7. North Korea: 11.8, 12.2, 11.2. Malaysia: 2.9, 5.2, 10.3. China: 14.7, 13.0, 9.7. Thailand: 1.2, 3.9, 3.9. Philippines: 0.4, 0.5, 0.8. Sources: (1) USDA; (2) U.S. Bureau of the Census, World Population Profile, 1994 and 1984; (3) Statistical Yearbook, Statistical Office of the United Nations, New York, NY.

Another table shows annual soybean consumption in million metric tons in 1974, 1984, and 1994, as follows, in descending order of amount consumed in 1994: China: 5.237, 6.193, 5.350. Indonesia: 0.546, 1.072, 2.105. Japan: 0.716, 0.830, 0.950. South Korea: 0.328, 0.358, 0.410. North Korea: 0.083, 0.109, 0.117. Thailand: 0.023, 0.092, 0.105. Malaysia: 0.015, 0.036, 0.090. Philippines: 0.007, 0.013, 0.025. Source: USDA.

A final table shows the amount of soybeans used (in thousand metric tons) in Japan, by product and total, each year from 1978 to 1993, as follows: Use of soybeans for tofu rose from 486 in 1978 to a peak of 531 in 1984, falling to 492 in 1993. Use for natto rose from 71 in 1978 to a peak of 109 in 1993. Use for miso rose from 182 in 1978 to a peak of 185 in 1980, falling to 173 in 1993. The total rose from 750 in 1978 to a peak of 927 in 1992, falling to 920 in 1993. Address: Iowa State Univ. Phone: 515-294-0160.

1407. Hayes, Keri. 1995. Feeding their own: Cubans turn to soy as an alternative protein source. *Bluebook Update* (*Bar Harbor, Maine*) 2(1):1, 3-4. Jan/March.
• ***Summary:*** Pam Montanaro of Global Exchange (San Francisco, California) explains how Cubans–led by Alberto Ortega Jhones–have turned to soy and developed a host of delicious products, especially soymilk yogurt drink (in five flavors), which are now being produced in factories that formerly made dairy products. These factories are also manufacturing hard cheese from soymilk, soymilk cream cheese, and soymilk ice cream.

Some of the soybeans used to make these soyfoods are now being grown in Cuba; however most are imported from Canada and Brazil.

The USA, which has a trade embargo against Cuba, also holds embargoes against Iraq, North Korea, Libya, Serbia, and Montenegro. However the "Cuban embargo is the only one, at this time, that denies the right to trade for food and medicine." A photo shows two men at work in one of the dairy factories that has been converted to include a soyfoods processing section.

1408. Lee, Sang Sun. 1995. [*Meju* fermentation for a raw material of Korean traditional soy products]. *Korean J. of Mycology* 23(2):161-75. March. [36 ref. Kor; eng]
• ***Summary:*** "Meju is a raw material used to make Korean soy. sauce (*Kanjang*) and soybean paste (*Doenjang*), both of them rich in plant protein. Twenty-nine fungal and a bacterial species were identified from twenty-three traditionally homemade meju cakes. Out of them, only a few species were found to be involved in the actual fermentation process of meju; The other species were contaminants during the improper subprocesses of meju fermentation." Address:

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Assoc. Professor of the Graduate School, Korea National Univ. of Education, Chung Won Kun, Chung Puk 363-791, Republic of Korea.

1409. *SoyaScan Notes.* 1995. Dr. Chungs Food Co. Ltd. USA (Overview). May 30. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** In the '94 Soya Bluebook is a listing for this famous Korean soymilk manufacturer at 960 Massachusetts Ave., Boston, Massachusetts 02118. Phone: 617-427-1507. Contact Rob Martel, Sales Manager. They may be planning to make soymilk in North America and it is said that they have a co-packing contract with Pacific Foods of Oregon. They are now constructing a soymilk plant in Australia.

1410. **Product Name:** Tofu [Firm, Soft, or Extra Soft].
**Manufacturer's Name:** Pulmuone U.S.A., Inc.
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 213-564-2000.
**Date of Introduction:** 1995 June.
**Ingredients:** Tofu-Soft: Water, soybean, calcium sulfate, glucono delta lactone, magnesium chloride.
**Wt/Vol., Packaging, Price:** Firm and soft in 18 oz water pack. Extra soft in 10.5 oz (300 gm) sausage shape.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Jeannie U. Sim of Pulmuone. 1996. Aug. 6. Pulmuone (pronounced PUL-mu-wun) is the "the largest natural foods manufacturer and the largest tofu manufacturer in Korea." They are known primarily for tofu in Korea, where the company name is the same. They have built a tofu factory in southern California and began making water pack tofu in June 1995. The Korean tofu market used to be dominated by Japanese-American tofu makers, but now Pulmuone has captured about 70% of it. The word "Tofu" is written on the front panel in Roman letters only, and also in larger Korean characters. The firm and soft tofu each weigh 18 oz and are packed in tubs. The extra soft comes in a sausage-shaped tube. The company is planning to launch an aseptic tofu in a Tetra Brik carton, and perhaps a soy yogurt-like dessert.

Products with Labels sent by John Sim. 1997. June 23. (1) "Tofu-Soft" is sold water-packed in a square plastic tub. The curds are pressed in cloths. Since GDL is one of the 3 coagulants used, the tofu is very soft, with a high yield. The product is marketed primarily to Korean Americans, since the three largest blocks of text are all in Korean. Label for "Tofu-Soft": 5 inches square. Black, gold, green, and blue on white. "No preservative." Contains 16 gm protein per 200 gm of tofu = 8.0% protein. (2) "All Natural Tofu Firm" is similar to Tofu-Soft except that: There are no Korean characters on the label, but there are several Chinese characters. It contains 18 gm protein per 171 gm of tofu = 10.5% protein. GDL is used as a coagulant, but is the least predominant ingredient. The circle in the upper right corner is orange instead of blue. (3) "Tofu-Extra Soft" comes in a plastic sausage-shaped pack about 7 inches long and 2 inches in diameter. The soymilk is coagulated by GDL in the sealed package using heat. The two largest blocks of text are written in Korean. Ingredients: Water, soybean, glucono delta lactone, magnesium chloride. Contains 6 gm protein per 140 gm tofu = 4.3% protein.

Note: This is the earliest record seen (May 2019) concerning Pulmuone in the USA.

1411. Pulmuone U.S.A., Inc. 1995. [The difference of Pulmuone tofu: The tofu without preservatives and full of nutty flavor] (Ad). *Korean Journal* (*Los Angeles, Calif.*). July.
• ***Summary:*** The top half of this full-page Korean-language contains a photo showing two types of tofu in square plastic tubs and two types is sausage-shaped packs. On the bottom half are eight photos of other Pulmuone products. Address: South Gate, California. Phone: 1-800-287-3838.

1412. Han, Sallie. 1995. A Seoul train of eateries: Korean restaurants bring do-it yourself barbecue and a hot of other regional specialties to 32d St. Korean restaurants spice up the city. *Daily News* (*New York, New York*). Aug. 30. p. 205, 215.
• ***Summary:*** Jay Kim, manager of Won Jo restaurant on 32nd St., says that where Chinese use chopsticks, Koreans use chopsticks and a spoon.

"Another popular choice is *hae mul denjang*, a bubbling hot pot of spicy seafood and tofu."

Mul means "water." "'Koreans tend not to use a use a lot of oil in their cooking. They will cook with water instead of oil.'" Address: Daily News staff writer.

1413. Orthoefer, Frank T.; Liu, Keshun. 1995. Soybeans for food uses. *International Food Marketing & Technology* (*Germany*) 9(4):4-8. Aug. [5 ref]
• ***Summary:*** Contents: Introduction. Traditional soy foods: Soy milk, tofu, toasted whole soybeans and full-fat soy flour ("The toasted flour is often used in rice recipes or for the preparation of flavored bakery snacks. The toasted powder may be mixed with plastic fats and sugar to be used as a filling for confectionery and bakery products"), soybean sprouts, yuba, soy sauce, tempeh, natto, miso. Soy protein ingredients: Soy grits and flour, soy protein concentrates, soy protein isolates. Soy nutrition: Soy protein, fat and calories, phytochemicals. Food bean market. Summary.

Two "different types of soybeans have emerged: oil beans and food beans. This is particularly true in the US soy market..."

Of the fourteen phytochemicals, seven are present in soybeans. These seven are phytates, isoflavones, carotenoids, coumarins, triterpenes, lignans, and phenolic acids. Phytochemicals have been shown to affect human health as much as vitamins and minerals, and many of them have

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anti-cancer properties. The discovery of phytochemicals may change how the nutritional value of food is assessed.

The world market for soybeans for food use is estimated at about 1 million metric tons (tonnes). In Japan alone about 830,000 tonnes are made into soyfoods as shown in a pie chart as follows: Tofu (552,000 tonnes, 63.4%), miso (180,000 tonnes, 21.5%), natto (90,000 tonnes, 10.7%), soymilk (10,000 tonnes, 1.2%), soy sauce (5,000 tonnes, 0.6%), and others (22,000 tonnes, 2.6%). In the USA the food bean market is estimated at 50,000 tonnes. Other major markets for food beans are in Korea, China, Taiwan, Hong Kong, Singapore, Malaysia, and Thailand. Food-grade soybeans can be sold by the growers at a premium of 5-20% above the base price. The demand for food beans is increasing steadily. Address: 1. Vice President, R&D, Riceland Foods, Stuttgart, Arkansas; 2. Project Leader, Soy Food Lab., Jacob Hartz Seed Co., Stuttgart, Arkansas.

1414. *Soya Bluebook Plus.* 1995-1997. Serial/periodical. Bar Harbor, Maine: Soyatech, Inc. Peter Golbitz, publisher and editor. Frequency: Annual.

• ***Summary:*** Preceded by Soya Bluebook. A directory and information book for the soybean processing and production industries. One of the most valuable sources of worldwide information on soybeans. The first issue (shipped Sept. 1995) is titled "Soya Bluebook Plus: the annual directory of the world oilseed industry." Crops featured on the front cover are "soya, corn, cottonseed, palm, canola, rapeseed, and sunflower." Contents (most sections are marked with a fold-out tab): Organizations and government agencies: White pages, yellow pages. Oilseed product processors and marketers. Equipment supplies and services. Oilseed statistics. Oilseed reference: Oilseed glossary, standards and specifications, oilseed technical charts and tables. Indexes: Comprehensive index, advertiser index.

Concerning the year: The edition published in mid-1994 was titled '94 Soya Bluebook. The edition published in mid-1995 was titled '95-96 Soya Bluebook. The edition published in Sept. 1996 (the 50th edition) was titled '97 Soya Bluebook. The change was made to give the company extra time (16 months) to market the latest edition before the next year arrived. Address: 318 Main St., P.O. Box 84, Bar Harbor, Maine 04609. Phone: 207-288-4969.

1415. Wilson, Lester A. 1995. Soy foods. In: D.R. Erickson, ed. 1995. Practical Handbook of Soybean Processing and Utilization. Champaign, Illinois: American Oil Chemists' Society Press; St. Louis, Missouri: United Soybean Board. viii + 584 p. See p. 428-59. Chap. 22. [41 ref]

• ***Summary:*** Contents: Introduction. Soybean chemical composition. Unfermented soy foods: Soymilk, tofu (momen, kinugoshi or silken, packed tofu, aseptically packaged tofu, deep-fried tofu, kori tofu or dried-frozen tofu), other nonfermented soy foods (yuba, kinako or roasted whole soybean flour, fresh {edamame} and canned soybeans, texturized soy protein-based foods). Fermented soy foods: Miso, shoyu (soy sauce), natto, tempeh, sufu. Japanese Agricultural Standards. Identity preservation and transportation. Soybean quality characteristics: Overview, judging quality (tofu, miso, natto). Note: This is the earliest English-language document seen (Nov. 2012) that contains the term "roasted whole soybean flour."

Tables: 1. Nonfermented soy food products and common names by country. 2. Fermented soy food products and common names by country. 3. Chemical composition of soy foods. 4. Per capita annual consumption of soybeans (kg) in selected Asian countries (China, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand; for the years 1968, 1978, 1988, 1994).

Figures: 1. Flowchart of refrigerated and shelf-stable soymilk production. 2. JAS seal of approval. 3. Diagram of equipment used in large scale tofu production (each piece of equipment is numbered and labeled). 4. Flowchart of regular tofu production. 5. Graph showing percent transmittance of whey versus coagulant concentration for soymilks at 6% solids made from Weber, Vinton, and Amsoy soybeans. A concentration of 0.023 N was selected as the optimum coagulant concentration, since it gave the most transparent whey. 6. Graph showing percent transmittance of whey versus coagulant concentration for Amsoy soymilk at concentrations of 4, 5, and 8% solids. Concentrations of 0.018N, 0.019N, and 0.035N, respectively, were selected as optimum coagulant concentrations. 7. Flowchart of kinugoshi (silken) tofu production. 8. Flowchart of packaged tofu production. 9. Flowchart of aseptically packaged tofu production. 10. Flowchart of kori (dried-frozen) tofu production. 11. Diagram of equipment used in large scale production of dried-frozen tofu (each piece of equipment is numbered and labeled). 12. Flowchart of miso production. 13. Diagram of the interactive factors producing the characteristic attributes of miso. 14. Flowchart of tempeh production. Address: Iowa State Univ., Ames, Iowa.

1416. Reigler, Susan. 1995. Pacific rim to the brim. *Courier-Journal* (*The*) (*Louisville, Kentucky*). Oct. 14. p. 55.

• ***Summary:*** A restaurant review of Kim's Asian Grill, 2354 Frankfort Ave. "Bee-beem bop ($7.25) was served in a big bowl, Seasoned vegetables and beef are piled atop rice and garnished with a fried egg. The proper way to eat it is to stir it all up and dig in This particular bee-beem bop also featured a dollop of gochu-jang sauce. This is a somewhat salty, traditionally mild chili paste. But if you are like one of my friends, who seems to have a high pain threshold, you can request the sauce hotter."

1417. Lang, Paul. 1995. Roasting and milling full-fat soy flour (Interview). *SoyaScan Notes.* Nov. 28. Conducted by William Shurtleff of Soyfoods Center.

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• ***Summary:*** Natural Products Inc. dry roasts whole soy flour to five different degrees of darkness. He basically custom roasts for each customer, to get exactly the color and other characteristics they need. The most popular of these is the lightly roasted soy flour, which has a light creamy, beige color; it is not dark-roasted like kinako. This is one of the few light-colored full-fat soy flours on the market that is processed with dry heat. Yet when the beans come out of the roaster, their outside looks dark. When applied to soy flour, "roasted" implies that the product was processed with dry heat, whereas "toasted" implies steamed with moist heat. Paul runs PDI, trypsin, and urease tests to be sure that he is roasting sufficiently. The main buyers of this product are American bakers, who want the flour to be no darker than it has to be. Getting this exact degree of roasting is more of an art than a science.

Paul also makes a "chocolate roast," but he has signed an agreement not to advertise it. Only one company presently uses this product and they don't want anyone else in the industry to know that they are using a $0.35/lb product rather than a $1.35/lb product–the so-called "spray-dried tofu powder" that has become the subject of controversy. Paul thinks that "spray-dried tofu powder is a big hoax that will be going by the wayside." In most applications, Paul's roasted soy flour, roasted to the desired degree, will work just as well for only 26% the cost. He has saved one company over $100,000 in one week. Yet Paul does not really come out ahead, because he also sells the soy flour to the people who make the "spray-dried tofu powder."

Koreans in America mix a dark-roasted soy flour with honey and make it into a traditional drink, which they consume only in hot weather. Paul does not know what this drink is called, but he will try to find out.

Paul's roasting process is unique. First, he uses a continuous process. Second, he uses a roasting medium (such as salt or sand), which is confidential. He bought his patent and equipment from HiPro Food Products Co, owned by Bob Olsen and Bob Cross, in Minnesota. The man who invented Cheerios sold out to General Mills; he had an idea for a roaster and spent about 12 years trying to perfect it. Three years ago the inventor of Cheerios died and the brains behind the idea, the engineer, got cancer. Olsen and Cross were both in their upper '70s and they had a great little roasting system but they didn't develop the market. The patent is 17 years old and it expired one month after Paul bought the company. The process has changed so much over the years that reading the original patent would give almost no idea of the current process. Paul believes the secret to his success lies in making an inactivated flour, with no beany flavor, that keeps its creamy color. Paul built a separate building that houses his roaster; nobody sees it (though a photo appeared in *Bluebook Update*, Oct/Dec. 1995, p. 4). The original patent used gas with salt as the medium; now they use electricity and a different medium. His process is totally unique.

One of Paul's options is to go into the business of selling roasters. He has had a request to sell one company five roasters for $2 million–and his company is presently only worth $500,000. But at this stage he wants to focus on making soy flour. Address: Natural Products, Inc., 798 Hwy 6, Grinnell, Iowa 50112. Phone: 515-236-0852.

1418. Attwood, Charles R. 1995. Spelling trouble at an early age. *Nutrition Advocate* (*Dr. T. Colin Campbell with News of the Cornell China Project*) 1(5):5. Nov.
• ***Summary:*** In 1953, the vast majority of apparently healthy young American soldiers killed in the Korean War–their average age was 22 years–were found to have coronary artery fatty deposits. Their Asian counterparts had none.

"Today, 42 years later, nearly 50 million American children have abnormally high blood cholesterol levels, which have led to fatty deposits within their coronary arteries as early as age 3. These deposits grow thicker during the teens, and virtually all young adults have them by the age of 21. By the age of 12, two-thirds of all children,... have the beginning stages of coronary disease, which eventually accounts for a third of all adult deaths."

"Next month, I will introduce a step-by-step program for greatly reducing dietary fat in your children's meals. Remember, the key to a healthy adult body begins when lifelong eating habits are just starting to form." Address: M.D., F.A.A.P [Fellow of the American Academy of Pediatrics].

1419. **Product Name:** SoyaDeli FiberPro.
**Manufacturer's Name:** Miwon Co. Ltd.
**Manufacturer's Address:** 720 Banghak-Dong, Dobong-Ku, Seoul 132-020, Korea. Phone: +82 2 992 1191.
**Date of Introduction:** 1995 November.
**Ingredients:** Incl. soy protein and soy fiber.
**How Stored:** Shelf stable.
**New Product–Documentation:** Soyafoods (ASA, Europe). 1996. Spring. p. 6. "New soya products at FiE '95." This product, exhibited at the Food Ingredients Europe Exhibition, is a bland tasting powder of soy protein and soy fiber, which can also be used as a fiber source and a thickening agent. With a high water holding capacity and fat binding, emulsifying, stabilizing, and gelling properties, it is recommended for meat products, frozen foods, pasta and noodles, baked products, snacks, sauces, soups and yogurts.

1420. **Product Name:** SoyaDeli PeptiPro.
**Manufacturer's Name:** Miwon Co. Ltd.
**Manufacturer's Address:** 720 Banghak-Dong, Dobong-Ku, Seoul 132-020, Korea. Phone: +82 2 992 1191.
**Date of Introduction:** 1995 November.
**Ingredients:** Incl. soy protein isolate.
**How Stored:** Shelf stable.
**New Product–Documentation:** Soyafoods (ASA, Europe).

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1996. Spring. p. 6. "New soya products at FiE '95." This product, exhibited at the Food Ingredients Europe Exhibition, is a soy protein hydrolysate made by enzymatic treatment of soy protein isolate. It consists mainly of oligopeptides and amino acids. It is claimed to have good solubility and organoleptic properties over a broad pH range. It can reduce the allergenicity and accelerate the absorption rate of the nitrogen source. As a protein supplement it can be used in nutritional foods and drinks, infant formulas, sports drinks, and enteral feeding products.

1421. **Product Name:** SoyaDeli FlavorPlus, and FlavorBase.
**Manufacturer's Name:** Miwon Co. Ltd.
**Manufacturer's Address:** 720 Banghak-Dong, Dobong-Ku, Seoul 132-020, Korea. Phone: +82 2 992 1191.
**Date of Introduction:** 1995 November.
**Ingredients:** Incl. soy sauce, amino acids, sugar, nucleotides, and salt.
**How Stored:** Shelf stable.
**New Product–Documentation:** Soyafoods (ASA, Europe). 1996. Spring. p. 6. "New soya products at FiE '95." These two products, exhibited at the Food Ingredients Europe Exhibition, can be used to improve the flavor of a wide variety of food products. FlavorPlus is a dehydrated enzymatic soy sauce post-formulated with amino acids, sugar, nucleotides, and salt. It can be used as a flavor enhancer or flavor base in a wide range of savory applications. FlavorBase is an enzymatically hydrolyzed soya protein used to improve flavor in processed products; it can be used to make soy sauce and in various fermentation media.

1422. *Honolulu Star-Bulletin* (*Hawaii*). 1995. Classified ad: Cook, Korean style food. Dec. 22. p. 24.
• ***Summary:*** "Prepare Korean cuisine for lunch and dinner including but not limited to Korean soup, meats & vegetable side dishes desserts and appetizers...

"Utilize Korean ingredients, spices, and sauces (hot sauce, bean paste, barbecue sauce, dressed soy sauce) to cook food. Supervise a kitchen helper. 40 hr/week. 10:30 am–6:30 pm/ $10.01 per hour Min. Reqmnt: High School graduate + 2 yrs experience in job offered. Must have knowledge and understanding of Korean Language specifically to recognize and know Korean names of certain entrees, ingredients and menus, e.g. Kalbi, Bul Go Gi, Kim Chee, Man Doo, Chop Chae,... Kochu Jang, Daen Jang, etc.

"Submit resumes to Hawaii State Employment Service..."

1423. *SoyaScan Notes.* 1995. Chronology of major soy-related events and trends during 1995 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Spring–A small number of farmers grow Monsanto's Roundup Ready soybeans (see Holmberg, Oct. 1995).

June–Pulmuone (pronounced PUL-mu-wun), the largest natural foods manufacturer and the largest tofu manufacturer in Korea, builds a tofu factory in South Gate, California and begins to manufacture firm soft, and extra soft tofu. The company name here is Pulmuone U.S.A., Inc.

Aug. 3–Article titled "Meta-analysis of the effects of soy protein intake on serum lipids," by James W. Anderson, PhD, and coworkers (Univ. of Kentucky) is published in the prestigious *New England Journal of Medicine* (p. 276-282). A summary of 60 scientific studies, it is probably the most significant and influential article on the health / medical benefits of soyfoods ever to be published. It receives widespread media coverage and leads to a large jump in soyfoods consumption in the USA during the following years.

Aug. The first issue of the *U.S. Soyfoods Directory* is published by Jane Ade Stevens and Roger Stevens for the Indiana Soybean Development Council. Subtitle: "A listing of over 270 companies in the U.S. who produce foods made from soybeans." An important, much-needed innovation. Contents: Glossary of the different soyfoods and soy ingredients (alphabetical). Soyfoods companies by product (e.g., names of all companies that make miso). Company directory (alphabetically by company name, with address, phone, fax, contact person, names of products made, and classification {e.g. "Consumer products"}). Soyfoods companies by state (California has by far the most). Professional associations and industry information resources. U.S. soybean facts. Soyfoods directory survey. The fourth and list printed and bound issue was published in 1999.

Oct. The Higher Taste (Maker; Portland, Oregon), and Turtle Island Foods (Distributor; Hood River, Oregon) introduce Tofurky–a meat alternative resembling turkey. However the history of the product is amazingly complex and goes back (sort of) long before this date. The following number of Tofurky Roasts were sold: 800 in 1995, 1,500 in 1996, 18,000 in 1997, 45,000 in 1998, and 63,000 in 1999. As of 2019 the product continues to thrive; 400,000 sold in 2018.

Nov.–The first issue of *SIN Newsletter* is published by the Soy Information Network of Whangerei, New Zealand (editor: Dave Woodhams. Funded by Richard and Valerie James). This Newsletter deals largely with issues related to phytoestrogens in soybeans, misinformation about them, and attempts by the U.S. soy industry to prevent critics from pointing out possible health dangers. Issue no. 2 was published in Feb. 1996.

1424. *Korea Times* (*Los Angeles edition*). 1995. [Pulmuone tofu sweeps Korean-American market: Captures 80% of Hinoichi market share. Tofu dessert under development and pushing into general market]. Dec. [Kor]

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• ***Summary:*** A large photo shows a person holding a cake of tofu in a plastic tub against the background of the Pulmuone tofu packaging line inside their plant.

1425. **Product Name:** Soymunch (Snack Bars) [Sesame, Green Bean, Flax].
**Manufacturer's Name:** Jamae Natural Foods Inc.
**Manufacturer's Address:** 5958 West Pico Blvd., Los Angeles, CA 90035. Phone: 323-937-3670.
**Date of Introduction:** 1995.
**How Stored:** Shelf stable.
**New Product–Documentation:** Talk with Crystal Yu of Jamae. The company name is pronounced jah-MAY. She introduced this product about 5 years ago and has been selling it only locally since that time. She is Korean American.

1426. Lee, C.H. 1995. The mystery of chongkukjang. Seoul, Korea: Shinkwang Publishing Co. *
• ***Summary:*** Note 1. The is the earliest document seen with the word "chongkukjang" [Korean natto paste] in the title.

Note 2. The author of this book is not the well-known Korean food scientist and technologist Cherl-Ho Lee.

1427. Shin, Z.I.; Ahn, C.W.; Nam, H.S.; Lee, H.J.; Lee, H.J.; Moon, T.H. 1995. [Fractionation of angiotensin converting enzyme (ACE) inhibitory peptides from soybean paste]. *Korean J. of Food Science and Technology* 27(2):230-34. [16 ref. Kor]*

1428. Duus, Peter. 1995. The abacus and the sword: The Japanese penetration of Korea, 1895-1910. Berkeley, California: University of California Press. xiv + 480 p. Plus [13] pages of plates. Illust. Index. 24 cm. [400* ref]
• ***Summary:*** A very important, profound, and very readable book containing much original research. The Introduction, "The origins of Meiji imperialism," asks several very interesting questions. "Why did Japan begin to acquire an overseas colonial empire in the late Meiji period? (Note: The Meiji period was 1868-1912). After all, there was little precedent in Japanese history for a deliberate program of overseas territorial expansion. Throughout most of their recorded past the Japanese had remained in splendid isolation from their continental neighbors, making few attempts to expand their political power abroad." Yet: "Within a generation after the Meiji Restoration, the Japanese leadership had shifted from a traditional policy of peaceful and passive isolation to a radically new policy of active expansion."

The international context for this new policy was European colonial expansionism–worldwide. "Between 1800 and 1900 the Europeans acquired control over territory eight or nine times the size of Europe itself... The global reach of Western imperialism could not help but influence both the character of Meiji modernization and the thrust of Meiji foreign policy. It provided the context in which the Meiji leaders acted and a model for them to follow."

After the 'opening' of Korea by Japan in 1876, the Japanese first began to settle in a number of treaty ports that were soon opened for trade.

The number of Japanese residing on the Korean peninsula increased from less than 1,000 in the 1880s to over 170,000 in 1910, the year that Japan annexed Korea as a colony. In 1944, Japanese population of Korea has surpassed 700,000 (p. 290).

Page 247: "In East Asia, Japan's chief market was China, a sprawling society of several hundred million people. To some extent trade with China involved an exchange of primary goods–iron products, copper, and coal from Japan in return for soybeans and soy flour [sic, soybean cakes] from China. But trade revolving around the new Japanese cotton spinning and weaving industry steadily grew in importance. Not only was China a major source of raw cotton, but it also became the chief market for Japanese machine-spun cotton yarn."

Page 255: "During the period 1876-82, Western-made goods, mainly cloth and woven goods but other cheap manufactures as well, accounted for 88 percent of Japanese exports to Korea, and Japanese only 12 percent. Profits on these goods were lower than on the Japanese-made handicraft items like silk, sake, lacquer, and matches, but there was an insatiable demand for them.

"The Japanese carried home mainly products of primary industry–rice, soybeans, and leather. Most of the rice, which was extremely cheap in comparison to Japanese rice, went to urban consumers at home, and demand eventually grew to the point that Korean rice prices were quoted in the market at Osaka, its main destination. The rice trade, however, was volatile, with volume and prices fluctuating markedly from year to year, depending on harvest conditions at home and in Korea. An abundant harvest in Korea and a poor crop at home meant big profits, but the reverse situation depressed the trade. Until 1882 rice was the biggest Korean export to Japan, but a sudden fall in Japanese rice prices, caused by the Matsukata deflation, hurt the trade. Soybeans, by contrast, were a sturdier crop, less susceptible to changing weather than rice. Similar to domestically grown Japanese beans in quality and moisture content, Korean soybeans were also easy to process into tofu. As the cheapness and quality of Korean soybeans became known at home, the demand grew, and when Korean farmers discovered that Japanese merchants were willing to pay a good price, they began to put more land into the crop. When Japanese demand for rice slackened in the mid-1880s, soybeans became the most important staple exported from Korea to Japan" (with 4 footnotes).

Page 270: "Following the Sino-Japanese War [1894-95] the overwhelming bulk of all Korean exports went to Japan.

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Perhaps 80 to 90 percent of this export trade was accounted for by rice and soybeans."

Page 278: "The trade in rice and other agricultural staples like soybeans doubtless had an important economic impact on the hinterlands of the ports, often prompting a shift in local production patterns."

Page 331. "Although Wônsan remained a port of call for coastal shipping and shipped out the best soybeans in Korea, it remained a commercial backwater." Footnote: "Its small Japanese community was attractive to foreign visitors."

Pages 347-48 tell the story of a Japanese merchant named Okuda in his 30s with no prospects at home who emigrates to Inchon, Korea. In 1898 he began trading soybeans from Inchon to Chefoo. His perseverance "won him a considerable reputation among the still tiny Japanese community in Inchon."

Note: Peter Duus earned his B.A. at Harvard College and his Ph.D. at Harvard University. He has been a professor of Japanese History at Stanford University since 1973. Address: Stanford, Tokyo, and Seoul.

1429. Garcia Uriarte, Alvaro; Ortega, Alberto. 1996. Recent history of soyfoods in Cuba. Part V (Interview). *SoyaScan Notes.* Jan. 9. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** At this point we were invited for lunch at a nice hotel on the Food Industry Research Institute (FIRI) compound. There we were served various flavors of three dairylike soy products developed at FIRI. Our group of two Cubans and three Americans was invited to taste each product and offer our comments. (1) A set soy yogurt in cups in six flavors: Caramel, coconut, banana, orange, vanilla, and strawberry. Caramel, the most widely distributed flavor in Cuba, comes, of course, from Cuba's abundant sugar supply. The soy yogurt's acidity is 0.4 to 0.5 (half that of cow's milk), and it contains 3.2% protein and 1.6% fat. By comparison, dairy yogurt contains 3.0% protein and 3.4% fat when made from whole milk, or 3.4% protein and 1.7% fat when made from low-fat milk. This set soy yogurt is now sold in all provincial capitals in Cuba.

The soy yogurt plant at Santiago de Cuba had an original capacity of 2,000 liters/hour. The plant was briefly shut down to double its capacity to 4,000 liters/hour. During this period, children in Santiago de Cuba were supplied with dairy yogurt and this caused them to complain, as they objected to the more acid flavor.

(2) Soymilk ice cream (caramel flavored). The ingredients are soymilk, sugar, soy oil, caramel (for flavor), and a stabilizer. (3) Soy Cream Cheese. This is like the traditional Cuban *queso crema,* with much the texture of American Philadelphia cream cheese. Spread on crackers, it is delicious. Our group of five tasters gave each of these three products excellent marks for flavor, texture, and color. Shurtleff (who has the most experience with soyfoods of the five) noted that this is the best soy yogurt he has tasted anywhere, one of the best soy ice creams, and the first fermented soy cream cheese. Also served at this tasting was *queso blanco,* which resembled the traditional non-fermented white cheese but made from whole buffalo's milk. No soymilk was added. It was served in slices about ½ inch thick and 4 inches square, to be enjoyed on toast or crackers. This delicious product might also be made some day from soy.

Alvaro says in summary that his team of researchers is proud of three major achievements: (1) Making soymilk with no beany flavor; (2) Producing it at relatively low cost on equipment designed and constructed in Cuba using middle-level technology; and (3) Making soymilk with a high protein yield (The figure for protein yield is a top secret).

What are the big lessons to be learned from Cuba's bold and very successful experiments with soyfoods? (1) Cuba is the world's first country (outside of the traditional soy countries in East Asia) to fully grasp and realize the potential of soyfoods, and specifically dairylike soy products. Countries with high population densities in East Asia (such as China, Indonesia, and Japan) have known for centuries that it makes much more sense in terms of economics, land use, the environment, and good health to get protein directly from plants (specifically soybeans and cereal grains) than to feed those plants to animals and then eat the animals. Since the 1960s experts in the field of Third World development and food resources have stated repeatedly that soybeans are the protein source of the future. Not only are they the world's lowest cost source of high-quality protein, but they are now known to contain a host of beneficial phytochemicals, not found in any animal products, that appear to protect humans from cancer, heart disease, osteoporosis, and many of the unpleasant symptoms of menopause. Yet it took a major crisis to prompt Cuba to make the switch. (2) Cuba switched from dairy products to dairylike soy products largely for economic reasons and to make the country's food economy more efficient. The fact that Cuba has a centrally controlled economy probably facilitated the swift change. Yet with rapidly growing populations and declining incomes, many Third World countries may soon find it necessary or wise to follow Cuba's lead. Cuba has also become the world leader among Third World countries in sustainable, organic agriculture. Introducing a good food to a country under hardship conditions can pose a threat to that food's future. Will the people associate it so strongly with memories of the hard times that they want to get rid of it when good times arrive? (3) Cuba made the transition to dairylike soy products without constructing any new buildings, and with a relatively modest investment in locally designed, appropriate technology that actually revitalized flagging dairy processing plants. (4) By approaching the challenge with "beginner's mind" and plenty of creativity, Cuba was able to develop exciting new soy products especially suited to Cuban tastes

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and unknown in other countries. (5) Cuba's new soyfoods technology and processes offer the possibility of a new category of exports, which could earn badly-needed foreign exchange and, perhaps more important, offer new hope in the fight against malnutrition and hunger throughout the Third World.

Wm. Shurtleff was given (1) A list of soymilk plants (converted dairies) in Cuba, with the name and location of the plant, the capacity in liters per hour (mostly 2,000 or 4,000), the date each plant started making soymilk (from April 1994 to May 1995) and any observation (such as "Under construction").

(2) A graph of commercial production of soymilk (all kinds) from 1978 to 1985 in Japan, Thailand, Hong Kong, Korea, Taiwan, Malaysia and Singapore. Address: 1. Ing., Director; 2. Vicedirector. Both: Food Research Inst. (*Instituto de Investigaciones para la Industria Alimenticia*), Carretera Guatao Km 3½, La Lis 19200, Havana City, Cuba. Phone: 21-6986 or 21-6742.

1430. Zibart, Eve. 1996. The very fertile vegan field. *Washington Post.* Jan. 26. p. N24. Weekend section.
• ***Summary:*** The article begins: "It's not unusual anymore for non-vegetarians to eat at such green hot spots as the Health Zone, Food for Thought or Planet X (which is turning into the caterer-of-choice for veggie and vegan alternative rock types). Likewise, its easier and easier for vegetarians to find foods they like at new nutrition-conscious restaurants such as Felix, Greenwood, etc.–as well as at mainstream spots.

Today, more and more restaurants are offering vegan dishes, which contain no animal products whatsoever. A vegan diet precludes not only meat, poultry and seafood, but dairy products, eggs, butter, lard and other animal fats, cream sauces, cheese, etc. Yet that still leaves plenty of room for fine dining.

Most Asian cuisines (except Korean and Filipino) limit the use of dairy products and eggs. Malik, a downtown Thai restaurant, has a dozen vegetarian / vegan entrees, "including several featuring that heart-healthy favorite tofu" in various sauces such as red curry, black bean sauce, and peanut curry.

The Vegetable Garden in Rockville is the only wholly vegan Chinese restaurant in the area, although most Chinese eating places have a good variety of choices. The key words are "mock" and "Buddha." Mock chicken and mock pork are nicknames for tofu and other soy-based meat alternatives. The word "pork" sometimes refers to seasoned tempeh dishes. Since Buddhists are also vegans, correctly labeled "Buddhist delights" contain no animal products.

Most Japanese restaurants offer hot or cold tofu and "lightly salted soybean pods called edamame."

Ends with a directory of ten restaurants in the Washington, DC, area that offer a good selection of vegetarian or vegan dishes.

1431. Doidge, Brian. 1996. Canadian soybean export prospects for 1996. *Canadian Export Soybeans* (*OSGMB, Chatham, Ontario, Canada*) 9(1):3-4. Jan.
• ***Summary:*** "The recent formation of the Canadian Soybean Export Association (CSEA), serves to focus attention on this rapidly growing sector of the Canadian soybean industry." The 1994/95 crop set a new record with soybean exports of 524,254 tonnes (19.26 million bushels). Another strong year is projected for 1995/06.

Note: The CSEA is an association of major Canadian soybean exporters; the association does not itself export. One of its major objectives is to lobby the Canadian government for funding and promotional support.

Talk with Michael Loh of Canada. 1996. Jan. 24. Members of CSEA include W.G. Thompson, Maple Leaf Foods, Cargill, etc. Nutrisoya, Inc. will also be a member.

A half-page table (p. 3) shows Ontario soybean supply and demand for 4 years from 1992/93 to 1995/96. Under soybean supply, statistics show: Acres harvested, beginning stocks, production, imports, and total supply. Under soybean supply are: Crush, export, seed, other domestic use, and total use. Plus ending stocks and average price per bushel.

A full-page table (p. 4) lists Ontario soybean exports for 4 years from 1991/92 to 1994/95. Ontario's top four export customers in Asia in 1994/95 were: Japan (25,988 tonnes), Hong Kong (23,311), Singapore (22,502), and Malaysia (16,231). Others are Indonesia, North Korea, Philippines, and Taiwan. The top 4 customers in Western Europe in 1994/95 were: Netherlands 73,654 tonnes, Spain 61,134, France 51,119, Belgium 15,428. In Eastern Europe, Poland bough 10,000+ tonnes in 1993/94 and 1994/95 and Uzbekistan bought 7,117 tonnes in 1993/94. Total exports have grown steadily from 238,809 tonnes in 1991/92 to 495,772 tonnes in 1994/95. Address: Education and Business Manager, Ridgetown College of Agricultural Technology.

1432. Pulmuone U.S.A., Inc. 1996. [Pulmuone USA–Successful business: Putting tofu on the dinner table of Americans. Korean product–Bridge to a global market (Ad)]. *Korean Journal* (*Los Angeles*). Jan. p. 64.
• ***Summary:*** Photos show: (1) An executive sitting behind a desk. (2) A panoramic view of the inside of the Pulmuoune tofu factory in Los Angeles. Address: 4585 Firestone Blvd., Southgate, California 90280. Phone: 1-800-287-3838.

1433. Chung, Woo Kyung; Hwang, I.K. 1996. [Quality characteristics of vegetable soybeans at different harvesting time]. *Korean J. of Crop Science* 41(1):103-08. Feb. [10 ref. Kor; eng]
• ***Summary:*** "The 100-seed weight of vegetable soybean had a tendency to increase before 43 days after flowering, but decrease slightly after then. After 37 days after flowering, the sucrose content of Douya had a tendency to decline and in

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case of Shirofusa, total sugar content was sharply decreased at 40 days after flowering. The total vitamin C content of Douya and Shirofusa was dramatically increased at 37 days after flowering and then got the plateau, otherwise the total vitamin C content of Shirofumi and Hwaeomputkong was the highest level at 43 days after flowering." Address: 1. National Crop Experiment Station, RDA, Suwon.

1434. Green, Aliza 1996. Side show: when you dine Korean-style, side dishes make the meal. *Philadelphia Daily News* (*Pennsylvania*). March 6. p. 77, 80.
• ***Summary:*** "The Philadelphia area has the fifth-largest Korean community in the country [Los Angeles has the largest by far], between 50,000 and 60,000 people, concentrated in the Upper Darby and the Olney / Cheltenham area.

*Denjang* is a fermented soybean paste.

"The hot flavor is more than fire. It comes from a complex layered combination of ground red pepper, black pepper and the fermented red pepper sauce called *gochu jang."*

Page 80. After the recipe for "Korean Barbecued Beef (Bulgoki)" we read: "Eat the meat and onion rolled up in a lettuce leaf. If you like, top the meat with *gochu jang*, fermented red pepper sauce, sold at Korean groceries."

1435. *Korea Times* (*Los Angeles edition*). 1996. [Tofu recipe contest]. April 23. [Kor]
• ***Summary:*** A large photo shows a Korean women standing in front of a blackboard on which Korean characters are written.

1436. Chung, Woo Kyung; Kim, Yong Ho. 1996. Functional properties and composition of tofu flours. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 206-09. [9 ref]
• ***Summary:*** To make tofu flour, fresh tofu (coagulated with either calcium chloride or GDL) is soaked for 10 minutes, the dried at 60ºC in an oven dryer, then ground to pass through a 60-mesh screen. The product was then compared with soy protein isolate (SPI). "The calcium content and phytate content of tofu flours were higher than that of SPI. The solubility was maximum at 3% NaCl. The emulsifying activity of tofu flours was higher than that of SPI at 3% NaCl. The emulsion stability of tofu flours was higher than that of SPI. It will be possible to substitute high calcium tofu flour for SPI."

Tables: (1) Proximate analysis of flours: Soy flour, Ca-tofu flour, and GDL-tofu flour. (2) Emulsion stability of SPI, Ca-tofu flour, and GDL-tofu flour.

Figures: (1) Preparation of tofu flour (flow chart). (2) Solubility profiles of SPI, Ca-tofu flour, and GDL-tofu flour by Bluret method at various NaCl concentrations. (3) Turbidity of emulsion of SPI, Ca-tofu flour, and GDL-tofu flour at various NaCl concentrations.

Note: We are not told the comparative costs of making SPI and these two tofu flours. In what applications would tofu flour outperform SPI? Address: Soybean researchers, National Crop Experiment Station, RDA, Suwon, Rep. of Korea.

1437. Kim, Kil-Hwan; Kim, Don-Man. 1996. Improved soy food products through food science and nutrition application. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 300-08. [35 ref]
• ***Summary:*** Contents: Introduction. New approach to functionality of soybeans and their products: Nutrient contribution of soy food, soy fibre, soy protein, trypsin inhibitor, phytic acid, saponins and phytosterols, isoflavones. Improved processing technology for soy products: Off flavor of soybean protein foods, soy milk flavour (in fermented soyfoods, off-flavour is not a problem), gel hardness of soybean curd, soy sauce bioreactor, soy products by membrane technology. Address: Korea Food Research Inst., Baekhyun-dong, Bundang-gu, Songnam-si, Kyonggi-do, 463-420, Korea.

1438. Kim, Yong-Ho; Kim, Seok-Dong; Hong, Eun-Hi. 1996. 11S and 7S globulin fractions in soybean seed and its soycurd characteristics. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 210-13. [10 ref]
• ***Summary:*** "Soybean seed consists of two major storage proteins, the 7S and 11S globulins. For improving the quality of soybean seed protein, an increase of 11S/7S ratio would be a desirable objective because the 11S globulin contains more of the sulphur-containing amino acids than the 7S globulin. In this study, some soybean varieties were used to investigate the analyzing method for 7S and 11S globulins. 7S and 11S globulins could be fractionated by their different solubilities in tris buffers.

"Adjusting the pH and tris concentration were major factors affecting the precipitation of the two globulins. It was possible to screen the soybean genotypes having aberrant subunit compositions of the two globulins by a sodium

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dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) in total soybean proteins. The ratio of 11S to 7S globulin ranged from 1.29 to 1.38. The soycurd from crude 11S was remarkably harder than that from crude 7S, and springiness and cohesiveness were slightly higher in soycurd having a high proportion of 11S. The proportion of protein components in soybean seed can be an important factor in the suitability for soycurd or other foods."

Note: "Tris" is an organic compound that forms a corrosive solution in water and is widely used as a buffer and emulsifying agent. Address: National Crops Exp. Station, RDA, Suwon, 441-100, Korea.

1439. Kwon, T.W.; Song, Y.S. 1996. The role of soybean in Oriental food systems. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 20-32. [19 ref]

• ***Summary:*** Contents: Introduction. Direct uses of soybeans. Nutritional significance of soybeans. Concluding remarks.

Page 22: "Most traditional soybean foods described so far are known to have originated in China, and then gradually have been introduced or have spread into other Asiatic countries. Of course, there are a few exceptions, such as soy sauce and Tempeh. As a matter of fact, ancient Chinese records indicate that soy sauce is not indigenous to China, but rather was introduced from Korea during the era of the Koguryo Dynasty (2nd century BCE to 668 CE). Another typical example is Tempeh, which was developed in Indonesia then introduced to neighbouring countries."

Tables: (1) Traditional nonfermented soybean food products: Fresh soybeans (*Put kong* in Korea; Edamame in Japan), toasted soy powder (*Kong ka ru* in Korea; Kinako in Japan), soy sprouts (*Kong na mool* in Korea; *Daizu no moyashi* in Japan), soymilk (*Kong kook, Doo yoo* in Korea; *Tonyu* in Japan), soymilk film (Yuba in Japan; Tou-fu-pi in Chinese), soy curd (*Doo bu* in Korea; *Tofu* in Japan).

(2) Traditional fermented soybean food products: Fermented whole soybeans (*Tempeh* in Indonesia and Malaya; Natto in Japan; Hamanatto in Japan) soy sauce (*Kang jang* in Korea; Shoyu in Japan), soy paste (*Ko chu jang* in Korea; *Miso* in Japan), fermented soy curd (Sufu in China), fermented soy pulp (Tempeh gembus [okara tempeh] in Indonesia; Oncom ampas tahu in Indonesia).

(3) Essential amino acid composition of rice and soybean and FAO/WHO reference pattern of amino acids (mg/gram of Nitrogen).

(4) Per capita daily soybean consumption for soyfood use in selected countries:

Taiwan 54.89 gm.
Korea 27.62 gm.
Japan 20.82 gm.
China 12.88 gm
Indonesia 11.51 gm.
Singapore 7.40 gm.
Malaysia 4.38 gm.
Thailand 1.64 gm.
Philippines 0.55 gm.

(5) Nitrogen balance data when feeding mixtures of beef protein and Supro isolated soy protein.

(6) Nutrient content of soyfoods (per 100 grams): Soybean, soy sauce, ko chu jang, soy paste. natto, chongkuk jang, tempeh, soy curd (tofu), soybean sprout.

(7) Major causes of mortality in selected countries (per 100,000 people). Countries: Korea, Japan, Singapore, America, Germany, Hungary. For the period 1991-1994 Cardiovascular disease is the leading cause of death in all of these countries, however the death rates are higher in Western countries.

(8) Animal and isolated soy protein foods used in study with hypercholesterolemic men in Canada.

(9) Isoflavone contents of soy varieties of Korean soybeans: The isoflavones are genistein, daidzein and daidzein+genistein. The highest is the Danyop variety with 2317 mg/kg. The lowest is the Hwaum variety with 458 mg/kg. Thus, there is a huge range of variation among soybean varieties.

(10) Breast-cancer and prostate-cancer mortality in soyfood-consuming countries compared to the United States, per 100,000 people (age adjusted).

Korea is 2.6 and 0.5
China is 4.7 and unknown.
Japan is 6.0 and 3.5
Hongkong is 8.4 and 2.9.
United States is 22.4 and 15.7.

Source: American Cancer Society (Atlanta, Georgia). 1992. "Cancer facts and figures."

Figures show: (1) The effect of dietary proteins on plasma cholesterol in rabbits. Source: Carroll et al. 1975. Plant proteins lower blood cholesterol.

(2) Cytotoxicity of genistein–it kills cancer cells. Address: 1. Director, Inst. of Food Sciences; 2. Associate Prof., Dep. of Food and Nutrition. Both: Inje Univ., South Korea.

1440. *Soyafoods* (*ASA, Europe*). 1996. New soya products at FiE '95. 7(1):6-7. Spring.

• ***Summary:*** "Every year the Food Ingredients Europe Exhibition seems to get bigger and bigger, with more exhibitors and more visitors." Last year's FiE, held 7-9 November 1995 in Frankfurt, Germany, was no exception, and many soy products–especially soy sauces and related seasonings–were on display.

Miwon Co. Ltd. (Seoul, Korea) has developed a range of ingredients under the brand name SoyaDeli. Products include

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FiberPro, PeptiPro, FlavorPlus, and FlavorBase.

Kikkoman Trading Europe GmbH (Heerdter Lohweg, Germany) introduced FVP Paste, made by enzymatic hydrolysis and concentrated in a vacuum.

Wan Ja Shan International (Middletown, New York) is one of the largest makers of naturally brewed soy sauce and Oriental sauces in the USA. Their products include soy sauce, preservative-free soy sauce, stir-fry sauce, hoisin sauce, teriyaki sauce, tamari soy sauce, dehydrated soy sauce, dehydrated teriyaki sauce, and clear soy sauce.

Ajinomoto Europe Sales GmbH (Hamburg, Germany) was selling San-J Tamari in both liquid and dried forms.

Nikken Foods (Tokyo, Japan) is a large maker of natural food flavors. Exported mainly in powdered form, these include a wide array of soy sauce, natural flavor enhancers, and other fermented products, including white miso powder and red miso powder.

Inproba BV (Baarn, Netherlands) offers a wide selection of about 160 Oriental products, both at retail and to the food industry. These include various soy sauces and other soy products, and they can also develop custom recipes for their customers.

Upcoming FiE exhibition and conferences: 1996 Nov. 12-14 at Paris, France; 1997 at London, UK; 1998 at Frankfurt, Germany.

1441. Hymowitz, Theodore. 1996. Evaluation of wild perennial *Glycine* species and crosses for resistance to *Phakopsora. National Soybean Research Laboratory, Publication* No. 1. p. 33-37. J.B. Sinclair and G.L. Hartman, eds. Proceedings of Soybean Rust Workshop, 9-11 Aug. 1995. (College of Agricultural, Consumer and Environmental Science, University of Illinois at Urbana-Champaign). [28 ref]

• ***Summary:*** "The genus *Glycine* Willd. is currently divided into two subgenera, *Glycine* and *Soja* (Moench) F.J. Herm. (Table 1). The subgenus *soja* includes the cultivated soybean, *G. max* (L. Merr.) and the wild soybean, *G. soja* Sieb. and Zucc. Both species are annual, diploid with 2n = 40, and hybridized readily. The soybean grows only under cultivation while *Glycine soja* grows wild in China, Japan, Korea, Taiwan, and Russia. *Glycine max* and *G. soja* form the primary gene pool for the cultivated soybean. Evidence from several sources, including morphology, cytogenetics, seed proteins, phytoalexins, restriction endonuclease fragment analysis of mitochondrial DNA, ribosomal RNA, and chloroplast DNA supports the hypothesis that *G. soja* is the wild ancestor of the soybean."

"In 1976 the subgenus *Glycine* contained six wild perennial species, that is, *Glycine canescens, G. clandestina, G. falcata, G. latrobeana, G. tabacina,* and *G. tomentella.* At present the subgenus consists of 16 wild perennial species (Table 1)." Address: Dep. of Crop Sciences, Univ. of Illinois at Urbana-Champaign, Urbana, Illinois.

1442. Kim, Wonkeuk; Choi, K.H.; Kim, Y.T.; Park, H.H.; Choi, J.Y.; Lee, Y.S.; Oh, H.I.; Kwon, I.B.; Lee, S.Y. 1996. Purification and characterization of a fibrinolytic enzyme produced from *Bacillus* sp. strain CK 11-4 screened from chungkook-jang. *Applied and Environmental Microbiology* 62(7):2482-88. July. [42 ref. Eng]

• ***Summary:*** The fibrinolytic enzyme (CK) was purified from supernatant of Bacillus sp. strain CK 11-4 culture broth and showed thermophilic, hydrophilic, and strong fibrinolytic activity. The optimum temperature and pH were 70 degrees C and 10.5, respectively.

The first 14 amino acids of the N-terminal sequence are identical to those of subtilisin Carlsberg and different from that of nattokinase, but CK showed a level of fibrinolytic activity that was about eight times higher than that of subtilisin Carlsberg. Address: 1-6,8. Dep. of Biotechnology, Inst. of R&D, Lotte Group, Yangpyung-Dong, Youngdeungpo-Gu, Seoul, South Korea.

1443. *Daily News* (*New York, New York*). 1996. Classified ad: Cook, Korean style (Bronx). Aug. 8. p. 1051.

• ***Summary:*** "2 openings–Prepare, season and cook Korean specialty foods such as jok boi, pa jun, yuk hoe bo ssam ahi chigae, doen jang chigae, nak il bokum,... sun du bu chigae, du bu chigae..."

"2 years experience required. Send resume or letter in duplicate to:..."

1444. Seo, Jae-Soon; Chang, H.G.; Ji, W.D.; Lee, E.J.; Choi, M.R.; Kim, H.J.; Kim, J.K. 1996. Aroma components of traditional Korean soy sauce and soybean paste fermented with the same meju. *J. of Microbiology and Biotechnology* (*Korea*) 6(4):278-85. Aug. [29 ref. Eng]

• ***Summary:*** "Conditions for making traditional Korean soy sauce and soy bean paste are the same until the end of the first fermentation..."

"We identified volatile components of traditional Korean soy sauce and soybean paste which had been manufactured with the same traditional Meju with a view to improving the quality of traditional Korean soy sauce and soybean paste. All of the volatile components were extracted by simultaneous steam distillation-extraction (SDE) apparatus." Address: Dep. of Applied Microbiology, Yeungnam Univ., Kyongsan 712-749, Korea.

1445. Pulmuone U.S.A. Inc. 1996. Pulmuone (Catalog). South Gate, California. 16 p. 28 cm.

• ***Summary:*** This is a very attractive, full-color catalog describing the company and its products. Contents: Cover (with a green photo of Korean countryside). Bring nature to your life: a message from Pulmuone. "Pulmuone begins with nature. We strive to bring nature to your door steps. Our job is a process to create a balance between nature

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and technology. The most advanced technology is applied in developing our products. Seek the balance. Taste our promise." Tofu: Good as meat without the fat (3 tofu products). Pasta from Asia? Instant noodle, fresh noodle, dried noodle. Authentic taste from home: Tea, soybean paste (6 types of Korean-style miso), oil and vinegar, organic beans and grains [brown rice, sweet brown rice, whole barley, pressed barley, soy bean, black [soy] bean, kidney bean], mineral water. Health food: What if you don't have time to eat the right food? Multi-complex health supplements, diet supplements, concentrated health supplements. Cosmetic: Isslin skin care program. About Pulmuone. Important dates in the history of Pulmuone: May 1981–Pulmuone Organic Foods founded (direct distribution of Organic farm products). Oct. 1982–Pulmuone Fermented Foods founded. April 1983–Pulmuone Fermented Foods opens production facility in Pochun (begins production of supplementary foods). May 1987–Pulmuone Kimchi Museum opens. May 1988–Pulmuone R&D Center opens. Jan. 1989–Pulmuone Scientific Committee founded, Dietary Life Research Center opens. Jan. 1990–Doan Soybean Past Plant opens. Jan. 1991–Pulmuone USA Inc. founded. June 1991–Doan Noodle Plant opens. Sept. 1992–Doan Supplementary Foods GMP Plant opens. Aug. 1993–Korean-Chinese joint venture, Ilsongjung Foods Ltd. founded. June 1995–Tofu Plant opens in U.S.A.

"Pulmuone was founded in 1981 with forty employees. It has grown to become a multi-national company of 2,000 employees with annual sales volume of $250 million.

"The secret to their success lies in their uncompromising commitment for better foods and better life.

"Pulmuone's 'Research and Development Center' opened in 1988 to continue the search for more advanced technology in ensuring the quality of food and life. Together with 'Pulmuone Science Committee' organized with the outstanding scholars in the field, our challenge to science and technology for the future will be succeeded."

Photos show: Sliced and packaged tofu (p. 4-5). Six varieties of Korean soybean paste (p. 9). The outside of Pulmuone's tofu plant at South Gate, California (p. 14). A tofu production line in the USA plant (p. 15).

Letter from John Sim, marketing director of Pulmuone. 1997. June 17. This brochure was printed in September 1996. Concerning the statement that Pulmuone uses only organic materials: "Pulmuone Tofu manufactured here in the U.S. is made from Vinton 81 soybeans from Minnesota. Products such as bean paste are manufactured in Korea using only certified organic soybeans." Address: 4585 Firestone Blvd., South Gate, California 90280. Phone: 213-564-3000.

1446. Gest, Emily. 1996. How to break up breakfast routine: start your day by exploring a tasty world of possibilities, from kimchee to crullers. *Daily News* (*New York, New York*). Nov. 6. p. 756.

• ***Summary:*** "Korean: The beauty of breakfast at Chung Ki Wa Restaurant is that it's served 24 hours a day. Favorite dishes among the regulars include... *doen jang jige*, bean paste casserole with bean curd, pork and onion ($7.95)." Address: New York Daily News.

1447. Goch, Georgia. 1996. Korea Garden's grilled fare and filling soups are a pleasure. *Daily Herald* (*The*) (*Chicago, Illinois*). Nov. 8. p. 78 (Section 6, p. 19).

• ***Summary:*** Bibimbop ($8.85) is a large bowl of mounded steamed rice topped with juicy beef Bulgogi, assorted vegetables and fried egg. This is served with spicy bean paste [*gochujang*] on the side for those wishing to add a little fire to their lives.

"A vegetarian miso and tofu soup, Doen-jang Jigae, is also available for $8.95."

"Aljigae ($10.95) is a hot and spicy fish, vegetable and tofu soup." Address: New York Daily News.

1448. *ASA Today* (*St. Louis, Missouri*). 1996. Soy ink gaining favor in Europe and Asia. 3(1):2. Oct/Nov.

• ***Summary:*** "Trenal, S.A., the pioneer of soybean oil printing inks in Belgium and Europe, recently announced a new investment in order to satisfy the increasing demands for soybean oil newsprint inks. A brand new building with three fully automatic production lines (for yellow, magenta and cyan) should be finished by the end of the year." Before the spring of 1997 the new facility, based on Trenal's own design and ingenuity, is expected to be producing ten tons of each color per day. This represents an annual use of approximately 3,500 tons of soybean oil.

In Korea, two of the three largest daily newspapers have begun using environmentally-friendly soy ink in their printing.

1449. Pulmuone U.S.A. Inc. 1996. Update on Pulmuone (Brochure). South Gate, California. 3 p. 28 cm.

• ***Summary:*** This 3-page black-and-white brochure was inserted into the color Pulmunoe catalog in June 1997. Contents: Background. Situation analysis. Pulmuone's future. Why Pulmuone tofu for the general market? Sales and trade promotions. Distribution. Media plan. "Background: The success of Pulmuone in Korea stems from the original philosophy of naturally produced foods with respects to mother nature. This corporate culture is prominent in its employees and product line. From delivery personnel to the board of directors, Pulmuone identity is imbedded in the corporate and personal lives of all employees.

"In 1991, Pulmuone's dedication expanded across the Atlantic Ocean to the United States. Pulmuone had a far reaching dream to provide Korean Americans with natural ethnic products they could not find in the U.S. Pulmuone bean paste [miso] and pepper paste were the first products to come into the U.S. and minerals and supplemental foods

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followed thereafter. Then in June of 1995, Pulmuone opened its first tofu plant in South Gate, California.

"Thus began the history of Pulmuone USA.

"Situation Analysis: Currently, Pulmuone USA holds 70% of Korean tofu market. A market held for over 3 decades by a single Japanese company in the U.S., Pulmuone boldly and aggressively captured the Korean American market within 14 months. Once Pulmuone tofu was introduced to the market, Korean Americans immediately recognized the superior quality of Pulmuone Tofu over other brands.

"Pulmuone has also enjoyed success in the Japanese American market within a short span of time. Pulmuone currently produces private label tofu for Marukai, which is a very popular wholesale type market amongst the Japanese Americans. In the past, they carried two of the most popular brands, Hinoichi and Aloha. However, within a 3 month period, Marukai brand tofu sold both brands by a ratio of 3 to 1.

"We have a state of the art facility with complete automation. Our current production rate is 20,000 pounds of tofu per day running at single shift.

"Pulmuone Tofu's obvious superior qualities are attributed to the following: 1. Use of highest quality pure Vinton 81 soybeans; Vinton 81 soybeans are 30% more expensive than regular soy beans. 2. Quick Chill System for optimum freshness and flavor. 3. Lower pasteurization temperature without compromising taste or shelf stability. 4. Complete Manufacturing Plant Sanitation System on a daily basis."

The company has scheduled advertisements in *Vegetarian Times, Los Angeles Times Magazine* (in Korean), and *Super Market Business* for late 1996 and early 1997.

Letter from John Sim, marketing director of Pulmuone. 1997. June 17. This insert was printed on 17 Nov. 1996. Address: 4585 Firestone Blvd., South Gate, California 90280. Phone: 213-564-3000.

1450. Vita Mix. 1996. Vita-Mix TNC and soy help lower your risk of breast cancer, heart disease, osteoporosis and menopause symptoms (Ad). *Vegetarian Times.* Nov. p. 101.
• ***Summary:*** This full-page color ad begins: "Americans have 8.6 times more breast cancer and 31 times more prostate cancer than Koreans. Koreans eat 19.9 grams of soy per day. Americans eat virtually none. (Cancer Facts & Figures).

"Soy contains phytochemicals called isoflavones which have been found to contain beneficial disease-prevention properties-that most Americans will never benefit from-until they eat significant amounts of soy on a regular basis."

The ad goes on to discuss: "Soy outsmarts cancer." "Soy normalizes breast cell growth." "Genistein starves cancer cells." "The fastest way to make soy delicious: Using our NEW Soy Recipe Book with the NEW Vita-Mix TNC [Total Nutrition Center] enables you to add the protective powers of soy to over 100 Vita-Mix recipes–including our delicious and nutritious desserts."

"Call Today! 1-800-848-2649. Free Video!" Address: 8615 Usher Rd., Cleveland, Ohio 44138.

1451. Kluis, Alan. 1996. Global soybean demand continues to increase: A price rebound likely in 1997. *Soybean Digest.* Dec. p. 54.
• ***Summary:*** A table shows U.S. soybean exports to leading nations and regions from 1990/91 to 1995/96, with Northstar estimates for 1996/97. China began importing U.S. soybeans in 1995/96 with 12 million bushels, projected to rise to 26 million in 1996/97.

Europe is the largest market: European imports of U.S. soybeans rose from 212 million bu in 1990/91 to 339 million in 1995/96.

Japan is the 2nd largest market. Japan's imports of U.S. soybeans rose from 131 million bu in 1990/91 to 149 million in 1995/96.

Taiwan is the 3rd largest market. Taiwan's imports of U.S. soybeans rose from 69 million bu in 1990/91 to 96 million in 1995/96.

Mexico is the 4th largest market. Mexico's imports of U.S. soybeans rose from 59 million bu in 1990/91 to 95 million in 1995/96.

South Korea is the 5th largest market. South Korea's imports of U.S. soybeans rose from 32 million bu in 1990/91 to 51 million in 1995/96.

Indonesia's imports of U.S. soybeans rose from 3 million bu in 1990/91 to 25 million in 1995/96.

Israel's imports of U.S. soybeans rose from 15 million bu in 1990/91 to 16 million in 1995/96.

Total imports of U.S. soybeans rose from 557 million bu in 1990/91 to 845 million in 1995/96. Address: President, NorthStar Commodity Co.

1452. *Ontario Soybean Growers' Marketing Board Newsletter.* 1996. Canadian soybean exports and imports. Dec. p. 2.
• ***Summary:*** Gives comparative soybean statistics in metric tons (tonnes) for crop year 1994/95 and 1995/96.

Total soy [soybean] imports: Increased 12% from 62,539 to 69,900.

Exports to East Asia: Increased 11% from 110,251 to 122,176. The leading importers, in descending order of thousand tonnes imported in 1995/96, are: Japan (36.5), Hong Kong (31.2), Malaysia (21.3), Singapore (19.7), Indonesia (3.6), South Korea (2.5).

Exports to Europe: Increased 27% from 262,163 to 333,412. The leading importers, in descending order of thousand tonnes imported in 1995/96, are: Spain (100.7), Netherlands (88.2), Portugal (48.2), Belgium (44.0), Norway (28.3).

Exports to USA: Decreased 16% from 150,757 to

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136,903.

Total soybean exports: Increased 11% from 528,102 to 586,621 tonnes.

Source: Statistics Canada. Address: Box 1199, Chatham, ONT, Canada N7M 5L8.

1453. Pulmuone. 1996. Pool-mooo-one: The sooner you learn to pronounce it, the better for all of us (Ad). *Vegetarian Times.* Dec. p. 33.
• ***Summary:*** This full-page color ad shows the head of a cow against a green field. Along a 1-inch-high white strip at the bottom is written: "Polmuone Tofu: The alternative, humane protein." http://www.pulmuones.com. A small color photo shows a package of their tofu.

Note: Pulmuone (pronounced PUL-mu-wun) is the largest natural foods manufacturer in Korea. Address: South Gate, California.

1454. Choe, J.S.; Kim, J.S.; Yoo, S.M.; Park, H.J.; Kim, T.Y.; et al. 1996. [Survey on preparation method and consumer response of chungkukjang]. *Korea Soybean Digest* 13:29-43. [Kor]*

1455. Choi, J-S.; Kwon, T-W.; Kim, J-S. 1996. Isoflavone contents in some varieties of soybean. *Foods and Biotechnology* 5(2):167-69. *
• ***Summary:*** Discusses: Soybean varieties (Korean-Black #1, Kwangan, Danbaik, Danyop, Manri, Moohan, Paikoon, Bokwang, Paldal, Sinpaldal, Janggyung, Jangsu, Janyop, Taekwang, Pureun, Hwaum, Hwangkeum, Sinpaldal #2), Daidzein, Genistein.

1456. Kim, J.S. 1996. [Current research trends on bioactive function of soybean]. *Korea Soybean Digest* 13:17-24. [Kor]*

1457. Park, Kun-Young; Moon, S.H.; Cheigh, S.H.; Baik, H.S. 1996. Antimutagenic effects of doenjang (Korean soy paste). *Preventive Nutrition and Food Science* 1(2):151-58.
• ***Summary:*** The antimutagenic effect of doenjang on various carcinogens in *Salmonella typhimurium* strains TA98 and TA100 were studied. Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan 609-735, Korea.

1458. Palmer, R.G.; Hymowitz, T.; Nelson, R.L. 1996. Germplasm diversity within soybean. In: D.P.S. Verma and R.C. Shoemaker, eds. 1996. Soybean: Genetics, Molecular Biology, and Biotechnology. Wallingford, England: CAB International (Commonwealth Agricultural Bureaux). x + 270 p. See p. 1-36. Chap. 1. [234 ref]
• ***Summary:*** Contents: Introduction. Germplasm–Subgenus *Soja.* Germplasm–Subgenus *Glycine.* Germplasm–Characterization of diversity: Soybean breeding and loss of diversity, diversity for 'yield' traits within *G. max*, diversity for value-added traits within *G. max*, diversity for pest resistance/tolerance within *G. max*, diversity for physiological traits within *G. max*, soybean breeding and use of *G. soya*, diversity for cytogenetic and molecular traits within *G. max* and *G. soja.* Conclusions.

The introduction states: "There are more than 100,000 *Glycine max* accessions, probably less than 100,000 *Glycine soja* accessions, and approximately 3,500 accessions of perennial *Glycine* species in germplasm collections throughout the world. Inasmuch as the only worldwide survey of soybean collections is a decade old (Juvik et al., 1985), the exact numbers are unknown. Major *Glycine* collections exist in Australia, Brazil, China, Germany, India, Indonesia, Japan, Russia, South Korea, and the United States. Many other smaller but important collections exist throughout Asia and Europe."

Tables show: (1.1) List of species in the genus *Glycine* Willd., three-letter code, 2n, standard (PI), genome symbols and distribution. (1.2) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection from China. (1.3) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection from Japan. (1.4) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection from South Korea. (1.5) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection by country and maturity group. (1.6) Origin and number of accessions of *Glycine max* in the USDA Soybean Germplasm Collection. (1.7) Number of accessions of *Glycine max* in the USDA Soybean Germplasm Collection by maturity group. (1.8) Representative examples of plant introductions and their descendants used in pest reaction studies in soybean (19 references from 1951-1992). (1.9) Representative examples of plant introductions and their descendants used in qualitative genetic studies in soybean (34 references from 1918-1992). (1.10) Representative examples of plant introductions and their descendants used in protein and isozyme studies in soybean (13 references from 1977-1992).

Figures show: (1.1) Summary of genomic relationships based on cytogenetics and seed protein profiles among 11 of the 16 wild perennial species of the subgenus *Glycine.* Address: 1. United States Dep. of Agriculture, Agricultural Research Service, FCR and Dep. of Agronomy and Zoology/Genetics, Iowa State Univ., Ames, IA 50011; 2. Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801; 3. USDA-ARS and Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

1459. Steinkraus, Keith H. ed. 1996. Handbook of indigenous fermented foods. 2nd ed., revised and expanded. New York, Basel, and Hong Kong: Marcel Dekker, Inc. xii + 776 p. Illust. Index. 26 cm. Food Science and Technology Series, Vol. 73. Index. 26 cm. [350 + soy ref]
• ***Summary:*** This 2nd edition is about 108 pages longer

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than the original 1983 edition. Contents: Introduction to indigenous fermented foods. (1) Indonesian tempe and related fermentations: Protein-rich vegetarian meat substitutes. (2) Indigenous fermented foods involving an acid fermentation: Preserving and enhancing organoleptic and nutritional qualities of fresh foods. (3) Indigenous fermented foods involving an alkaline fermentation (p. 349-62). (4) Indigenous fermented foods in which ethanol is a major product: Type and nutritional significance of primitive wines and beers and related alcoholic foods (incl. Chinese koji (big *qu* {bricklike in shape and made from barley or wheat and soybeans, inoculated with *Aspergillus*} molds), and small *qu* ({spherical, plate-circular or rectangular in shape and made from rice or rice bran with various herbs, inoculated with *Mucor* and/or *Rhizopus* molds}, p. 449), Japanese amazake (p. 480-81).

(5) Indigenous amino acid / peptide sauces and pastes with meatlike flavors (p. 509-654): Introduction.

(A) Soy sauces: Japanese shoyu: Koikuchi, usukuchi, and tamari; Chinese chiang-yu, by Tamotsu Yokotsuka (p. 511-17). Biochemistry of *Saccharomyces* (*Zygosaccharomyces*) *rouxii*, by Steinkraus, Franta, and Ayres (p. 517-24). Umami flavor, by Kawamura and Kare (p. 524-28). Chinese fermented products related to soy sauce (big *qu*, small *qu*, and jiang, by Chen & Ho, p. 528). Taiwanese soy sauce, by Liu (p. 528-33). Malaysian soy sauce: Kicap, by Ong, Mercian, Poesponegoro and Tanuwidja (p. 531-39). Indonesian soy sauce: Kecap, by Saono, Poesponegoro and Tanuwidja (p. 539-43). Korean soy sauce, by Chang (incl. homemade kanjang and meju, p. 543-44). Taiwanese black bean sauce: Inyu, by Jan et al. (p. 544). Philippine taosi, by Steinkraus (p. 544-45).

(B) Fermented soybean pastes: Japanese miso, by Ebine, Shurtleff and Aoyagi (p. 545-56). Indonesian tauco, by Saono et al. and Winarno (p. 556-59). Korean Doenjang and kochujang, by Chang, Shurtleff and Aoyagi (p. 559-64).

(C) Fermented fish-shrimp sauces and pastes (p. 565-606).

(D) Fish-soy sauce and fish-soy paste, by Ismail, p. 607-11).

(E) Miscellaneous Oriental fermentations. Japanese natto (itohiki natto), by Hayashi and Ota (p. 611-24). Japanese Hama-natto (hamanatto) and related products (incl. yukiwari natto, p. 624-26). Chinese red rice: Anka (Ang-kah), by Lin, Su and Wang, Sooksan and Gongsakdi, and Pichyangkura (p. 626-33). Chinese sufu, by Su and L.-P. Lin (p. 633-41). Preserved duck eggs / Century eggs, Chinese pidan (p. 641-42). Pidan are made by a chemical process, not by fermentation. Note: Chapter 5 contains about 240 references. Much of the text in this chapter is similar to that in the original 1983 edition, although this chapter is 7 pages longer and contains 3-4 new sections.

(6) Mushrooms: Producing single-cell (microbial) protein on lignocellulosic or other food and agricultural wastes.

(7) General papers related to indigenous fermented foods. Address: Inst. of Food Science, Cornell Univ., Geneva, New York.

1460. Na, Shin; Breen, Michael; Gustavson, John. 1997. Korea: Insight guides. 6th ed., updated. Singapore: Apa Publications. Houghton Mifflin. 297 p. Illust. (some color). 23 cm.

• ***Summary:*** The section on "Food and drink" (p. 98-99) states: "More common table vegetables–such as mung and soy beans, spinach, lettuce, and black sesame leaves–as typically grown in the backyard,... Especially popular is *twoengjang-guk*, fermented soybean paste soup... A spicy hot seafood soup, called *mae-un-t'ang* "usually includes a good portion of firm, white fish, vegetables, soybean curd (*tubu*), red pepper powder, and an optional poached egg."

The working man's brew (p. 102): The Korean counterpart of Japanese *doburoku* is *makkolli*, "a milky liquor that most households ferment at home from rice." Side dishes (*anju*) served with this mildly alcoholic beverage include soybean curd (tofu).

The city of Chonju (p. 207-08) is famous for *Pi pim pap* made of boiled rice mixed with soy sprouts and topped with many delicacies.

The "Yellow pages" at the back, titled "Travel tips," includes a section on "Eating out" (p. 278-79) that lists seven types of restaurants. Foods they serve include soy sauce (*kan-jang*), soybean curd, fried soybean curd, and soybean paste.

Created and directed by Hans Höfer. Executive editor: Scott Rutherford. Editorial director: Brian Bell.

1461. Brown, Lester R.; Flavin, C.; French, H.; et al. 1997. State of the world 1997: A Worldwatch Institute report on progress toward a sustainable society. New York, NY: W.W. Norton & Co. xiii + 229 p. Index. 24 cm. [300* ref]

• ***Summary:*** This 14th edition takes a realistic look at our progress toward sustainable development since the 1992 Rio Earth Summit. It shows how pervasive resource loss is at the root of the "new world disorder" and argues that if unsustainable trends continue, "the pressure on the earth's natural limits will undermine food security–now already evident in the decline of marine fisheries and the shrinking grain harvest per person. Indeed, food scarcity may be the first major manifestation of our environmentally unsustainable global economy.

"To reverse this situation, *State of the World 1997* calls for us to take urgent measures to build an environmentally sustainable economy, slow population growth, value the nonmonetary services nature provides, adopt the best of simpler and less consumptive lifestyles, and abandon tax-payer subsidies that encourage the consumption of natural resources such as water and fossil fuels."

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Contents: A special tribute. Acknowledgments. List of tables and figures. Foreword. 1. The legacy of Rio, by Christopher Flavin: The road from Rio, eight environmental heavyweights, stabilizing the climate, conserving biological wealth, limiting human numbers and consumption, Rio plus five... and counting. 2. Facing the prospect of food scarcity, by Lester Brown: Food security trends, land and water scarcity, the fertilizer factor, the carrying capacity question, food security–the next generation, responding to the challenge. Graphs show: World grain production, 1950-96. World grain production per person, 1950-96 (it peaked in 1984 at 346 kg). World grain carryover stocks as days of consumption, 1961-96 (they have fallen from a peak of about 100 days in the mid-1980s to about 50 days consumption). World irrigated area, 1950-93. World fertilizer use, 1950-95 (after 1989 it began to decline). World grain harvested area and fertilizer use per person, 1950-95. World grain yield per hectare (it has grown steadily at about 2.3% a year, from 1.06 tons in 1950 to 2.54 tons in 1990).

3. Preserving global cropland, by Gary Gardner: Trends–from surplus to scarcity, expanding cities, degrading our future, import dependence–the case of Asia, a land-scarce world, land for the next generation. A graph shows: Grain harvested area per person and imports as a share of consumption in Japan, South Korea, and Taiwan, 1960-95. Imports now account for about 75% of consumption in these 3 countries! 4. Preventing chronic disease in developing countries. A graph shows Total dietary oils per capita in selected regions, 1965-95. North America is the highest, rising from 11 to 28. South Asia is the lowest, rising from 3 to 8. 5. Tracking the ecology of climate change. 6. Valuing nature's services. 7. Transforming security. 8. Reforming subsidies. 9. Learning from the ozone experience. Address: Worldwatch Inst., 1776 Massachusetts Ave., N.W., Washington DC 20036-1904. Phone: 202-452-1999.

1462. *Daily News* (*New York, New York*). 1997. Classified ad: Cook, Korean style (Jackson Heights). Feb. 7. p. 77.
• ***Summary:*** "Prepare and cook foods according to traditional Korean recipes... Dishes include Hae Jang Kug, Buk-U Kug, Jun Bok Juk, BiBim Bob, Kimchi Jige & Daen Jang Jige. Must be able to prepare authentic Korean dishes & accompanying condiments. 2 yrs. exp. req'd., 40 hrs./wk. $425/wk. Send 2 copies..."

1463. Smith, Michelle. 1997. Members of the Soyfoods Association of North America (as of 12 Feb. 1997). Walnut Creek, California. 1 p. Feb. 12. Unpublished typescript.
• ***Summary:*** The Association has 35 paid members. Two of the companies (Devansoy and MLO Products) have two people listed from each company. The companies are: ADM–Jack Painter, Eden Foods–Sally Gralla, Devansoy–Elmer Schettler & Ed Pedrick, Lightlife Foods–Rick McKelvey, MLO Products–Ed Cabelera & Ryan Schmidt, Pulmuone–Seung Hoon Lee, SunRich–Allan Routh, Sacramento Tofu–Alvin Kunishi, American Miso–Don DeBona, Tofu Shop–Matthew Schmit, Turtle Island–Seth Tibbott, Vitasoy–Yvonne Lo, Westbrae–Myron Cooper, American Soy–Tim Redmond, Clofine–Richard Eluk, International ProSoya–Dusty Cunningham, Monsanto–Molly Cline PhD, MYCAL–Terry Tanaka, Natural Products–Paul Lang, Pacific Soybean–Dan Burke, Alfred College–Charles Goubau, Ohio Soybean Council–Jim Kapp, Iowa Soybean Association–Kirk Leads, Iowa State University–Dr. Lester Wilson, Mark Messina PhD, Nebraska Soybean Board–Stephanie Lynch, EMB Partners–John Eastham, Nutrition Advantage–Anne Patterson R.D., Soyatech–Peter Golbitz, Soyfoods Center–Bill Shurtleff, Apple Valley Market–Gary Pappendick, Essene–Howard Waxman, Sevananda–Vince Hoffman. Address: Executive Director, Soyfoods Assoc. of North America, P.O. Box 3179, Walnut Creek, California 94598. Phone: 510-935-9721.

1464. House Foods America Corporation. 1997. House Foods America Corporation. Garden Grove, California. 12 p. 28 cm.
• ***Summary:*** This color booklet is written in 4 languages: English, Japanese, Korean, and Chinese. Thus four blocks of text, each with the same message, appear on each 2-page spread. Contents: Introduction. House Foods products. Tofu & tofu products. Restaurant–Curry House. Factory.

"House Foods Corporation is the biggest spice manufacturer in Japan, selling processed foodstuffs such as curry mix and stew mix products. In 1981, we established the Los Angeles office to introduce Japanese style curry... In 1983 we opened a curry restaurant in Little Tokyo, where our customers enjoy cuisine created with a Japanese sensibility. We also [in 1983] started manufacturing tofu, the healthy food low in fat and high in protein. Tofu has become increasingly popular in the United States and most grocery stores carry it. In 1997, we established House Foods America Corporation by merging the three enterprises: House Foods Los Angeles Office, which is in charge of the sales of House Foods' products from Japan, Curry House Restaurant, and Hinoichi Tofu manufacturing. The new entity allows us to provide better quality products to our customers. House Foods America Corporation aims to bring the rich Japanese food culture to the United States by providing high quality food products to American customers."

The new factory in Garden Grove makes 3 types of tofu, natto, fried bean curd, and konnyaku. "This factory features state-of-the-art equipment which can produce 150,000 packages of tofu per day." As of March 1997 there are five Curry House restaurants in the Los Angeles area.

Contains many color photos including: Two views of the outside of the new tofu factory in Garden Grove, California. Curry and Chinese Mabo Tofu Sauce packages. Packages of 3 types of Hinoichi Tofu (regular, firm, and soft kinugoshi)

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plus natto. The inside of a Curry House restaurant. Five views of the equipment in the new tofu factory, including an overview of the production area. Address: 7351 Orangewood Ave., Garden Grove, California 92841. Phone: (714) 901-4350.

1465. Sim, John. 1997. Tofu production statistics and philosophy at Pulmuone (Interview). *SoyaScan Notes.* May 23. Conducted by William Shurtleff of Soyfoods Center. Followed by a letter dated 14 July 1997.

• ***Summary:*** John Sim (brother of Jeannie Sim) is marketing director at Pulmuone (pronounced PUL-mu-wun) USA Inc. in southern California. This company is owned by a larger Korean company of the same name. John volunteered the following statistics: Pulmuone soaks 3,000 kg (6,613 lb) of soybeans a day. From these soybeans they make only tofu (no soymilk). This tofu is of four types: Soft, firm, silken, and "extra soft." The "extra soft" is actually unpressed soymilk curds, called *sun tubu* in Korean, and sold by Pulmuone in America as "Spiced Tofu Casserole."

Pulmuone sells all of its tofu water-packed. They think this is the packaging of the future, because water-packed tofu tastes best.

In response to some follow-up questions in a fax (dated 24 June 1997) from William Shurtleff, John replied (July 14): "1. The average retail price of firm, soft, and silken is $0.99 and two or three times a year the markets retail sale price is at 2 for $0.99. Extra soft (*sun tubu*) tofu sells at retail for $0.69.

"2. From one pound of soybean, we get three pounds of tofu (average). It is difficult to get a specific for each of the tofu. You can assume that firm requires more soymilk than soft and so forth.

3. Pulmuone's tofu is color coded: "Pink is for firm, blue is for soft, green is for silken. This seems to make things easier for our warehouse and markets for stocking purposes where the carton boxes indicate the appropriate colors as well.

4. Competitors for Korean-speaking consumers: "There are two other brands or competitors in the Korean markets. Hinoichi and Obok Foods. Hinoichi uses their own English version label and Obok uses their single, Korean label.

"5. Yes we are making *sun tubu* and currently distributing to Beverly sun tubu in Korea town. They are the second largest in Korea town next to So Kong Dong sun tubu. We are currently supplying them 100–5 gallon buckets of sun tubu per week. So you can imagine how much So Kong Dong uses." Address: Marketing Director, Pulmuone, 4585 Firestone Blvd., Southgate, California 90280. Phone: 213-564-2000.

1466. Sim, John. 1997. Re: Pulmuone brochure and tofu production statistics. Letters to William Shurtleff at Soyfoods Center, June 12 and June 17. 1 p. each. Typed, with signature.

• ***Summary:*** John encloses a handsome brochure on Pulmuone. "I hope you can utilize the information and include it in your database.

"You will be quite surprised at our current production rate." Pulmuone is currently making 20,000 pounds/day of tofu, and operating at only half of its tofu production capacity (one shift, 5 days a week); full capacity is 40,000 pounds of tofu per day (two shifts, five days a week).

Pulmuone began distribution to all 262 Ralphs Supermarkets in March of this year, and the company expects to have distribution to Vons by early August this year.

Update: June 17. Pulmuone makes 100,000 lb of tofu per week and 435,000 lb of tofu per month at its factory in Southern California.

Update: June 30. Talk with John Sim. About 80% of Pulmuone's tofu is sold the Korean-American market. The handsome labels are designed by the company's art department, which has won numerous awards, in Korea. Three companies now sell tofu in Korean-American food retail stores in Southern California; Pulmuone, House Foods, and Obok; only Pulmuone and Obok use Korean characters on the labels. Pulmuone's ads in the *Los Angeles Times* have been entirely in Korean.

Update: 1997. Dec. 29. John says that Pulmuone's main office is in the process of setting up a tofu factory in mainland China; it is expected to open in about December 1998. Address: Marketing Director, Pulmuone, 4585 Firestone Blvd., Southgate, California 90280. Phone: 213-564-3000.

1467. Nordquist, Ted. 1997. Re: Founding and early history of Aros Sojaproduktor KB in Örsundsbro, Sweden. Letter to William Shurtleff at Soyfoods Center, Aug. 4. 3 p. Typed, with signature on letterhead. Preceded by an interview on July 14.

• ***Summary:*** Ted Nordquist and William Shurtleff have been friends since Oct. 1975. In looking at the early history of Aros Sojaprodukter (1980-1992, Sweden's earliest known tofu manufacturer), Shurtleff was struck by the fact that three nice articles had been published about the company in Swedish during 1980, yet (according to a 1984 letter from Nordquist, its founder) the company had not started making tofu commercially until Feb. 1981. Shurtleff talked with Nordquist about this, then sent Nordquist a photocopy of all documents (16, in chronological order) in the Soyfoods Center library that were published (or written) before Jan. 1982 and asked Ted if he would please check that Feb. 1981 date. Ted did so, carefully and with interest, then wrote the following:

"Re: Aros Sojaprodukter KB. Dear Bill: Thank you for the call and the materials. Wow, how to bring back memories... and good ones to boot!

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"I was right the first time [about Feb. 1981 being the date the company started making tofu commercially]. You can't trust married men over 50 with instant truth about their pasts. Time is condensed into the Good Times, and the hard work is quickly forgotten. Your documentation pays off handsomely revealing that.

"1. We located the building in Örsundsbro in the fall of 1979, as revealed in Tim Öhlund's letter of November 26, 1979. We planned and talked money, floor plans, permits and whatnot.

"2. We formed the *kommanditbolag*, limited partnership, and raised $20,000." Prof. Ki Yong Kim and Ted each contributed $10,000, and 5% of the company shares were distributed to Tim Öhlund, Göran Sollenberg, Gunnar Karlsson [no relation to Ted's wife], and Lars-Oluv Kulin in return for time spent working on establishing the company. "I do not remember the exact date we received the papers and became official, but it was in 1979.

"3. We applied for loans from several banks during the beginning of 1980. We rented the locality in Örsundsbro from January 1980. The rent was 1,000 SEK per month, about $200/month.

"4. We did not get the money we asked for, about 800,000 SEK or about $160,000. By this time, we were famous! The local newspaper journalist, Göran Palm, interviewed us several times, and the Health Food Store in Uppsala owned by Birgitta Akerheden was used for Soy Product Presentations. So by the Spring of 1980, we still had a building, lots of enthusiasm, media coverage, but no money.

"In May (I think) of 1980, Gunnar Eriksson, the local bank manager of Nordbanken in Örsundsbro called me in to tell me that even his bank, Nordbanken, was not prepared to lend us the 800,000 SEK. Then he asked me how much money I could raise. I told him the $20,000 (100,000 SEK) was all that I could raise. He asked me if I could start the factory with a total of 200,000 SEK. I told him I would get back to him the next day with an answer.

"6. So we started on a shoe string. I called Anne-Marie's father, Gösta Karlson, and told him that if he would live with us during the summer of 1980, help me renovate the factory, and build the plant primarily with material from the stainless steel scrap-yard, then I would go for it. He accepted.

"I ordered the machinery through Birgitta Akerheden simply because I had no credit. I ordered a Takai grinder, hydraulic press, coagulation barrels, stainless steel pressing boxes, presses and two stainless rinsing tanks. The steam cooking process, pressing tables, etc., we built ourselves. I paid Takai about 46,000 SEK for this equipment.

"7. So Gösta and I built Aros Sojaprodukter KB and we completed the job by the end of 1980 (The article #3540 by Göran Palm dated 23 September 1980 shows me in the office using our tool chest as a coffee table). Tim, the other partners and I had an open house by the end of the year, beginning production in February of 1981. During the year of 1980, we were making tofu at home and presenting tofu dishes to people in Uppsala and Stockholm. We were basically doing what we could to build up an interest for the opening of our factory.

"8. By the summer of 1981, the lady living above the factory died, and the owners asked me if I wanted to buy the building. Again, Gösta helped me renovate the living quarters and we moved into the building from Uppsala in time for school, August of 1981. Again, Gunnar Eriksson of Nordbanken in Örsundsbro just granted me the loan to buy the building. He helped me throughout our development and also took up to 18% interest in our loans!

"10. I worked at Uppsala University at the History of Religion Institute until the summer of 1984. But my 18-hour days were catching up to me and I quit the academic life to work and pay back loans full time. Actually, I was not able to pay back my loans until after I founded Aros Sojaprodukter AB with a new partner named Erik Kennhed (in 1990), finished building the TAN Soy Base plant in Tinnsryd, made Tofuline glass [Tofu Line soy ice cream] a success in Sweden and Finland and then sold everything to Blekinge Invest in 1992. I started that project with Marc Ljungström, Trensums Musteri AB, in Tingsryd in 1982. We started making TAN Soy Base in 1987 but it was not until 1990 that the Tofuline glass started rolling off the production line.

"11. I agreed not to compete with Blekinge Invest for three years (in return for a percentage of Tofuline sales over three years)." Address: TAN Industries, Inc., 351 California St., Suite 1330, San Francisco, California 94104. Phone: 415-398-8007.

1468. Tobar, Hector. 1997. A world of surprises at Tofu Festival: Little Tokyo event includes twists on dishes from burgers to chocolate mousse that belie the food's bland image. *Los Angeles Times.* Aug. 10. p. B3, B7. Metro News section.

• ***Summary:*** The article begins: "To the uninitiated, tofu is synonymous with bland. It comes in funny white blocks that float in water. All by itself, it doesn't taste like much. But the people attending the Tofu Festival in Little Tokyo this weekend know better. They'll tell you what with some imagination and expertise–and a lot of spices–tofu is a culinary delight." More than 20,000 people were expected at the event, on Saturday and Sunday. Twenty-six restaurants served up a variety of tofu dishes. One favorite dish was the tofu cheesecake offered by Ryo Sato, the chef *de cuisine* and owner of Chez Sateau restaurant in Arcadia. The exact recipe is secret but the ingredients include tofu (50% of total), cream cheese, sour cream, egg, and lemon juice.

Talk with Margaret Endo of Little Tokyo Service Center. 1997. Sept. 10. This year's Tofu Festival was much bigger and better than the first one last year. Close to 20,000 people attended; roughly 70% of these were Asian Americans

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(with the majority of those being Japanese-Americans, but with also many Chinese- and Korean-Americans), and the remaining 30% were Caucasian-Americans. Pat Greenberg was very involved. A new edition of *The Four Seasons of Tofu* cookbook was prepared for the festival, and about 1,000 copies were sold. Address: Times Staff Writer.

1469. Myong, Jung. 1997. A Korean food manufacturing company named "Zion" plans to start making soy sauce, tofu, and soy sprouts in America (Interview). *SoyaScan Notes*. Aug. 21. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Jung is Korean. She works for a Korean company named "Zion" which currently makes soy sauce and tofu in Korea. They are planning to start a factory in the USA to make soy sauce, tofu, and soy sprouts. Address: 20973 Glenbrook Dr., Walnut, California 91789-4818. Phone: 909-595-4681.

1470. American Soybean Association. 1997. ASA foreign offices–August 28, 1997–Directory (Leaflet). St. Louis, Missouri. 1 p. 28 cm.
• ***Summary:*** Contains details on ASA's 13 overseas offices in Japan, Taiwan, Korea, Singapore, Austria, Belgium, Venezuela, China, Mexico, Russia, Cyprus, Germany, and India. For each entry: Name of director, address, phone and fax numbers, e-mail address. Address: Missouri. Phone: -.

1471. Goloenko, Denis V. 1997. Re: Documenting the early history of soybean cultivation in Belarus. Letter (fax) to William Shurtleff at Soyfoods Center, Oct. 30. 2 p. Typed, with signature on letterhead. [4 ref. Eng]
• ***Summary:*** The article by Strazh and Myatel'ski (1930) did not state that soybean cultivation in Belarus began in the year 1880; rather, they said it began during the decade of the 1880s.

The earliest document we have seen that describes soybean cultivation in what is now Belarus was an article published in 1886, and titled "The experience of soybean cultivation," by G. Tupikova and V. Hodasevich. This article is cited by Strazh and Myatel'ski (1930, p. 68, footnote No. 3). According to this article, the soybean was first introduced to Belarus in 1885 and first cultivated that year in the Gorky Botanical Garden (Mogilev region) by Mr. V. Hodasevich. Unfortunately the author doesn't mention the source of these soybeans–but they may have been obtained from an agricultural exhibition held in 1884 in Odessa (which is now located in southern Ukraine). This supposition is based on a statement in "Soybeans and raw materials of the world industry" by Victor Popov (1927) in which he says that various soybean plants, seeds, and soyfoods were presented at this 1884 agricultural exhibition.

In 1885 Hodasevich planted a small plot of early yellow-seeded soybeans in the field and a similar plot in a green house. The soybean plants in the field did not mature. Thus, the first soybean trials in Belarus were not successful.

The second earliest attempt to cultivate soybeans in Belarus, as far as we can find, was in 1893. An article titled "The early soybean of Ovsinsky," published in 1899, states that in 1893 Mr. I.E. Ovsinsky brought some early soybean varieties from Asia; they were successfully tested in the Grodno and Mogilev regions. One of these varieties had a vegetation period of 118 days. Unfortunately no information was given about the areas planted or yields of these trials.

From the article "The early soybean," by Mr. L'ucian Yurkevich (1999) we found out that in 1894 the author brought some soybean seeds from North Korea; these also were tested in the Grodno and Mogilev regions, where they matured. There is no additional information about the areas planted or yields. Despite the test results, there was no real interest in soybeans in Belarus until 1930, when Strazh and Myatel'ski tested 17 soybean varieties at the Belarussian State Academy of Agriculture in Gorky (Mogilev region). In general, they were interested in cultivating soybeans for green fodder. They investigated the possibility of soybean cultivation in Belarus, optimum planting period, plant density, and influence of mineral fertilizers and chalk. The area of the trials was not more than 100 square meters. The majority of varieties matured. The average productivity was 60 seeds per plant. Address: Soya-North Co. Ltd., 220067, Belarus, Minsk, Zhodinskaya str. 14. Phone: (017) 263 58 27.

1472. Olson, Joan. 1997. Soy ink makes Asian news. *Ag Innovation News* (*AURI–Agricultural Utilization Research Inst., Waseca, Minnesota*) 6(4):14. Oct.
• ***Summary:*** "Leading printers and newspapers are switching to soy ink. Korea's two largest daily newspapers have made the switch; their combined readership is 4.7 million. Japan and Taiwan are also beginning to switch to soy ink. 'There is a tremendous opportunity for market growth,' says Jo Patterson, coordinator of the National Soy Ink Information Center, Des Moines, Iowa. American Soybean Association seminars in Asia have sparked overseas use of soy ink."

Source: Illinois Soybean Checkoff Board, Claudine Wargel, (309) 663-7692.

1473. Sonka, Steven. 1997. From the director's desk. *National Soybean Research Laboratory Bulletin* (*NSRL, Urbana, Illinois*) 4(3):5. Oct.
• ***Summary:*** Recently I participated in a meeting where the major topic was the growing world population and the future need for food. Considerable attention was devoted to various projections indicating that the world's population is poised to increase dramatically. The most conservative estimates indicated an increase of 2 to 3 billion people in the world population over the next 30 years.

"During the meeting, one person made a startling

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comment. In effect, he said, "... that we've been hearing about hungry people, growing populations, and world food needs for years. Yet the average soybean producer really isn't any better off because of these factors."

"This statement surprised me and I promised myself that I'd check into the data to see if we can get a better handle on what the growth of world food needs means to the soybean producer. I thought it might be interesting to identify some of the countries that currently lead in soybean consumption and compare their current import levels with those of 30 years ago.

"Soybean imports to Japan are an astonishing story. Already one of the major soybean importing nations in 1962, Japan's soybean imports have increased more than four-fold over the three decades since then. By 1993, those imports exceeded 184 million bushels. Of course, much of those imports come from the United States.

"But Japan is only part of the story. Other countries, such as Columbia, Costa Rica, Indonesia, Korea, Malaysia, Mexico, and Spain, also have dramatically increased soybean imports. Each of these seven countries is now in the top group of soybean importing nations. Their 1993 imports range from the level of about 5 million bushels for Costa Rica and Columbia to more than 75 million bushels for Spain and Mexico.

"These countries, however, are not, necessarily the largest importers even after Japan. Instead, what is particularly interesting is that 30 years ago, soybean imports into these nations were insignificant. Their total imports in 1962 were only slightly more than one million bushels, a pittance compared to their 1993 imports exceeding 250 million bushels. But do any of these numbers really matter to the average soybean producer? Just the increase in soybean imports by Japan and those other seven countries exceeds 388 million bushels. Using 1996 average yields in the U.S. at 37.6 bushels per acre, this increased level of imports alone equals the production from more than 10 million acres of U.S. cropland.

"Interestingly, soybean acreage in Illinois in 1996 was 9.9 million acres. So, without the increase in soybean imports of just these eight countries, we would need to find a new home for U.S. soybean production equal to that from the entire State of Illinois.

"Maybe hungry people, growing populations, and world food needs have indeed mattered to the average soybean producer over the last 30 years. And, if we are to maintain and increase the profitability of soybean production, it's likely that these global variables will be just as important over the next 30 years.

"Research efforts and discoveries, such as described in this and prior issues of the NSRL Bulletin, will be essential to maintain a competitive and dynamic soybean sector that can respond to the future challenges of a global economy. It is critical, however, that we understand the need to continually inform and educate decision makers throughout the soybean industry of the need for global perspectives that match the reach of that industry." Address: NSRL Director and Soybean Industry Chair for Agricultural Strategy.

1474. Picard, Jacques. 1997. Dishes simmer with taste at Koreana. *Pensacola News Journal* (*Pensacola, Florida*). Nov. 7. p. 62 (p. 14).
• ***Summary:*** Located just north of Pensacola Naval Air Station. Smoking is allowed. Not handicap accessible. Owned by Mr. and Mrs. Jae Sun Do. He is a taekwondo grand master and teacher.

"One of Do's personal favorites is the Doen Jang Chie Gae, a stew pot dish of clams, bean curd and onions served with..." Address: News Journal staff writer.

1475. Kanai, Y.; Kim, H-R.; Kiuchi, K.; Muramatsu, Kanako; Takeyasu, M.; Tanaka, T. 1997. Manufacture of *Chungkuk-jang* with elastase activity. *Food Science and Technology International* (*London*) 3:251-56. *

1476. Kim, Dong-Ho; Lim, D.W.; Bai, S.; Chun, S.B. 1997. Fermentation characteristics of whole soybean *meju* model system inoculated with 4 *Bacillus* strains. *Korean J. of Food Science and Technology* 29(5):1006-15. [23 ref. Kor; eng]
• ***Summary:*** "Whole soybean meju was fermented with four Bacillus strains for 45 hr in its model system. The pH range of the product was 7.98 to 8.68, the contents of amino nitrogen and ammoniacal nitrogen were 286 to 439 mg, respectively and that of reducing sugar ranged from 0.65 to 2.24." Address: 1. R&D Team, Pulmuone Co., Ltd., 457-13 Gwangduk-ri, Doan-myun, Keisan-gun, Chungbuk 367-810, Korea.

1477. Kim, H-R; Muramatsu, Kanako; Kanai, Y.; Tanaka, T.; Takeyasu, M.; Kiuchi, K. 1997. Manufacture of chungkuk-jang with elastase activity. *Food Science and Technology, International* (*Tokyo*) 3:251-56. *

1478. Kim, H-R; Muramatsu, Kanako; Kanai, Y.; Tanaka, T.; Takeyasu, M.; Kiuchi, K. 1997. Development of a new soy protein food employing chungkuk-jang. *Food Science and Technology, International* (*Tokyo*) 3:310-16. *

1479. Lee, Jeong-Soo; Cheigh, H.S. 1997. [Antioxidative characteristics of isolated crude phenolics from soybean fermented foods (doenjang)]. *J. of the Korean Society of Food Science and Nutrition* 26(3):376-82. [27 ref. Kor; eng]
• ***Summary:*** "Antioxidative characteristics of doenjang (fermented soybean paste) phenolics on the lipid oxidation systems were studied by the determination of the oxidative related activity including lipoxygenase (LOX) inhibition, metal chelating and free radical scavenging of doenjang phenolics. Manlikong variety containing the highest amounts

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of phenolic compounds among the soybean variety, was used for doenjang processing. Doenjang was prepared by the series of processes including soaking for overnight, cooking for 1 hr at 12 lb, first fermentation (3 days at 30±2ºC) for the preparation of meju (soybean koji) after inoculation of *Aspergillus oryzae*, and further fermentation (60 days at 30±2ºC) for the ripening after addition of salt 13% to meju. In order to investigate the antioxidative activity of phenolics in doenjang, the doenjang phenolics was extracted with methanol from freeze dried defatted doenjang. Antioxidative effects of methanol extract on linoleic acid oxidation systems were observed by the significantly decreased levels of peroxide and conjugated diene formation. In addition, methanol extract resulted in the inhibition of LOX activity. And also, metal (FeCl3) chelation and free radical scavenging activities were increased with increasing concentration of methanol extract." Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan 609-735, Korea.

1480. Lee, S.M.; Hwang, I.K. 1997. [Texture characteristics of soybean curds prepared with different coagulants and compositions of soybean-curd whey]. *Korean J. of Food Science* 13:78-85. [Kor; eng]

1481. Shih, M.C.; Hou, H.J.; Chang, K.C. 1997. Process optimization for soft tofu. *J. of Food Science* 62(4):833-37. [38 ref]
• ***Summary:*** "Response surface methodology (RSM) was used to determine the optimum combinations of four factors, solids content of soy milk (10-14 ºBrix), concentration of coagulant (0.25-0.41%, W/V), mixing temperature (75-91ºC) and stirring time (5-25 sec) for producing soft tofu on a small pilot scale." Address: Korea.

1482. Food and Agricultural Organization of the United Nations. 1997. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production* (*Rome, Italy*) 51:102-03.
• ***Summary:*** The 1997 Production Yearbook, under "Soybeans" (p. 102-03, in English, French, and Spanish) gives area harvested (1,000 ha), yield (kg/ha), and production (1,000 MT), each for the years 1989-91, 1995, 1996, 1997, for the following places: World. Africa: Benin, Burkina Faso, Burundi, Congo–Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia PDR, Ethiopia, Gabon, Liberia, Morocco, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia, Zimbabwe.

North and Central America: Canada, El Salvador, Guatemala, Honduras, Nicaragua, USA.

South America: Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela.

Asia (fmr = former). Asia: Azerbaijan, Bhutan, Cambodia, China, India, Indonesia, Iran, Iraq, Japan, Kazakhstan, Korea–Democratic People's Republic of (north), Korea–Republic of (south), Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Syria, Thailand, Turkey, Viet Nam (Vietnam).

Europe (former). Europe. Albania, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czechoslovakia, Czech Republic, France, Germany, Greece, Hungary, Italy, Latvia, Moldova Republic, Romania, Russian Federation, Slovakia, Spain, Switzerland, Ukraine, Yugoslav SFR, Yugoslavia.

Oceania. Australia.

USSR.

1483. Hicks, P.A. 1997. Soybean industry applications in Asia. In: Banpot Napompeth, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 437-40. Held at Chiang Mai, Thailand, 21-27 Feb. 1994.
• ***Summary:*** RAPA stands for "Regional Office for Asia and the Pacific."

Table 2 (p. 438) shows the area of soybeans harvested (in 1,000 ha) in 27 developing and 3 developed Asian countries, in the following years: 1982, 1989, 1990, 1991, and 1991. The last columns shows the average annual growth rate in soybean area from 1982 to 1992. The countries, their 1992 area, and their growth rates are (NL = no values listed; F = FAO estimate):

Developing countries (Bangladesh NL. Bhutan 2.0F, -5.4%. Cambodia, 8.8, 20.1%. China 7,203.5, -0.8%. Cook Islands NL. North Korea 310.07, 0.5%. Fiji NL. India 2,500.0, 12.8%. Indonesia 1,667.0, 9.4%. Iran 60.0F, 1.5%. Laos 6.1, 1.5%. Malaysia NL. Maldives NL. Mongolia NL. Myanmar 34.8, 2.7%. Nepal 22.0F, 9.4%. Pakistan 1.4F, -11.4%. Papua New Guinea NL. Philippines 10.0F, -1.7%. Rep. of Korea 120.0, 3.9%. Samoa, Western NL. Solomon Islands NL. Sri Lanka 1.4, -20.8%. Thailand 380.0, 14.4%. Tonga NL. Vanuatu NL. Vietnam 113.0F, 1.5%. Sub-total 12,440.0, 2.2%).

Developed countries (Australia 30.0, -2.2%. Japan 141.0, 0.3%. New Zealand NL. Sub-total 171.0, -0.2%).

Asia-Pacific Total 12,611.0, 2.2%.

Rest of world 41,979.7, 0.6%.

World 54590.7, 0.9%. Address: FAO Regional Agricultural Engineering and Agro-Industries Officer, FAO, RAPA, Bangkok, Thailand.

1484. Jordan, Michele Anna. 1997. California home cooking: American cooking in the California style. Boston, Massachusetts: Harvard Common Press. xxv + 501 p. See p. 353-54. Illust. Index. 24 cm. [120+* ref]
• ***Summary:*** The recipe for Korean-style grilled steaks (p. 353-54) is an adaptation of *bulgogi*, the well-known Korean barbecue dish that features thin strips of beef. Both San Francisco and Los Angeles have large communities

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of Korean immigrants, with many Korean restaurants and markets. "Note: To make *samjan* sauce, mix 2 parts *dhwen-jang* [*doen-jang*], or Korean bean paste, with 1 part *gochujang,* or Korean barbecue sauce." Both are available in Asian food stores. Miso may be substituted for dhwen-jang and *sambal ulek* for gochujang.

Note: This is the earliest English-language document seen (March 2009) that uses the word "gochujang" to refer to Korean-style red pepper and soybean paste (miso).

Teriyaki recipes appear on pages 318 and 327.

Contains a good bibliography, and many sidebars, on the history of California cooking. Address: California.

1485. Kim, S.B. 1997. Cultura: History of Korea food life. Seoul, Korea: Kwang Moon Kak. See p. 146-260. *
• ***Summary:*** The *Samkukji,* written by a Chinese in the 3rd century A.D., reported that Koreans prepared fermented foods, especially from soybeans, very well. It praised the fermentation skills of the Koreans.

1486. Kittler, Pamela Goyan; Sucher, Kathryn P. 1997. Food and culture in America: a nutrition handbook. Belmont, California: West/Wadsworth. xiv + 535 p. Illust. (photos). Index. 26 cm. [100+* ref]
• ***Summary:*** What is American food anyway? Does it include sushi, soy sauce, miso soup, or tofu? How about Peking duck or pot stickers? How about enchiladas, chile rellenos, or tacos?

This excellent and original work is arranged in chapters by cultural groups or subcultures living in the USA.

The chapter on "Latinos" states under "Foreign influence" (p. 286) that the "demand for Asian ingredients by later immigrants resulted in the introduction of soybean products,..." Under "Regional variations" (p. 290) that Cubans like a chicken dish marinated in lime juice and soy sauce. Under "Meal composition and cycle" (p. 290) that West-African fritters are made from the meal of soybeans..."

The chapter on "Asians," under "Chinese," notes (p. 328-30) that "Soybeans are transformed into an amazing array of food products that are indispensible to Chinese cooking," including soy sauce, soy milk, bean curd or tofu, black beans ("made with cooked fermented soybeans preserved with salt and ginger. Black beans are usually added as a flavoring in dishes"), hoisin sauce, and oyster sauce. Soy oil is also used in Chinese cooking. The Hakkas enjoy tofu stuffed with meat (p. 332). Every Chinese meal aims for a good balance of *fan* (grain foods, such as rice or wheat) and *tsai* (side dishes). "The Chinese believe that a good diet is critical for physical and emotional harmony and necessary to strengthen the body against disease" (p. 334). During pregnancy, soy sauce may be avoided to prevent dark skin (p. 335). Chinese who avoid fresh dairy products because of lactose intolerance, may consume soybean curd and soy milk (if fortified with calcium) as alternatives.

Under "Japanese," soy sauce is a traditional food of Japan (photo, p. 341). Soybean products (p. 350) are an important part of the Japanese diet; they include tofu, shoyu (soy sauce), miso, and teriyaki sauce–to name just a few. Second-generation Japanese use more soy sauce than non-Asians (p. 354) but as their diet becomes Americanized, they fall prey to more diseases of affluence. The response to dairy products and lactose intolerance is similar to that of Chinese, with the use of tofu and soy milk.

Under "Koreans" (p. 363, 366) Soybean products are in important part of the diet; they include soy sauce, soy paste, and soybean curd or tobu [sic, *tubu*] (tofu).

Under "Southeast Asians and Pacific islanders." Adobo is a popular Filipino stew, seasoned with soy sauce (p. 389). Soy products include soy milk and tempeh (p. 399, 402, 404, 421-22).

The "Glossary of ethnic ingredients" mentions many soy products including (p. 490): "Black beans, fermented: Black soybeans salted and fermented to produce a piquant condiment. Used in Chinese cooking as a seasoning or combined with garlic, ginger, rice wine, and other ingredients to make black bean sauce." Address: 1. M.S., Food and nutrition education consultant; 2. Dep. of Food and Nutrition, San Jose State Univ., California.

1487. Lee, Kweon-Haeng; Kim, Nam-Dae; Yoo, Jin-Young. 1997. [Survey on the manufacturing process of traditional Meju for and of Kanjang (Korean Soy Sauce)]. *J. of the Korean Society of Food Science and Nutrition* 26(3):390-96. [68 ref. Kor; eng]
• ***Summary:*** "Meju is a basis for manufacturing Kanjang. Meju was traditionally prepared at home by different types of process depending on the regional area. It is necessary to standardize and simplify the process of Meju-preparation for Kanjang of good quality. For these purposes, the process of Meju and Kangjang making as well as analysis of commercial Kanjang, were compared. Generally, traditional Meju was prepared by steeping and dehulling the whole soybean. After steeping for 24 hr. soybean absorbed water up to 110-120% of its weight. The soaked soybeans were steamed for 2 hr. and cooled to 50ºC. Cooked soybeans were crushed down to the size of 10-15 mesh and molded. Molded soybeans were dried for 2 days in the air, hung up by rice straw and fermented for 20-30 days under natural environmental condition." Commercial soy sauce is Japanese-style shoyu, which contains roasted wheat. Address: 1. R&D Advanced Inst., Samho Co. Ltd., Seongnam, 462-120, Korea.

1488. Vavilov, Nicolay Ivanovich. 1997. Five continents. Translated from the Russian by Doris Löve. Rome, Italy: International Plant Genetic Resources Inst. xliii + 198 p. Illust. No index. 24 cm. [10 ref. Eng]
• ***Summary:*** This book, about the life and work of N.I.

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Vavilov (1887-1943), was published long after his death as a political prisoner. Unfortunately, the book has no index. The excellent introductory chapter titled "The Russian scientist Nicolay Vavilov," by Seymon Reznik and Yuri Vavilov (p. xvii-xxix) is a frank biography, including details of his conflict with arch-enemy Trofim Lysenko, his fall into disgrace by 1935, his arrest by the KGB on 7 Aug. 1940, and his death in prison in 1943.

In "The basic principle behind the expeditions" (p. 1-4) Vavilov notes that the seven basic geographical centers of origin, which cover only about 7% of the world's land area, are: (1) The tropical centre, in tropical India, IndoChina, and southern China. (2) The East Asiatic Centre, includes the central and western parts of China, Korea, Japan, and the major portion of Taiwan. (3) The Southwest Asiatic Centre. (4) The Mediterranean Centre, along the coast of the Mediterranean. (5) The Abyssinian Centre. (6) The Central American Centre, and (7) The Andean Centre. Maps show Vavilov's travels in each center. These centers were first outlined in his book *Centres of Origin of Cultivated Plants* (1926, Leningrad).

In the chapter titled "Expedition to Japan" (p. 58-61) he expresses his surprise at "the endless variety of plant types" including the "various preparations of soya beans and 'adzuki' beans (*Vigna angularis* [Willd. Ohwi & H. Obashi])." "There is perhaps no other country where the love of trees and flowers is so strongly expressed as in Japan. The care of flowers and plants has become a national characteristic of this country." "There is not a single weed in the fields or in vegetable gardens." In Japan he found "a multitude of dishes made of soyabeans (substituting for fat and including a cheese called 'tofu,' a soya product)..." He was impressed by the work of Ekiken Kaihara [Kaibara; 1630-1714]. A philosopher, man of letters, physician, geographer, historian, agronomist and naturalist, he wrote 270 volumes on 60 different themes, including a 5-volume work on garden plants and a 3-volume work on vegetable plants. In 1638 two gardens of pharmaceutical plants were established in Edo (Tokyo) and in 1720 another one in Komada.

In the chapter titled "Expedition in Korea" (p. 69-71) he again mentioned soyabeans and 'adzuki beans,' and noted: "Dozens of different foods are made from soyabeans, including the special cheese, tofu. Sprouts of soyabeans are rich in vitamins and are available in large amounts in all markets in Japan. Soya is used for seasoning meat and rice and of course, it produces an excellent oil, used for making margarine and for technical purposes. Although it is a crop exceptionally well suited to a monsoon climate, the soyabean has become the most important technical crop worldwide during the last couple of decades. Owing to the effect of European and American demands an enormous area has become planted to soyabeans. During the past two decades the plantations of soya in Manchuria have reached 7 million hectares and the world-wide area has exceeded 15 million hectares. It is difficult to imagine a more flexible plant in respect of the variation of both biological and other characteristics. The varieties of soyabeans can be counted by the thousands. The present American industry has introduced even more variety."

In Seoul, Vavilov unexpectedly met two colleagues, P.H. Dorsett and William Morse, known to him from Washington, DC. "Dr. Morse is the co-author of a well-known monograph on soyabeans, written by him and Dr. Charles Piper, another plant introducer from Vancouver, Canada. Morse was fanatically devoted to soyabeans throughout his life. In the course of some years, Piper studied in China, Korea, Manchuria and Japan on behalf of the U.S. Department of Agriculture, investigating crops of soyabeans, collecting seed material and forwarding it to the USA." Also discusses the agricultural explorations of Frank Meyer and Mark Carleton. Swingle "organized an extensive utilization of Chinese research, including the building up of a valuable library of Chinese literature and a whole staff of translators, who revealed the treasures of ancient Chinese agronomical science. The results of this endeavour have become obvious during the past couple of years. The similarity between the conditions of extensive parts of the territories of the USA and China make possible a wide utilization of soyabean crops, which during the last couple of years have amounted to as much as 1.5 million hectares."

"Quietly and modestly, Morse, who traveled with his family, wife and daughter, went from one city to another while staying in the best hotels."

Note: Soyfoods Center has a copy of the "Translator's Foreword" (p. xxx-xxxvi) which was typeset but later deleted from the book. Only the last two paragraphs were used. It tells the real story of Vavilov's work, his downfall at the hands of Trofim Denisovich Lysenko, several moving petitions by Vavilov asking that he be able to finish writing unfinished books, and details of his case history and death. Address: Head, All-Union Inst. of Plant Industry (VIR), Russian SSR.

1489. Yu, T'ae-jong; Yu, Young-nan. 1997. Korean foods. Seoul, Korea: Korean Cultural Research Center, Korea University. 200 p. Illust. (color). 22 cm. [30+ ref]
• ***Summary:*** *Chongguk-jang*, (fast fermented beans), which could be called Korean natto, is mentioned on pages 14 and 110.

Note: This is the earliest English-language document seen (Jan. 2012) that uses the word "Chongguk-jang" to refer to Korean-style natto.

Also on page 14: "Toenjang chige (Bean paste stew)."

1490. Ota, Eileen. 1998. Update on Ota Family Tofu in Portland, Oregon (Interview). *SoyaScan Notes.* Jan. 28. Conducted by William Shurtleff of Soyfoods Center.

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• ***Summary:*** Ota Family Tofu has tofu making equipment that Eileen would like to sell; it has hardly been used. In about 1981 the company moved to a new location, 812 S.E. Stark St.; it had more than twice as many square feet as their previous location. When they moved Ko went to a soy conference and met Eddie Okita, who was selling tofu manufacturing equipment. Ko decided to buy new equipment. Eileen objected at the time, suggesting that he try it before he buys it–to be sure you get the product that you want. Ko said "No." He just wanted to buy it. Coincidentally, at the same time, a competitor (Dae Han Tofu) began making tofu in Portland. Before that, there was a small tofu maker in Salem that didn't last very long. Dae Han was planning to deliver their tofu, which Ota had never had to do before. So Ota lost a large portion of the Portland tofu market to Dae Han.

Ko used the new equipment for a while, but then it became apparent that the tofu and the agé were not coming out the same. He had less control over the more automated equipment. Their customers noticed the difference and did not like the change. Moreover, Ota no longer had the volume to support the new equipment. So they went back to their old machines.

One of the early tofu-makers was Saizo Ohta (not Seizo), but he was not one of the founders. Two brothers apparently started the company. At the time of the "Spanish flu" epidemic in 1918-19, one or both of them became ill and the business went to Saizo Ota, Matsuno Ota's father. Matsuno was an only child, and in those days there was the tradition of sending Japanese children in America back to Japan for education. So when she was 4-5 years old she went to Japan. She did not return to America until after World War II. During the war her father, Saizo, had died. Matsuno returned to the USA in the early 1950s. The Grandmother, Shina, had a stroke after they arrived in Portland. At that point, in about 1956-57, Ko's father (Matsuno's husband) took over the tofu business. Ko's father was trained as a medical technician in Japan, but he couldn't get a job in the USA because his certification didn't transfer. So he worked for a while as a janitor and then spent a lot of time helping the grandmother, Shina.

After Ota Tofu moved to its present location, there was a huge influx of Vietnamese people who wanted soymilk, so the company started making it.

Shurtleff tells Eileen of an early listing for Ota Tofu in Portland in a 1922 Japanese-language directory of Japanese in the United States.

1491. Kluis, Alan. 1998. Currency woes threaten ag exports: Devaluations have hurt some of our best customers. *Soybean Digest.* Jan. p. 108-09.
• ***Summary:*** The USA now grows about 50% of the world's soybeans. One graph shows the world's top soybean producing nations and states (in hundred million bushels): USA (280), Brazil (110), Argentina (55), Iowa (50), Illinois (40), Minnesota (28). A second graph shows U.S. soybean exports by country (in million bushels): Japan (145), Netherlands (125), Mexico (122), Taiwan (75), China (68), Brazil (62), Korea (55), Spain (55), and Germany (43). Address: President, NorthStar Commodity Investment Co.

1492. Paolucci, Danny. 1998. How LEASA helped to build distribution for Swan Foods Corp. in Miami, Florida, then ended up destroying Sunshine Soy Co. and Swan Gardens (Interview). *SoyaScan Notes.* March 8. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** LEASA Industries Co. was (and still is) a food manufacturing and distribution company in Miami owned and run by a Korean-American family. They made and distributed [mung] bean sprouts and tofu. After Danny arrived at Swan Foods (in late 1977) they arranged to have LEASA distribute their products to grocery store chains. This was very beneficial for Swan Foods.

After Heartsong Tofu (run by Bob and Toni Heartsong in Miami) went out of business in about 1984, LEASA bought their equipment. Then they proceeded to put Swan Gardens out of business. Later they also killed Danny's company, Sunshine Soy Co. Address: 2219 S.W. 59th Ave., Miami, Florida 33155. Phone: 305-266-0830.

1493. Iderabdullah, Bisi. 1998. History of work with soybeans and soyfoods. Part I (Interview). *SoyaScan Notes.* April 6. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Bisi was born in Brooklyn right after World War II, and grew up there; her father was from Jamaica and her mother from the American South. After graduating from high school, Bisi's entrepreneurial spirit began to appear. She and her mother bought a Carvel ice cream franchise, and she began to make money. On her own initiative, she traveled to Europe three times–before she had even entered college! In 1968 she entered Brooklyn College in New York. During her first year as pre-med student, she was introduced to soyfoods and soybeans when she read Jethro Kloss' book *Back to Eden.* Her college friends were also exploring more natural lifestyles, including natural foods. Bisi liked to cook so she experimented with Kloss' recipes for soybean butter, soybean cheeses, etc. Also during her first year she met her husband-to-be. In 1970 he converted to Islam and changed his name to Mahmoud. As part of her medical program, she had to see an autopsy. "It really shook me up. When they peeled the person's skin back, it looked just like chicken. The only meat I could eat after that was hot dogs–and that got tiring after a while." She had taken the first steps to becoming a vegetarian.

In 1973, during her junior year at Brooklyn College, Bisi converted to formal Islam (she did not become a Black Muslim) and was married to Mahmoud in an Islamic wedding. "At that period in U.S. history Islam was strongly

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linked with Africa and African myths; many converted to Islam because they felt it was more African. It wasn't as much religion as it was traditional carriage." Mahmoud was a pre-med student studying to be a health educator. Three months later she won a scholarship to study abroad–anywhere in the world she wanted. She chose Africa. Bisi wanted to return to study her roots, to learn more about where she (as an African-American) had come from. So, leaving her husband studying in Brooklyn College, she flew to Zambia for 5 months and studied at the University of Zambia in Lusaka. When school was out there, she flew to Ghana, where she was joined by her husband. She studied archaeology at the University of Ghana in Legon for one year. When in Ghana, they tried unsuccessfully to study with a traditional natural healer.

Returning to the USA (Brooklyn), pregnant with their first child, she decided not to continue her pre-med education, because of its lack of emphasis on healthy lifestyles, nutrition, prevention, etc. They bought a house in Queens. Her husband was working at a clinic, but in 1974, one week before the birth of their first child, a boy, he lost his job. When the child was born, the delivery was extremely long, difficult and painful. In 1976, shortly after the birth of their second child. Bisi started making jewelry as a hobby, then professionally to earn money. They bought a camper, took their two kids, and began to travel all over America. "We became free spirits, traveling to wherever there was an art show, to enter our jewelry."

They ended up settling in an apartment in Fort Lauderdale, Florida. Expecting a third child in 1978, they decided to do the birth themselves–with a midwife. So they bought the book *Spiritual Midwifery,* by Ina Mae Gaskin, published by The Farm. They also bought one of the Farm's cookbooks. From these books Bisi learned about the many creative things done by The Farm–such as donating food and relief help to developing and poor countries.

They bought a house in Miami and decided, now with three kids, to end their itinerant life. First they opened a jewelry shop in Miami; soon it was thriving. Then they joined a co-op and many of their friends were Rastafarians–who are vegetarians. Soon they decided firmly to become vegetarians and soy became a large part of their diet. Bisi made her own tofu for her family, using *The Book of Tofu* by Shurtleff & Aoyagi. She also made her own whole-wheat breads and other natural foods. Bisi decided to start an alternative school in Miami to give her sons a better education. She incorporated the school and became the principal. Many Rastafarians sent their kids to the new school.

When she was in Ghana in 1973, Bisi decided that someday she definitely wanted to return to Ghana. Over the years she had worked hard to save her money for the return trip. One place in Africa she knew she didn't want to go was Liberia, where she heard the indigenous people were treated badly. Now she realized that if she waited any longer to return to Africa, their eldest son would resist the move. So they pulled up roots in Miami, rented their house in Queens, and Bisi flew to Africa to prepare the way for her family. She decided to settle–of all places–in Liberia, arriving in 1985. After finding a place to live, she returned to New York to bring her family back with her. Her goal was to do something to help the people of Liberia and to find a place where she and her family could pursue their own development.

In 1986 Bisi and her husband started the African Islamic Mission in Monrovia, Liberia, as a non-governmental organization (NGO). Its focus was to be on agriculture and education, helping the people of Liberia to feed themselves, and also on promoting Islam. Because of their lifestyle, they were very interested in organic, sustainable agriculture. But the local people became suspicious; who were these foreigners who were not connected with any known organization? When Bisi and Mahmoud finally got a permit to open their own school, they decided instead to teach at an existing Liberian school (pre-school to 9th grade) in Monrovia. Bisi taught there from late 1986 to 1990. Mahmoud taught there for one year, then got a private-sector job to earn needed money. In their spare time they started programs at their Mission–teaching literacy, English as a second language, and sex education for young girls. Their agricultural work was limited to a backyard garden.

In about 1985-86 Koreans started coming to Liberia to farm. They started selling small amounts of tofu in about 1989, and Bisi started buying it from them in Monrovia–but unfortunately the tofu didn't stay fresh very long. Bisi has no idea where they got the soybeans to make the tofu.

In about 1987 or 1988 the extension service at the University of Liberia in Monrovia tried to grow soybeans. They collected some statistics, but everything was lost during the civil war. Methodists in Liberia had experimented with growing soybeans just before the war, but the project was a total failure. A friend of Bisi's who is a vegan and a Methodist missionary, Bill Whitfield, convinced the Methodist Farm Project to grow soybeans, because he eats soyfoods in place of meat and dairy products–and he was having to import the soybeans. They did grow the soybeans successfully. Bisi bought a 50-lb bag from the Methodists, so that her African Islamic Mission could start making tofu again. But it was a failure because the farmers and the Liberian people weren't interested, and Bill Whitfield had left Liberia and didn't go to the extension service to show people how to use the soybeans. Continued. Address: Director, Imani House, 76A Fifth Ave., Brooklyn, New York 11217. Phone: (718) 638-2059.

1494. Ralston Purina Company. 1998. Agribrands International, Inc. St. Louis, Missouri. 95 p. April 1. 28 cm. • ***Summary:*** Ralston Purina Co. has decided to create a new company, Agribrands, by spinning off its international animal

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feeds and agricultural products operations. The company, whose stock symbol will be AGX, will be traded on the New York Stock Exchange. Shareholders of record of Ralston stock as of 1 April 1998 will receive one share of Agribrands Stock for every ten shares of Ralston stock they own. The spinoff will occur on April 1.

The production and sale of animal feed was the primary business of Ralston when it was established in 1894. Animal feeds and agricultural products continued to be the dominant business until the 1950s. "The development at that time of a new extruded dry dog food by Ralston revolutionized the pet food industry and transformed Ralston into primarily a consumer products company. Since then, the pet food business has continued to grow in importance to Ralston while the relative contribution of the animal feeds and agricultural products business declined. In the 1980's, Ralston's focus became increasingly directed away from the animal feeds and agricultural products business as Ralston acquired Continental Baking Company, the nation's largest wholesale baker, in 1984, and the worldwide Eveready battery business in 1986. The intention of Ralston's management to focus on consumer packaged goods and its stable of leading brands culminated in the sale of its U.S. animal feeds and agricultural products business to a subsidiary of British Petroleum in 1986. British Petroleum did not acquire Ralston's international animal feeds and agricultural products business, which became a non-core business, having limited synergies with Ralston's other international businesses."

"In 1994, Ralston spun-of Ralcorp Holdings, Inc., a subsidiary to which Ralston had contributed its breakfast cereal, baby food, cracker and cookie, coupon redemption and all-seasons resort businesses. In 1995, Ralston sold all of the capital stock of Continental Baking Company. In 1996, Ralston sold its assets associated with its cereal business in the Asia Pacific region (which it had retained in the Ralcorp spin-off), and terminated its European cereal operations. In 1977, Ralston sold its international soy protein technologies business. In line with this focus on its core businesses, Ralston attempted to sell its international animal feeds and agricultural products business to PM Holdings Corporation in 1994, but negotiations broke off as the parties were unable to agree on key terms of the transaction."

Agribrands' principal properties are its animal feed manufacturing facilities and property, which are located in the following countries: Brazil (7 plants), Canada (7), Colombia (6), France (7), Guatemala (1), Hungary (2), Italy (5), Korea (3), Mexico (8), People's Republic of China (4, incl. 3 joint ventures), Peru (3), Philippines (2), Portugal (2), Spain (7), Turkey (2), Venezuela (4, plus a hatchery) (p. 41-43; notes which are leased, joint venture, under construction, or to be divested). Address: Checkerboard Square, St. Louis, Missouri 63164.

1495. *SoyaScan Notes.* 1998. The worst famines in human history (Overview). May 1. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** The worst famine in human history, in terms of total famine-related deaths, was the Chinese famine of 1958-1962 that killed 30 million people (Source: 1998 April 30–Newshour with Jim Lehrer–Famine in North Korea).

Other major famines in China since 1875 (chronological): 1876-79 in North China–Drought for 3 years. Children sold and cannibalism. Estimated deaths: 9 to 13 million. 1892-94 in China. Drought. Deaths estimated at 1 million. 1920-21 in North China. Drought. Estimated ½ million deaths. 1928-29 in China (Shensi, Honan, and Kansu). Comparable in extent and severity to the great famine of 1877-78, but because of railroads, deaths were probably less.

Major famines in the USSR since 1875: 1921-22, especially in Ukraine and Volga region. Drought. U.S. assistance requested by Maksim Gorky. Despite relief efforts, deaths estimated at 1.25 to 5 million. 1932-34 in all USSR, caused by collectivization, forced procurement, destruction of livestock by peasants. Estimated deaths 5 million. 1947 in USSR (reported by Khruschev on 10 Dec. 1963). Caused by policies of Stalin and Molotov.

1496. Louie, Elaine. 1998. Vegetarian that's filling. *New York Times.* May 13. p. F8.
• ***Summary:*** Julie Sahni, cookbook author and teacher, says that vegetarianism has been an inextricable part of Indian culture since about 500 B.C., when Mahavira, a Hindu philosopher, developed the concept of ahimsa, or non killing. Although meat is scarce in Indian cookery, protein is not. A recipe for Indian chickpea ragout shows this.

A recipe for Bean curd sauté, adapted from Youngin Hyun, calls for "2 pounds extra-firm or firm bean curd" [tofu]. Hyun, a Manhattan [New York City] photographer and talented home cook, says that Koreans, which also have a long and rich tradition of vegetarian cookery, have used beans as a protein source since 107 B.C. In Korea, all beans, including soybeans, are called "the meat of the soil." Koreans began making bean curd (called *du bu*) during the late Koryo Dynasty (918-1392), according to Mrs. Hyun. Today bean curd comes in two consistencies, firm or silken. The silken type can be sliced then drizzled with a mixture of soy sauce, sesame oil, vinegar, sugar, and chopped scallions. The firm kind is used in stews and sautéed dishes. In the decade after the Korean war (which ended in 1953), Koreans ate lots of bean curd as the poor country rebuilt itself.

1497. Japan Tariff Assoc. 1998. Exports of miso (bean paste): No. 2103.90-000. *Japan Exports and Imports: Commodity by Country.* June. No. 618. p. 83. [Eng; jap]
• ***Summary:*** For each country, gives the quantity and value for the current month, and for the cumulative year to date.

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Countries to which Japan exports large quantities of miso are (year to date in kg): USA 1,127,052. Taiwan 168,941. Hong Kong 156,221. South Korea 104,743. Total exported this year: 2,235,149 kg. Address: 4-7-8, Kohji-machi, Chiyoda-ku, Tokyo 102-0083, Japan. Phone: 81-3-3263-7221.

1498. Lee, J.D.; Hwang, Y.H. 1998. Quality evaluation for vegetable use in local soybean cultivars with various seed coat color. *Korean J. of Crop Science* 43(2):83-88. June. [20 ref. Eng]

• ***Summary:*** "Abstract: From the evaluation of physical properties such as springiness, gumminess, adhesiveness, chewiness and hardness by the texture analyzer, vegetable soybean lines with green seed-coat were best as compared with those with black, brown, mixed, and yellow seed-coats. A panel test evaluated on the basis of taste, sweetness, chewiness, and total scores also indicated that soybean lines with green seed-coat were the best. The total scores of panel test was decreased in the order of green> yellow> black> brown seed-coat colored soybean.

"The mean value of sucrose content obtained by HPLC analysis was highest in black seed-coat colored soybean, and followed by green, yellow, and brown soybeans. The highest sucrose content (8.22%) was observed in 180362, a soybean line with green seed-coat. The full-season type soybeans showed much higher sucrose content than summer types which are mainly cultivated on farmer's fields for vegetable purposes.

"The final 13 lines selected from 300 colored soybeans showed nearly the same panel scores as Miwongreen. However, these lines had a great deal of variation in sucrose content, and much higher readings in texture analysis than Miwongreen, especially in chewiness and hardness which were the most important properties in vegetable soybeans." Address: Dep. of Agronomy, College of Agriculture, Kyungpook National Univ., Taegu 702-701, Korea.

1499. Tamang, J.P. 1998. Role of microorganisms in traditional fermented foods. *Indian Food Industry* (*Mysore, India*) 17(3):162-67. May/June. [32 ref]

• ***Summary:*** This article is mainly about the benefits of fermentation and fermented foods. Contents: Introduction (main microorganisms are filamentous fungi, yeasts and bacteria, especially LAB = lactic acid bacteria). Biopreservation. Bioenrichment. Microorganisms that produce enzymes. Microorganisms that destroy undesirable components. Enrichment of the diet. Mixed starter culture. Traditional fermented foods of medicinal value (koumiss, kvass). Conclusion.

The following fermented soyfoods are mentioned: Kinema, hawaijar, miso, natto, shoyu, tauco, and tempe [tempeh]. Koji is also mentioned.

"Fermented foods are defined as foods that have been subjected to the action of selected microorganisms by which a biochemically and organoleptically modified substrate is produced, resulting in an acceptable product for human consumption." Address: Microbiology Research Lab., Dep. of Botany, Sikkim Government College, Gangtok, Sikkim–737 102, India.

1500. Menez, Gene. 1998. Forget Tiger [Woods]–Pak is on the attack: 20-year old Korean just wants to be the world's best golfer, of any gender. *Fort Worth Star-Telegram* (*Fort Worth, Texas*). July 26. p. 35, (C1).

• ***Summary:*** Se Ri Pak is an amazing young woman golfer.

In Orlando, Florida she frequents the Shin Jung Restaurant three or four times a week for the Doen Jang Jigae (soybean paste stew) or Kim Chee Jigae (pickled spice cabbage stew). Address: Star Telegram staff writer.

1501. *SoyaScan Notes.* 1998. Chronology of Frank N. Meyer (1875-1918), USDA plant explorer in Asia. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1875 Nov. 29–Frans Meyer is born in Amsterdam, Netherlands. 1889–Meyer, age 14 becomes a gardener's helper, later a gardener at the Amsterdam Botanical Garden, and assistant to Prof. Hugo de Vries, the eminent Dutch botanist and geneticist, in his special experimental garden. Note: In 1900 de Vries was one of three scientists who, at a conference in London, England, "rediscovered" the work of Gregor Mendel, introducing modern genetics.

1901 Oct. 20–Meyer first arrives in the USA, in Washington, DC, with a letter of introduction from de Vries to Erwin F. Smith, one of the five plant pathologists who were working with Beverly T. Galloway at the USDA in 1889. Smith found Meyer a modest job as a gardener in the USDA greenhouses on the Mall at Washington, DC.; here Meyer worked from 23 Oct. 1901 to 31 Aug. 1902. He resigned 1 Sept. 1902. On 15 Sept. 1902 re-entered USDA service at the Plant Improvement Garden at Santa Ana, California. Resigned after 7 months on 1 April 1903 and became head gardener at a little nursery in Montecito, California.

1904 Jan. to March–In St. Louis, Missouri, attending the World's Fair and working at Armstrong's nursery. 1904 March to August–Made journeys of study in California (visited Luther Burbank in Santa Rosa), Mexico (took a steamer in March from San Francisco to San Blas, Mexico; walked across Mexico from San Blas to Guadalajara to Mexico City, then to Vera Cruz on the Gulf of Mexico), and Cuba. From Havana he took a ship to New Orleans, Louisiana, then on to St. Louis. 1904 Aug. 1–Began work at the Missouri Botanical Garden [called the Shaw Botanical Garden locally] in St. Louis. Was a member of the jury on Forestry at the World's Fair of 1904. Resigned Shaw Garden on 1 July 1905.

1905–In about early March, Adrian J. Pieters, a fellow

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Dutchman who had come to know and admire Meyer, tells Fairchild about Meyer's love of walking and deep interest in plants. On March 10 Fairchild asks Pieters to telegram Meyer to ask whether he would be interested in going to China as an agricultural explorer (Fairchild 1938, p. 315; Cunningham 1984, p. 21). The dream of Meyer's youth had come true. But 3 months passed before Meyer left St. Louis.

1905 July–Fairchild and Meyer first meet and instantly become mutual friends. For a detailed description of their first meeting see Fairchild 1938 (p. 314-16). On 10 July 1905 Meyer re-enters USDA service for the third time, now as an agricultural explorer in the Bureau of Plant Industry.

1905-1908–First expedition; mainly to China, but also to Japan, Korea, Manchuria, and Eastern Siberia. He collected nearly 2,000 plants and seeds. He left Washington, DC, on 27 July 1905 and returned on 7 July 1908.

1906 Feb. 23–Meyer's first soybean introduction, SPI 17852 from Peking was received in the USA; it was later named Peking.

1908 July 21–Meyer submits a Petition for Naturalization (now located at the U.S. Immigration and Naturalization Service, Dep. of Justice, Washington, DC).

1909-1912–Second Expedition.

1912-1915–Third Expedition.

1916-1918–Fourth Expedition.

1918 June 4–Telegram arrives in Washington at 4:00 p.m. from the Consul at Nanking "Frank Meyer, Department Agriculture, disappeared from steamer in this consular district en route Hankow to Shanghai, June 2nd." His death occurred at night. His body was recovered from the Yangtze River on June 5, about 30 miles above the little town of Wuhu, and buried on June 12 at the Bubbling Well Protestant Cemetery in Shanghai. His death remains a mystery to his friends; it is not known whether he died from accident or suicide. It was well known among his friends, and clearly indicated in his letters to David Fairchild, that he had been very much depressed by the wars in both Europe and China and by his long confinement in the city of Ichang.

In 1907 the U.S. only had 23 varieties of soybeans, whereas in 1919 the U.S. had 629 varieties; most of the new ones were introduced by the Office of Foreign Seed and Plant Introduction (OFSPI), many by Meyer. Named varieties introduced by Meyer (or selected directly from introduced by Meyer), in order of PI Number are: Meyer (PI 17852), Peking (17852 B, selected from the Meyer variety), Lexington (PI 17862), Wilson (PI 19183), Morse (PI 19186), Virginia (PI 19186 D, selected from Morse in 1909), Habaro (PI 20405), Chestnut (PI 20405 B, selected from Habaro), Duggar (PI 20798), and O.A.C. 211 (OAC 211, selected from Habaro), Biloxi (PI 23211, named by Dec. 1916), and Laredo (PI 40658, named by June 1920). Of these varieties Meyer introduced, Peking, introduced in 1906, proved to be the most important commercially in America.

1502. Nakatomi & Associates. 1998. L.A. Tofu Festival media clips (Portfolio). Santa Monica, California. 53 inserts. 28 cm.

• ***Summary:*** This is a portfolio of 53 newspaper clippings, advertisements, news briefs, and articles related to the L.A. Tofu Festival, which took place in Los Angeles on 15-16 August 1998 (Saturday and Sunday). The dates range from August 7 to 21. The most popular source was *Rafu Shimpo* (an English-language newspaper for Japanese Americans) with 21 clips, followed by the Los Angeles Times (Food section, calendar section), with 6 clips, and the Daily News (incl. L.A. Life Weekend, 4). But clips from many other newspapers, spanning many ethnic groups, also appear: *Asian Journal*, *Chi-Am Daily News* (*3*), *Chinese Daily News, Downtown News, Gardena Valley News, KoreAm Journal, Korean Journal, La Opinion* (*Spanish*), *Lighthouse* (*2*), *Los Angeles Magazine* (*2*), *New Times Los Angeles, Pacific Asian Current, Pacific Citizen, Sing Tao Daily* (*Chinese*), *Vecinos del Valle* (*Spanish*), *and Viet Bao Kinhte* (*Vietnamese*).

These clips show how the Festival was promoted through and covered by the media in the greater Los Angeles area. Clearly the great success of this year's festival was due, in part, to the excellent public relations work of Nakatomi & Associates. A number of the clips in *Rafu Shimpo* featured individual restaurants that would be serving their favorite tofu dishes at the festival. This concept, starting on July 31, spotlighted 12 restaurants. Address: 1301 Montana Ave., Santa Monica, California 90403. Phone: 310-656-1616.

1503. *Soya & Oilseed Bluebook.* 1998--. Serial/periodical. Bar Harbor, Maine: Soyatech, Inc. Peter Golbitz, publisher and editor. Frequency: Annual.

• ***Summary:*** Preceded by Soya Bluebook Plus. A directory and information book for the soybean processing and production industries. The first issue (shipped Sept. 1998) is subtitled "The annual directory of the world oilseed industry." On the cover, below a map of the world is printed the date "1999" in large letters, followed by "A Soyatech Publication." Crops featured on the front cover and inside are "soya, corn, cottonseed, canola, rapeseed, sunflowerseed, palm kernel, palm, coconut, and peanut."

Contents (the four main sections are marked with a fold-out tab): Translations of oilseed terminology (English, German, French, Spanish, and Portuguese). Organizations and government agencies: Complete listings by country. Oilseeds and oilseed products: White pages (Index, individual crops), catalog pages, yellow pages (complete company listing by country). Equipment supplies and services. Oilseed statistics. Oilseed reference: Oilseed glossary, standards and specifications, oilseed technical charts and tables. Indexes: Comprehensive index, internet address index, brand name index, advertiser index.

Soy-related terms appearing in the translation section (p. 9-15) are: (1) Oilseeds and products: dairy analogs, lecithin–

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edible, lecithin industrial, meat analogs, miso, organic soy products, soy distillate, soy fiber, soy flakes–defatted–edible, soy flakes–full fat, soy flour–defatted, soy flour–enzyme active, soy flour–full fat, soy flour–low fat, soy flour–roasted, soy flour–textured, soy grits, soy isoflavones, soy livestock feed, soy oil margarine, soy oil shortening, soy oil–crude, soy oil–edible, soy oil–hydrogenated, soy oil–industrial, soy oil–refined, soy oil-based fuel, soy protein concentrate, soy protein isolate, soy protein–hydrolyzed, soy protein–industrial, soy sauce, soy sterols & tocopherols, soy-based foods–other, soybean fatty acids, soybean hulls, soybean meal, soybean meal–full fat, soybean seed breeder, soybean seed (for planting), soybean soapstock, soybeans–food grade, soybeans genetically modified, soybeans–green vegetable, soybeans–identity preserved, soybeans–non-gmo, soybeans–organic, soybeans, whole dry, soymilk beverages, soymilk powder, soynuts, tempeh, tempeh starter cultures, textured vegetable protein, tofu & tofu products, tofu powder. (2) Equipment & services: Coagulants for tofu, soymilk & tofu processing equipment, sprouting equipment. Address: 318 Main St., P.O. Box 84, Bar Harbor, Maine 04609. Phone: 207-288-4969.

1504. Choi, Ung-Kyu; Son, Dong-Hwa; Ji, Won-Dae; et al. 1998. [Changes of taste components and palatability during chunggugjang fermentation by *Bacillus subtilis* DC-2]. *J. of the Korean Society of Food Science and Nutrition* 27(5):840-45. Oct. [22 ref. Kor; eng]
• ***Summary:*** "This study was conducted to produce the high quality of chunggugjang... In case of free sugars, raffinose was sharply decreased between 72 and 96 hours after fermentation. Free amino acid was increased by 20 fold at 48 hours after fermentation compared to that of steamed soybean. As a result of sensory test, it was founded that the chunggujang fermented by *Bacillus subtilis* DC-2 was suitable to produce for commercial purpose." Address: 1. Dep. of Food Science and Technology, Yeungnam Univ., Kyongsan 712-749, Korea.

1505. Kim, Jong-Sang; Kwon, Tai-Wan. 1998. Soy and cancer–Soybean anticarcinogens and anticancer mechanisms: Soybean extract induces quinone reductase activity in hepa1c1c7 cells and murine lung but suppresses arylhydrocarbon hydroxylase activity in murine organs (Abstract). *American J. of Clinical Nutrition* 68(6 Suppl):1527S. Dec.
• ***Summary:*** Note: *Merriam-Webster's Collegiate Dictionary* (1998) defines murine, a word first used in 1607, as "of or relating to the murid genus (*Mus*) or its subfamily (Murinae) which includes the common household rats and mice... especially the house mouse."

"Soybean intake has been reported to be associated with lowered incidence of some tumors, including human breast and prostate carcinomas."

"These findings support the notion that soy components including genistein have a potential to function favorably in preventing chemical carcinogenesis." Address: Food Science Inst., Inje Univ., Obang-dong, Kimhae, Kyongnam 621-749, Republic of Korea.

1506. Lee, C.H. 1998. Hanbandowa dongbukasiseu kuseokgishidae siksaenghwal hwankyung [The food ways of Paleolithic man in Northeast Asia and the Korean Peninsula]. *Minjok Munhwa Yeonku* [*Korean Culture Research*] 31:415-58. Dec. [31 ref. Kor; eng]*

1507. Boerma, R.; Mian, R.M.A. 1998. [Application of DNA markers for selection of intractable soybean traits]. *Korea Soybean Digest* 15(2):106-21. [Kor]*

1508. Hwang, Y.H.; Lee, J.D. 1998. [Evaluation of agronomic characteristics for indigenous germ-plasms with color seed-coat for the development of high quality vegetable soybeans]. *Korean J. of Breeding* 30(1):55-64. *

1509. Kim, S.H. 1998. [New trend of studying on potential activities of Doenjang-fibrinolytic activity]. *Korea Soybean Digest* 15:8-15. [Kor]*

1510. Kwon, T.W.; Song, Y.S.; Kim, J.S.; Moon, G.S.; Kim, J.I.; Honh, J.H. 1998. [Current research on the bioactive functions of soyfoods in Korea]. *Korea Soybean Digest* 15:1-12. [Kor]*

1511. Muramatsu, K.; Kanai, Y.; Tanaka, T.; Kiuchi, K. 1998. Comparison of Korean chungkuk-jang with itohiki-natto on development of new fermented soybean food. *Bulletin of the Center for Interdisciplinary Studies, Science Culture Kyoritsu Women's Univ.* 4:22-25. *

1512. Yoo, C.K.; Seo, W.S.; Lee, C.S.; Kang, S.M. 1998. Purification and characterization of fibrinolytic enzyme excreted by *Bacillus subtilis* K-54 isolated from Chunggukjang [Chongkukjang]. *Korean J. of Applied Microbiology and Biotechnology* 26:507-15. *

1513. Holt, Stephen. 1998. The soy revolution: The food of the next millennium. New York, NY: M. Evans and Company, Inc. xiii + 214 p. Index. 26 cm. [28 ref]
• ***Summary:*** Contents: Special note (disclaimer). Foreword by T.V. Taylor, M.D., FRCS, Prof. and Chief of Surgery, Veterans Administration Hospital, Baylor College of Medicine, Houston, Texas. Preface, by the author. 1. I've heard about the benefits of soy, but... 2. What makes soybeans so special? 3. The ingenious soy isoflavones. 4. Soy and your heart. 5. Soy and weight control. 6. Soy and diabetes mellitus. 7. Keep your genito-urinary tract healthy: kidneys and prostate. 8. Soy and digestive problems. 9.

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Omnipause: both sexes should read this. 10. Thinning bones and creaking joints may not be inevitable. 11. Soy and cancer. 12. Dairy versus soy: is there one answer? 13. Soy and the special needs of active adults and athletes. 14. Soy and your children. 15. Many other benefits of soy. 16. Safety and application of soy. 17. The champions of soy and health: Chai-Won Chung (M.D., pediatrician in Korea), T.W. Kwon (PhD, Prof. and Director of the Food Science Inst. of Inje, Korea, and founder of the Korean Soyfood Assoc.), Mark Messina, William Shurtleff, Kenneth D.R. Setchell, Earl Mindell, Donald F. Othmer, Dr. Robert Atkins, E.C. Henley (of Ralston Purina Co.), Dr. James Anderson, Cathy Read.

As of Nov. 1999 this book is available in an inexpensive paperback pocketbook edition (Dell Publishing, a division of Random House; $5.99). Dr. Holt is at BioTherapies, Inc., 9 Commerce Road, Fairfield, New Jersey 07004.

In 2000 this book was issued in an inexpensive paperback pocketbook under the title: *The soy revolution: discover how the use this powerful nutritional miracle to prevent or treat a wide variety of illnesses* (New York: Bantam; London: Kuperard). Address: M.D., F.R.C.S., President and CEO, Biotherapies, Inc., Fairfield, New Jersey, and Clinical Prof. of Medicine at Seton Hall Univ. and Director of the Roseland Surgical Center.

1514. Lee, S.W. 1998. Kodae Dongasia sokeu Dujange kwanhan balsangkwa kyoryu kwanhan yeongu [A study on the origin and interchange of Dujang in ancient Asia]. *Korean J. of Dietary Culture* (*Hankuk Sikmunh Waha Ko-e*) 5(3):313-18. [12 ref. Kor; eng]*

• ***Summary:*** The appearance of beans (Leguminosae, Papilionoideae) increased in Late Paleolithic remains.

Note: a hominin is a primate of a taxonomic tribe (Hominini), which comprises those species regarded as human, directly ancestral to humans, or very closely related to humans.

Hominins of Northeast Asia who lived in mountain caves at the beginning of the Paleolithic gradually moved to the lower plains and riverbanks by the Late Paleolithic (1,000 BCE). Since food was now abundant around their dwelling sites, they could reside longer in these areas. They did less hunting and more gathering, including of wild beans and shellfish.

1515. Ling, Kong Foong. 1998. Food of Asia: authentic recipes from China, India, Indonesia, Japan, Singapore, Malaysia, Thailand and Vietnam. Singapore: Periplus. 160 p. Illust (color). Index. 31 cm.

• ***Summary:*** A very attractive book printed on glossy paper with at least one color photo on almost every page. The introduction and essays are by Kong Foong Ling. The index, which is poor, makes the book hard to use if you are looking for particular foods found throughout Asia such as soybeans, soy sauce, miso, salted / fermented black beans, yuba [bean curd skin], etc.

Contents: The flavors of Asia. Ingredients. The Asian kitchen. China. India. Indonesia. Japan. Malaysia & Singapore. Thailand. Vietnam. Appendix.

The "Ingredients" section includes: Bean curd (incl. cotton or momen tofu, silken bean curd, deep-fried bean curd or aburage, grilled bean curd or yakidofu, fermented bean curd or nam yee). Bean curd skin [yuba]. Black beans, salted (and fermented). Hoisin sauce ("A sweet sauce made of soy beans, with spicy and garlicky overtones"). Miso (incl. red miso and white miso). Salted soy beans (incl. "yellow bean sauce"). Soy sauce (incl. light soy sauce, black soy sauce, red soy sauce, Kikkoman, tamari, thick sweet soy sauce (kecap manis–Indonesian)). Tempeh. Also: Red beans (dried azuki). Seaweed (incl. dried kelp, golden kelp, mozuku, salted dried kelp, laver or nori, wakame). Sesame (black and white seeds, tahina {tahini}). Sesame oil. Sesame rice crackers.

Beancurd or bean curd is mentioned on pages 12, 29-30, 34, 36, 88, 94, 101, 155.

Fermented bean curd: p. 25.

1516. Sinclair, Charles Gordon. comp. 1998. International dictionary of food and cooking. Chicago: Fitzroy Dearborn. 594 p. See p. 234. 24 cm. *

• ***Summary:*** Vietnamese: dau hu: Bean curd. dau hu chien: Fried bean curd. dau hu chung: Bean curd. dau hu ki: Dried [sic, pressed] bean curd (p. 161).

fu jook pin (Chinese): Bean curd sticks [dried yuba sticks] (p. 219).

*"gochujang* (Korean): A chilli paste similar to sambal olek" (p. 234).

Indonesian: Kecap asin is thick, salty, dark colored soy sauce used for coloring and flavor. Kecap bentang manis: See kecap manis. Kecap manis: A sweet, thick, dark colored aromatic soy sauce used as a seasoning and condiment, and for satay. "Also called ketjap sauce, kecap bentang manis, sweet soya sauce" (p. 292).

Ketjap (Ho [Holland, Dutch]) Ketchup. Ketjap sauce. See kecap manis.

The word "soya" appears on 100 pages in this book. For example: Aburage (Japanese): Soya bean pouches made by deep-frying slices of pressed bean curd.

For "soy bean" see "soya bean." For "soy bean oil" see "soya bean oil." For "soy sauce" see "soya sauce."

"Sweet bean paste. A thick brown sauce made from ground fermented soya beans mixed with sugar and brine. Popular in Taiwan as a condiment or seasoning" (p. 530).

1517. Solomon, Charmaine; Solomon, Nina. 1998. Charmaine Solomon's encyclopedia of Asian food. Boston, Massachusetts: Periplus Editions. xiv + 480 p. Color illust. ([28] p. of plates). 29 cm. [67* ref]

• ***Summary:*** An outstanding book; the color illustrations of many ingredients are spectacular and very informative. The

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author has an insatiable curiosity.

Contents: List of illustrations. Introduction. How to use the *Encyclopedia of Asian Food.* Acknowledgements. A-Z of Asian Food. Bibliography. Illustrated index of selective ingredients. Index of recipes. Index of alternative words and main entries.

Soy related entries: Bean curd (p. 26-28, incl. all the different types, yuba, deep-fried tofu types, fermented tofu incl. ch'ou doufu [chou doufu]: "Despite its overpowering aroma, slimy texture, unappetizing color and the unfortunate odor it leaves on the breath, those brave enough to partake of it consider it a delicacy").

Bean paste, sweet (p. 29. The three colors and types are red {from adzuki beans}, yellow {from mung beans, husked and split}, or black {from black soy beans}. "The pastes are usually available ready-made sweetened in cans. It is possible to make your own, starting out with dried beans." Name in Chinese: dow sa, tau sa {sweet bean paste}).

Bean paste, yellow (p. 29. Despite what the label says, this thick, salty condiment is brown, not yellow, in color).

Bean sauces (p. 29. "Made from fermented soy beans," they range in color from yellow to brown to black [sweet black bean paste]. Their consistency is more like pastes that must be spooned from the jar than pourable tomato ketchup).

Beans, salted yellow (p. 31. Canned yellow soybeans which have been salted and fermented).

Beef (p. 31-37 incl. Teriyaki steak, Sukiyaki, Beef with black bean sauce, incl. "2 tablespoons canned salted black beans [fermented black soybeans]").

Black bean (p. 43-44. Black soy beans which are fermented and salted. "Some are sold in cans in a salty liquid, others in plastic bags, covered with salt crystals." Also called "preserved black beans").

Flours & starches (p. 157-61). Incl. soy flour. "A high protein, low starch flour... used mostly in Japan [where it is called kinako] and China. In Korea roasted soy bean flour and fermented soy bean flour are used to make a variety of bean pastes."

Note. This is the earliest English-language document seen (Nov. 2012) that uses the term "roasted soy bean flour" to refer to kinako.

Legumes & pulses (p. 206-18). A long and interesting section. All entries have a scientific name. Many have an illustration. Those found in many Asian countries (e.g., green bean, green pea) have the name in each country. Includes: Introduction, adzuki bean, asparagus bean (see winged bean), asparagus pea, black-eyed pea (a variety of cowpea), black gram, blue pea, broad bean, butter bean (see lima bean), chick pea, cowpea (see yard-long bean), fenugreek, green bean, green pea, hyacinth bean (see lablab bean), lablab bean, lentil, lima bean, long bean (see yard-long bean), moong bean (see mung bean), moth bean, mung bean, parkia, peanut, pigeon pea, red bean (see adzuki bean), red kidney bean, rice bean, sataw bean (see parkia), snow pea, soy bean (short entry), sugar snap pea, tamarind, white gram (see black gram), winged bean (China: su-ling dou; India: Goa bean; Indonesia: kecipir; Japan: shikakumame; Malaysia: kacang botor; Philippines: sigarilyas; Sri Lanka: dara-dhambala. Thailand: thua pu). Yard-long bean (this is the fresh bean known by a host of names). Recipes: Adzuki bean soup.

Master sauce (p. 232). "Also known as 'flavour pot' or 'lu,' this sauce has a base of soy sauce, water, sugar and Chinese wine or sherry, with a few variable additions..." Cooking with it is similar to 'red-cooking.'

Miso (see soy bean products). Mushrooms & fungi (p. 237-40, incl. recipe for Braised bean curd, cloud ear and vegetables, and Braised soy mushrooms). Natto (see soy bean products).

Oils (p. 258-59, incl. coconut oil, gingelly oil [sesame oil], mustard oil, palm oil, palm kernel oil, peanut oil, perilla oil, sesame oil). Note: Soy oil is not mentioned here! Okara (see soy bean products). Salads, incl. recipe for Indonesian vegetable salad (gado-gado), that calls for 4 oz. fried bean curd. Shoyu (see soy sauce).

Soy bean, dried (349). China: da dau, wong dau, hak dau, tai dau. Indonesia: kacang kedelai. Japan: daizu. Korea: jaa jang. Malaysia: kedelai. Philippines: utaw. Thailand: thua lueang.

Soy bean, fresh. China: mao dau. Indonesia: kacang soja. Japan: edamame. Malaysia: kacang soja. Recipe: Fresh soy beans with bean curd.

Soy bean products (p. 350): Miso (incl. recipe for miso soup). Natto. Soy bean paste (go). Soy milk (including okara). Tahuri (Philippine fermented tofu). Tokwa (tokwan; very firm square tofu).

Soy bean sprouts, with recipe for soy bean sprout salad. China: dai dau nga choi. India: bhat. Indonesia: kacang kedele, taugeh. Japan: daizu no moyashi. Korea: Kong namul. Malaysia: kacang soja, taugeh. Philippines: utaw. Thailand: thua-lueang.

Soy sauce (p. 351-52). Chinese soy sauce: Dark soy sauce. Light soy sauce ("Usually labeled 'superior soy'"). Mushroom soy sauce (Dark soy sauce that has been flavored with straw mushrooms). Japanese soy sauces: Koikuchi (regular shoyu), tamari, usukuchi. Korean soy sauce ("About the same colour as Chinese light soy sauce, but not as fiercely salty and with a sweet malted aroma"). Thick and flavoured soy sauces: Kecap asin ("A dark, salty soy sauce, from Indonesia, a little thicker than the dark soy of China"). Kecap manis (A thick, sweet soy sauce from Java, Indonesia). Kicap cair: "The Malaysian equivalent of light soy sauce." Kicap pekat: "The Malaysian equivalent of dark soy sauce, though thicker than the Chinese version, but not as thick as kecap manis." Ponzu shoyu. Toyo mansi (p. 352): "A soy sauce used in the Philippines soured with kalamansi juice."

Note: This is the earliest document seen (April 2012)

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that uses the term "Kicap cair" or the term "Kicap pekat" to refer to light and dark Malaysian soy sauces, respectively.

Tempeh (p. 386). Incl. recipes for Savoury Tempeh and Thai style tempeh. Tofu (see bean curd).

Also discusses: Adzuki bean, agar-agar (incl. almond bean curd, awayuki), almond, amaranth, cowpea, crab in black bean sauce (recipe at crab), daikon, millet, monosodium glutamate ("I would strongly recommend omitting it"), Nonya (pronounced 'Nyonya.' The unique cookery found in Malaysia and Singapore resulting from the fusion of Malay and Chinese cuisine during the last century), peanut, peanut sauce, sago (this palm flowers only once in its life, at about age 15. Just before flowering, it builds up a large reserve of starch in the pith. The tree is felled, the pith scooped out, ground and washed to make sago starch), seaweed (incl. agar-agar, hijiki, kombu / konbu, mozuku, nori / laver, wakame), sesame paste, sesame seed, vegetarian meals ("By far the most important vegetarian food in the Far East... is bean curd"). Address: Australia.

1518. Yokotsuka, Tamotsu; Sasaki, Masaoki. 1998. Fermented protein foods in the Orient: shoyu and miso in Japan. In: Brian J.B. Wood, ed. 1998. Microbiology of Fermented Foods. 2nd ed. Vol. 1. London: Blackie Academic & Professional / Thompson Science. An imprint of Chapman & Hall. xx + 440 + 17 p. Illust. Index. 24 cm. [197 ref]

• ***Summary:*** Contents: Introduction. History: The history of fermented proteinaceous foods in China (chu / koji, chiang / jiang, shi [fermented black soybeans], chiang-yu / soy sauce / tou-yu, shi-tche [the juice or extract of shi]).

Note: "This section was based on material drawn from *Thirty-five Years History of Noda-Shoyu Company* (1955), *The History of Kikkoman* (1970), Sakaguchi (1979) and Wang & Fuang (1981)," the history of shoyu and miso in Japan (hishio or sho or soya or soy, miso or misho, tamari, miso-damari, tare-miso and usudare, shoyu, miso and shoyu of today). Fermented soybean foods in the Orient: shoyu, miso, tempeh and natto: Japanese shoyu (establishment of the Japanese Agricultural Standard {JAS} for shoyu in 1963, production methods, types and grades of shoyu by JAS, quality standard of shoyu exported from Japan, production [statistics], technological contributions by the Japanese government to the shoyu industry, soy sauce produced in Oriental countries other than Japan [i.e., Korea, Taiwan, Singapore, Malaysia, Indonesia], miso). Manufacture: Koikuchi shoyu (treatment of raw materials, koji making, mash-making and ageing, pressing of mash, refining), tamari shoyu, miso. Recent progress in shoyu and miso production in Japan: Soybeans and wheat as raw materials (soybeans, wheat), treatment of raw materials (soybeans, wheat), koji moulds, koji-making, mash fermentation (microbes in the mash, chemical changes in shoyu-mash fermentation, temperature of the mash, period of mash fermentation), refining (pressing of the mash, pasteurization), material balance in shoyu manufacture, product (color and clarity of koikuchi shoyu, flavour components of shoyu {HEMF, HDMF, HMMF, phenolic compounds, flavour constituents of the top note aroma of pasteurized shoyu}, formation of flavour components during heating for pasteurization, flavour components of shoyu worldwide, relationship between organoleptic evaluation of shoyu and its chemical constituents, nutritional concern about excessive salt intake, safety of fermented shoyu [aflatoxins], microbial stability of shoyu). Discussion.

In the *Ben-Chao-Gong Mu* [*Bencao gangmu*, The great pharmacopoeia, 1596] many types of shi are discussed. In more recent times these have apparently been classified into three types depending on the microorganism used in the fermentation: (1) *Aspergillus oryzae* type. (2) *Mucor* type, usually made in Szechwan. (3) *Bacillus* type. Soak and cook soybeans, then place them in a cloth bag. Cover with straw and ferment for 1-2 days at 25-30ºC. "When the beans are covered with viscous substances, Shui-tou-shi is prepared." Mix the sticky beans with ginger and salt, then pack tightly into jars; age for one week. The product [a sort of salted natto with ginger] is now ready to eat. "The organisms responsible for this fermentation have been identified as *Bacillus* species" (p. 356). Address: Research and Development Div., Kikkoman Co. Ltd., 339 Noda, Noda-shi, Chiba-ken, 278 Japan.

1519. Yonzan, H.; Tamang, J.P. 1998. Consumption pattern of traditional fermented foods in the Sikkim Himalaya. *J. of Hill Research* (*Sikkim*) 11(1):112-15. [6 ref]

• ***Summary:*** During 1996-97 a survey was conducted using a questionnaire in 270 randomly selected houses in three hill sub-divisions of the Darjeeling Hills of West Bengal and 315 houses in four districts of Sikkim representing the ethnic communities of the Nepalis, the Bhutia and the Lepcha. The amount of fermented foods consumed at every meal by each person was weighed directly using a portable balance and daily per capita consumption (in gm per day) was estimated. The frequency of eating fermented foods by each family (as a percentage) was also recorded. Annual home production of each fermented food was calculated on the basis of population based on Indian census records. A database was developed from the field data.

For kinema, the average consumption rate in the Darjeeling Hills was 80.6%, whereas it was 78.9% in Sikkim. Kinema was one of three foods that was not eaten daily; it was typically consumed 2-4 times a week as a source of plant protein. The survey showed that, in the Darjeeling Hills, 45.3% of the people prepared the fermented foods at home and only 28.3% purchased them from local markets, while in Sikkim 53.7% of the people prepared the fermented foods at home and only 18.8% purchased them from local markets.

Table 1 shows per capita consumption (gm per day)

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and annual home production (tons per year) of the various fermented foods. For kinema the figures show: In the Darjeeling Hills, the average per capita consumption was 3.3 gm/day (range 2.3 to 4.7) and the annual production for the entire area was 829 tonnes. In Sikkim, the average per capita consumption was 2.2 gm/day (range 0.7 to 3.7) and the annual production for the entire area was 327 tonnes. Address: Microbiology Research Lab., Dep. of Botany, Sikkim Government College, Tadong (near Gangtok), Sikkim 737 102, India.

1520. Yoo, Jin-Young; Kim, Hyeon-Gyu; Kwon, Dong-Jin. 1998. [Improved process for preparation of traditional Kanjang (Korean-style soy sauce]. *J. of the Korean Society of Food Science and Nutrition* 27(2):268-74. [17 ref. Kor; eng]

• ***Summary:*** "The traditional kanjang has been prepared by mixing meju and 18% saline solution, and fermenting for 60 days. The traditional kanjang is very salty and inferior in flavor and taste compared with commercial fermented soy sauce. To improve the quality of traditional kanjang, *Zygosaccharomyces rouxii* H-62, a flavor-related mutant, was inoculated during fermentation." Address: Div. of Food Biotechnology, Korea Food Research Inst., Seongnam 463-420, Korea.

1521. Young, Louise. 1998. Japan's total empire: Manchuria and the culture of wartime imperialism. Berkeley, California: University of California Press. xiii + 487 p. Map. Index. 23 cm. Series: Twentieth-Century Japan. [390 ref]

• ***Summary:*** A very important book. Contents: Part I: Making of a total empire–Manchukuo and Japan. 1 Jewel in the crown: the international context of Manchukuo.

Part II: Manchurian incident and the new military imperialism, 1931-1933. 2. War fever: imperial jingoism and the mass media. 3. Go-fast imperialism: elite politics and mass mobilization.

Part III: Manchurian experiment in colonial development, 1932-1941. 4. Uneasy partnership: soldiers and capitalists in the colonial economy. 5. Brave new empire: utopian vision and the new intelligentsia.

Part IV: New social imperialism and the farm colonization program, 1932-1945. 6. Reinventing agrarianism: rural crisis and the wedding of agriculture to empire. 7. Migration machine: Manchurian colonization and state growth. 8. Victims of empire.

Part V: Conclusion. 9. Paradox of total empire.

From the publisher's description: "In this first social and cultural history of Japan's construction of Manchuria, Louise Young offers an incisive examination of the nature of Japanese imperialism. Focusing on the domestic impact of Japan's activities in Northeast China between 1931 and 1945, Young considers 'metropolitan effects' of empire building: how people at home imagined and experienced the empire they called Manchukuo. Contrary to the conventional assumption that a few army officers and bureaucrats were responsible for Japan's overseas expansion, Young finds that a variety of organizations helped to mobilize popular support for Manchukuo–the mass media, the academy, chambers of commerce, women's organizations, youth groups, and agricultural cooperatives–leading to broad-based support among diverse groups of Japanese. As the empire was being built in China, Young shows, an imagined Manchukuo was emerging at home, constructed of visions of a defensive lifeline, a developing economy, and a settler's paradise."

From a review on the back cover: "One of the most important books in Japanese to appear in several years... Young provocatively concludes that Japanese authoritarianism and empire-building from 1921 to 1945 were products of the nation's modernization..."

The word "soybean" (or "soybeans") appears on pages 28, 32, 34, 38, 94, 183, 203, 208, 209, 211, 240, 344, 346, and 432, and "bean cakes" on p. 300.

The South Manchurian Railway is discussed throughout the book; see the Index entry for "Mantetsu." Address: Asst. Prof. of History, New York Univ.

1522. *Detroit Free Press* (*Detroit, Michigan*). 1999. Classified ad: Cook, Korean specialty (Sterling Heights, MI). Jan. 29. p. 35.

• ***Summary:*** "Prepare & cook foods according to traditional Korean recipes;"

"Dishes served include Kalbi, Doen Jang Chi Ge, Sun Dubu Chige,..."

"2 years experience required. Send resume to:..."

1523. Daniels, Nahum Stiskin. 1999. Recollections of publishing *The Book of Tofu* (Interview). *SoyaScan Notes.* March 2. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** "*The Book of Tofu* was one of those very special projects–almost timeless indeed. We did what we all set out to do, which was to communicate a very tangible idea to the West. It's very rare when people can get together and actually pull that off. It was a very exciting and very worthwhile project–something I'm always very proud of being involved in."

Nahum has always imagined [not true] that I [Shurtleff] went to speak to Weatherhill and Tuttle before coming to Autumn Press. "I thought you came to me as a last resort, after they rejected your idea... I remember the day that I took a phone call from you. We were living in Hayama. I remember picking up the phone and hearing your voice at the other end–much like to tonight. You said, "Hi Nahum, this is Bill Shurtleff." Yeah. "I'm thinking of doing a book on tofu" something like that. "I said to myself–it was just an instinctive 'Great!' I think I said 'I think that's a great idea.'" It triggered something–like a light bulb went on in my mind.

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"As soon as I heard it, I thought it was a fabulous idea." We were struggling to get our own little publishing company going.

Bill recalls: I remember that phone call too. And I remember thinking 'Amazing–There's somebody else in the world who thinks this is a good idea."

Nahum continues: "I had an image of you as this waiflike creature who had been in my peripheral vision in Kyoto. You were a free spirit, doing interesting and bizarre things. I didn't know you, but I had an instinct that when you set your mind to something, you were going to do it. Only much later did learn about your family; I still remember that your grandfather had his own railroad car."

*The Book of Tofu* was the sixth book that Autumn Press published, but we had never done anything of its magnitude before. Lima Ohsawa's book was very helpful in preparing me to do *The Book of Tofu.* Through one of the editors at Weatherhill I was introduced to a woman cookbook editor in America. She taught me the high style in cookbook editing.

"I remember just before *The Book of Tofu* was published, that your mom, may she rest in peace, loaned Autumn Press some money–about $5,000–to help pay for the first printing. This loan was very important and helpful to Autumn Press, to get us over the hump."

Kim Chi Ha and *The Book of Tofu:* In 1974 Autumn Press published *Cry of the People,* by Kim Chi Ha–Poems written from jail by a South Korean dissident poet. Some years later Robert L. "Bob" Bernstein, the President and CEO of Random House, was in Japan. He had a strong personal interest in free speech, and he spoke up for oppressed writers around the world. He knew of Kim Chi Ha, and knew he was in a dungeon in South Korea because he wrote and spoke publicly against the country's dictator and tyrant. In Japan, Bernstein's translator, who was a friend of the Stiskins, gave him a copy of *Cry of the People.* He said that he wanted to meet the people who had published this book. Bernstein called Nahum just as Nahum was preparing to leave Japan after seven years. Nahum didn't know who Bernstein was and said he was sorry but he was too busy to meet with him. Back in the states, after realizing the opportunity he had missed, Nahum called Bernstein and accepted an invitation to visit his office in New York City. He took copies of each of Autumn Press' books, including *The Book of Tofu,* which had just been published. They talked about publishing and Bernstein was very interested to see what kind of books Autumn Press was publishing. Before they parted Bernstein said that Random House would like to distribute Autumn Press' books. This was a huge break for Autumn Press. Random House soon noted that *The Book of Tofu* was selling very well. Several years later at a sales conference, Dick Krinsley, in charge of Ballantine Books, approached Nahum and said he would like to buy the paperback rights to *The Book of Tofu.* Thank you Kim Chi Ha.

In 1978 Autumn Press published *Nuclear Madness: What You Can Do,* by Helen Caldicott, a physician and anti-nuclear activist from Australia. The book sold very well and was eventually very influential. However it led to the downfall of Autumn Press, in a process filled with conflict, in which Helen eventually sued Autumn Press. Address: Stanford, Connecticut.

1524. *SoyaScan Notes.* 1999. Update on Pulmuone (Overview). March 25. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** Pulmuone U.S.A. Inc. is a tofu manufacturer in southern California located at 4585 Firestone Blvd., South Gate, California 90280. With the recent economic hard times in South Korea, where the mother company is located, there have been a few rumors that Pulmuone in both California and Korea may be having hard times. However a talk with a tofu industry expert from Southern California indicates that both companies are quite solid and strong. He says that both the U.S. company and the Korean mother company are still in business, but like everyone in Korea, times are somewhat difficult there. The California subsidiary is focused on the Korean-American market, but they have entered the Japanese-American markets and supermarkets in a small way, and they are doing some private labeling. They are also making noodles, and they may be going into fish cake products. So if they are expanding their line into different categories, they probably still have a pretty solid base.

A Japanese tofu expert who knows the founder in Korea says that he was a student activist during the years of Korean dictatorships, and thus was prevented from going to college. So instead he started Pulmuone, which became a very successful health food company.

1525. Ionmag Corporation. 1999. Health tofu: Health tofu maker from Ionmag Corporation (Leaflet). Koyang Industrial Complex, 628, Siksa-Dong, Ilsan-Ku, Koyang City, Kyunggi-Do, Korea. 1 p. Single sided. 30 cm.

• ***Summary:*** See next page. Leaflet (glossy color) sent by Patricia Smith from Natural Products Expo West. 1999. March. A large color photo shows this red and clear plastic home tofu maker against a circle of soybeans with an orange and red border. "Coming to fresh tofu, tasty tofu within short time." Specifications: Weight: 5.5 kg. Height: 370 mm [14.6 inches]. Diameter: 240 mm. Material: Polycarbonate ABS [Acrylonitrile Butadiene Styrene], Stainless steel. Voltage: 110/220 volts. World patent pending.

Note: This machine is also widely advertised elsewhere for homemade soymilk. Address: Koyang City, Kyunggi-Do, Korea. Phone: (82-344) 968-0051/4.

1526. Liu, KeShun. 1999. Oriental soyfoods. In: C.Y.W. Ang, K. Liu, and Y-W. Huang, eds. 1999. Asian Foods: Science & Technology. Lancaster, Pennsylvania: Technomic Publishing

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Co., Inc. 546 p. See p. 139-99. Chap. 6. March. [60 ref]
• ***Summary:*** Contents: Introduction: Soybeans as a crop, composition and nutritional quality of soybeans, soyfoods–from the east to the west, soyfood classification.

Soymilk: Introduction, traditional soymilk, modern soymilk (techniques for reducing beany flavors, commercial methods, formulation and fortification, homogenization, thermal processing, and packaging), concentrated and powdered soymilk, fermented soymilk (with lactic acid bacteria), soymilk composition and standardization.

Tofu: Introduction, methods of tofu preparation, factors involved in tofu making (soybean varieties, concentration of soymilk, heat process of soymilk, types of coagulants, concentration of coagulants, coagulation temperature, coagulation time, process automation, packaging), varieties of tofu (silken tofu, regular and firm tofu, Chinese semidry tofu {*doufu gan*}, Chinese tofu sheets and tofu noodles, lactone tofu), varieties of tofu products (deep-fried tofu, Japanese grilled tofu, frozen tofu {"Made almost exclusively in rural farmhouses and temples by putting tofu outdoors in the cold weather, frozen tofu was never sold as a commodity in the past"}, Japanese dried-frozen tofu, Chinese savory tofu {"In China there are many specially made tofu varieties known as savory tofu"}, fermented tofu {Sufu or Chinese cheese, varieties of sufu, preparation methods, preparation principle}).

Soymilk film (yuba). Soybean sprouts. Green vegetable soybeans. Other non-fermented soyfoods: Okara, roasted soy powder. Concerning okara: In some parts of China, okara is salted and spiced and used as a pickle. Or it can be simply added to a dish with meat and vegetables. In other parts of China it is made into okara tempeh [called *mei-dou-zha* or meitauza].

Fermented soy paste (Jiang and miso): Koji, koji starter, and inoculum (koji, koji starter, inoculum), Chinese jiang (traditional household method, pure culture method, enzymatic method), Japanese miso (preparing rice koji, treating soybeans, mixing and mashing, fermenting, pasteurizing and packaging), principles of making jiang or miso.

Soy sauce (Jiangyou or shoyu): Chinese jiangyou (traditional household method, modern methods), Japanese shoyu (treatment of raw materials, koji making, brine fermentation, pressing, refining), principles of making soy sauce, chemical soy sauce (made by acid hydrolysis; heat with 18% hydrochloric acid for 8-12 hours, then neutralize with sodium carbonate and filter to remove insoluble materials), proximate composition of soy sauce, quality attributes and grades.

Japanese natto: Methods of preparation, principles of preparation.

Indonesian tempeh: Traditional method, pilot plant method, principles of tempeh preparation. Fermented black soybeans (Douchi or Hamanatto): Chinese douchi, Japanese Hamanatto.

Tables: (1) Names (English, Chinese, Japanese, Korean, Indonesian, Malay, Filipino) general description, and utilization of nonfermented Oriental soyfoods.

Soy sprouts: Chinese: Huang dou ya, Da dou ya. Japanese: Daizu no moyashi. Korean: Kong no mool.

Yuba: Chinese: Dou fu pi, Fu zhu. Japanese: Yuba. Korean: Kong kook. Filipino: Fu chok.

Yuba (Soy pulp): Chinese: Dou zha / doufu zha. Japanese: Okara. Korean: Bejee. General: "Insoluble residue after filtration of soy slurry into soymilk."

Roasted soybeans (Soynuts): Chinese: Chao da dou. Japanese: Iri-mame. Korean: no name. Indonesian: no name

Roasted soy powder: Chinese: Chao dou fen, dou fen. Japanese: Kinako. Korean: Kong ka au. Indonesian: Bubuk kedelai. (2) Names (English, Chinese, Japanese, Korean, Indonesian, Malay, Filipino) general description, and utilization of fermented Oriental soyfoods. (3) Proximate composition (gm per 100 gm fresh weight) of some fermented soyfoods.

Figures show: (1) Flowchart: Traditional Chinese method for making soymilk and tofu (from whole soybeans). (2) A commercial processing method (Alfa-Laval) for making soybase and a subsequent product–soymilk. (3) Photo of homemade firm tofu. (4) Photo of a dish of tofu and mushrooms. (5) Photo of cubes of sufu (Chinese cheese) on a white plate. (6) Flowchart for making sufu from firm tofu. (7) Photo of two packages of dried yuba sticks (Chinese). (8) Photo of a bowl of soy sprouts. (9) Photo of Chinese chiang, and Japanese red and white miso, each on one of three spoons in a shallow white bowl. (10) Flowchart of a common method for making Japanese rice miso [red miso]. (11) Photo of soy sauce in three different containers: dispenser, small bottle, and large Chinese can. (12) Flowchart of a common method for making Japanese koikuchi shoyu (soy sauce). (13) Photo of two chopsticks lifting some Japanese natto from a bowl full of natto; the thin strings connecting the natto above and below are clearly visible. (14) Flowchart of a common method for making Japanese natto from whole soybeans. (15) Photo of tempeh made in the USA in perforated plastic bags (Courtesy of Mr. Seth Tibbott, Turtle Island Foods, Inc., Hood River, Oregon). (16) Flowchart of traditional Indonesian method for making tempeh from whole soybeans. (17) Photo of Chinese *douchi* (fermented black soybeans) on a white plate.

Note: For a biography of KeShun Liu PhD see p. 544. Address: PhD, Soyfoods Lab., Hartz Seed, A Unit of Monsanto, Stuttgart, Arkansas.

1527. Newman, Jacqueline M. 1999. Cultural aspects of Asian dietary habits. In: C.Y.W. Ang, K. Liu, and Y-W. Huang, eds. 1999. Asian Foods: Science & Technology. Lancaster, Pennsylvania: Technomic Publishing Co., Inc. 546 p. See p. 453-85. Chap. 15. [104 ref]

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• ***Summary:*** Contents: Introduction. Foods of Bangladesh. Cambodian foods. Chinese foods: Food selection, eating behaviors, intracultural differences, feasts, holidays and special foods. Indian foods. Indonesian foods. Japanese foods. Korean foods. Laotian foods. Malaysian foods. Nepalese foods. Foods of Pakistan. Philippine foods. Thai foods. Vietnamese foods.

In each country and culture, the role and practice of vegetarianism is discussed.

Soyfoods are mentioned as follows: China (p. 458): "For breakfast, Northerners prefer warm soymilk and fried wheat-dough crullers." Vegetarians from both north and south get an important part of their protein "from a sophisticated cuisine based upon considerable use of gluten and tofu," made to look and taste like animal products.

Indonesia (p. 463): "... foods are preferred sweet; even the local soy sauce, kecap manis, is fermented sweetened."

Japan (p. 465): Mentions shoyu and tofu.

Korea (p. 468-69): Mentions tofu.

Malaysia (p. 472): Discusses Chinese who married Malay women (called Nonyas); "their families are called Peranakan or Straits Chinese and their cooking is called Nonya Cuisine. Straits Chinese live mostly in Penang, Malacca, and Singapore; practice Buddhism; and cook their Chinese food with a Malay influence. Their Nonya cuisine is eaten communally; all dishes are served at once,..."

Nepal (p. 473): "During Janai Purnima, a soup called *quantee* is essential; it is made from sprouted soy, chick pea, black beans,..."

Pakistan (p. 476): Pad Thai, a popular lunch dish, is made with tofu. Note: Pad Thai, based on rice noodles, is one of Thailand's national dishes. Address: PhD, R.D., Prof., the Dep. of Family, Nutrition and Exercise Sciences, Queens College-CUNY, Flushing, New York.

1528. Fischer, Bruno. 1999. Sale of his company, Bruno Fischer GmbH (in Aetorf, Germany), to DE-VAU-GE in Germany (Interview). *SoyaScan Notes.* April 2. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Bruno is a devout Seventh-day Adventist and DE-VAU-GE (DVG–Granovita) is a Seventh-day Adventist company. Many years ago DVG got out of the soymilk business; they sold their soymilk plant to Korea; it is now the third soymilk plant of Samyung Foods in Korea. Bruno is now interested in getting back into the soymilk manufacturing business in a different way. On 31 Dec. 1998 he sold all of his family-owned company, Bruno Fischer GmbH (in Aetorf, Germany) to DVG–for money. Bruno did not keep or exchange any stock. He now works as a consultant for DVG and no longer owns any part or shares of his former company. He sold the company largely because DVG contacted him at a very appropriate time and offered a very good price. The company had always been run as a triumvirate, his mother, his father, and Bruno. But during the summer of 1998, Bruno's mother had died very unexpectedly. Four weeks later, Bruno's father announced that he would like to get out of the business as soon as possible. This would mean major restructuring. Several months later, out of the blue, came the offer from DVG–like a gift from God. Bruno was not looking for a buyer. The timing was perfect. DVG was looking to buy a company that would allow them to penetrate the organic and natural foods food market better. They had a shopping list and Bruno's company was No. 1 on that list. DVG sells most of their products to the Reform Houses (the predecessor to the natural foods market and stores–*Naturkostlaeden*). DVG already owned a small company in the organic and natural foods market; they had tried for years, using this company, to penetrate the market, unsuccessfully. So they decided that they needed to buy one of the key players in that market.

DVG is owned by the Seventh-day Adventist Church. They contribute significant amounts of money to the church, but if they need money, they must go to non-church sources (mainly banks). Nevertheless DVG has grown at an astonishing rate. Fifteen years ago they had annual revenues (sales/turnover) of about 5 million Deutschmarks; today that figure has increased to about 200 million Deutschmarks. His experience in negotiating with DVG was that they were very ethical and fair. They offered attractive help in moving or severance pay (about one month's salary for each year they had worked for Fischer) to Bruno's former employees in Aetorf after his equipment was moved 400 km (250 miles) away northward to Lueneburg.

Bruno has a non-compete agreement with DVG, but they are interested in buying soymilk from him if should ever decide to make it. They now buy from Alpro.

Katrin [pronounced KAT-rin] Senger, who lives in Munich, is a colleague of Bruno's. She is doing her diploma thesis (something between a BA and an MA thesis) on his behalf on the soy market in Europe.

Bruno has started a new company named Natumi GmbH, located at the same address as his former company. Phone: +49 2243 850 162. Fax: +49 2243 850 172. The sale of his company to DVG is public knowledge. Address: Im Auel 88, 53783 Aetorf, Germany. Phone: 49-2243-4021.

1529. Yoo, S.K.; Cho, W.H.; Kang, S.M.; Lee, S.H. 1999. Isolation and identification of microorganisms in Korean traditional soybean paste and soybean sauce. *Korean J. of Applied Microbiology and Biotechnology* 27(2):113-17. April 28. [22 ref. Kor; eng]

• ***Summary:*** "As a basic study for quality improvement of Korean soybean paste and soybean sauce, we investigated on microflora of soybean paste and soybean sauce fermentation. Major microorganisms were isolated from the sample pastes and sauces, and identified systematically. Selected microorganisms were identified by MIS whole cell fatty acid analysis by gas chromatography. Identification

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results showed that *Bacillus licheniformis, Bacillus pumilis* and *Bacillus subtilis* were dominant in soybean paste and *Staphylococcus vitulus, Bacillus subtilis, Bacillus pumilus,* and *Lactobacillus fermentum* were dominant in soybean sauce. It seemed that these microorganisms played an important role in soybean paste and soybean sauce fermentation and could be used for the further studies such as protease and amylase activities."

Note: As of Jan. 2020 this journal is titled *Microbiology and Biotechnology Letters.* Address: Dep. of Biotechnology, College of Engineering and Bioproducts Research Center, Yonsei Univ., 134 Shinchon-Dong, Sudoemun-Ku, Seoul 120-749, Korea.

1530. Murphy, Patricia A. 1999. A new database on the isoflavone levels in foods, commercial ingredients, and soybeans (Interview). *SoyaScan Notes.* June 24. Conducted by William Shurtleff of Soyfoods Center. [1 ref]
• ***Summary:*** In April 1999 a new database became available on the Internet at www.NAL.USDA.gov/FNIC/FoodComp / Data/Isoflav/Isolfav.html. There are several files which are downloadable. Data are given for 160 foods, most of which are soy-related. Many individual branded products are included, such as Gimme Lean! or Lightlife Lean Links or Mead Johnson's Prosobee (infant formula). Soy oil is also included–just to show that it contains no isoflavones.

For each food, data may be given for daidzein, genistein, glycitein (pronounced gly-SEE-tun; if available), and total isoflavones. For each of these four information may be given on: Average, mean, and maximum, standard error, sample size, confidence code (A=best, C=least). of all published data. Finally a list of the numbers of all the references used to get this data. So there might be 7 references used to generate the mean value for tofu.

Soybeans themselves are also included, with data given for food-type soybeans, commodity-type soybeans, plus reports from Japan, Korea, Taiwan, etc. But there is no data on individual soybean varieties. Supplements are not included. For each food, some data is given on the isoflavone content The information in the database comes from published scientific studies and from work at Iowa State University's project on national sampling of foods. The food composition lab people will be updating the data as it is collected. There is also a separate file for items which are more typical of clover and alfalfa, which have different isoflavones.

The person in charge of the project is Gary Beecher, in the USDA Beltsville Lab. [Maryland], food composition group. David Haytowitz is the statistician. The funding came from the U.S. Army, Medical Branch, Breast Cancer Research Initiative. This year Congress, "in its wisdom," couldn't give any more money to HHS (the U.S. Department of Health and Human Services), so they gave a large amount of money to the Defense Department for work that would typically be done by NIH (National Institutes of Health). But the army has run this huge program very well–perhaps better than some NIH programs.

Note: NIH is under the Public Health Service, within HHS. Address: 2312 Food Sciences Building, Food Sciences and Human Nutrition Dep., Iowa State Univ., Ames, IA 50011.

1531. *ASA Today* (*St. Louis, Missouri*). 1999. Non-GMO niche markets may offer premium opportunities. 5(8):4. June.
• ***Summary:*** Since 1997, Brazilian suppliers have received a premium of up to 50% for non-GMO soybeans. Countries importing non-GMO soybeans include Norway, Korea, and Japan. Last year ADM and other processors paid fairly substantial premiums for non-GMO beans. Farmers who want these premiums and plant both GMO and non-GMO beans must clean their combines and bins.

1532. *Canadian Soybean Bulletin* (*OSGMB, Chatham, Ontario, Canada*). 1999. Canadian soybean exports. 13(1):4. June.
• ***Summary:*** A large table shows statistics on tonnes (metric tons) of soybeans exported to various countries, and regions, each year from 1994/95 to 1997/98. The countries are: In Asia–China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, and Thailand. In Western Europe–Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, and Spain. By continent–Africa, Central America, Eastern Europe, Middle East, Oceania, South America, and United States.

In 1997/98 the countries to which the largest amount of Canadian soybean exports went were (in tonnes): Norway 159,000, United States 134,706, Japan 62,931, Portugal 58,465, Spain 34,759, Hong Kong 23,210, Belgium 20,687, and Malaysia 20,539.

1533. Bender, Karen. 1999. Work with soybeans, tofu, and biotechnology (Interview). *SoyaScan Notes.* July 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Karen has done considerable research trying to find which compositional properties of soybeans contribute to tofu yield and organoleptic quality. Her research (like that conducted at Iowa State University) could find no variable or combination of variables that correlated positively with higher tofu yields.

She did considerable work with Korea, trying to find a way to get the Korean government to accept shiploads of special soybeans for tofu–but could not get them to make any changes in their strict rules. The cost of shipping identity preserved (IP) soybeans in containers is too high.

IFIC is a non-profit group based in Washington, DC, funded by large food and agribusiness companies, that tries be a source of accurate and fair information on biotech

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foods. Karen believes they do a good job.

This coming October, a potentially very interesting and important conference on biotechnology and food will be held in Chicago, Illinois. Sixty people have been invited to attend, representing agribusiness, academia, and consumers. It will closed to those not invited.

In one of its next 2-3 issues, Consumer Reports will publish an entire issue on genetically engineered foods. Address: Dep. of Agricultural and Consumer Economics, 1301 W. Gregory Drive, 304c Mumford Hall, Univ. of Illinois at Urbana-Champaign, IL 61801. Phone: 217-333-1694.

1534. Hesser, Amanda. 1999. Bet you can't eat just one soybean. *New York Times.* Sept. 8. p. F3. [1 ref]
• ***Summary:*** An excellent article on edamame (green vegetable soybeans), which are now becoming more popular in America. Trader Joes has been selling frozen green soybeans for 10 months. Sales at SunRich in Hope, Minnesota, have risen 25% in each of the last two years. Allan Routh, president, says he sells as many as he can grow. Recently SunRich began distributing the beans, grown mainly in Iowa and Minnesota, to mainstream grocery stores.

"Now that soy is being heralded for healthfulness," soybeans are seen as remarkable. But health is not the sole driving force behind the new interest in edamame. "Next to a bag of chips, soybeans in the pod happen to be the world's easiest hors d'ouevre." In Japan they are served in practically every bar. "In New York, edamame appears on the menus of most Japanese restaurants, usually among the appetizers. It also shows up on Korean and Chinese menus, as well as on ones that are not Asian"–such as Avenue [85th St. and Columbus Ave.] and Gourmet Garage [7th Ave. at 10th St.].

Most cooks and connoisseurs agree that fresh green soybeans are better than frozen. They have a sweeter and cleaner taste, and more snap when you bite into them. Frozen ones lack this sweetness and have a starchier, almost glutinous texture. The owner of two Chinese restaurants in New York City refuses to serve them frozen because freezing "ruins the texture."

Discusses which Asian-American restaurants in New York City serve green vegetable soybeans, and how they are served. Contains two recipes: Soybeans in the pod. Rice with edamame (*Mame gohan*). Color photos show: (1) A man picking green soybeans in a field; (2) A close-up of edamame pods.

1535. Bernard, Richard L. 1999. Re: Which soybean varieties are large-seeded and which are small-seeded. Letter to William Shurtleff at Soyfoods Center, Sept. 9–in reply to inquiry of Aug. 30. 5 p. Handwritten on letterhead.
• ***Summary:*** 1. Grande is large seeded. 2-3. Which Jackson? 4. Perry, Shore and Yelnando are grain type soybeans, not vegetable type. 5. "I compared your list of 'vegetable' types with my info and have a few comments." Protana, Provar and Proto and not large seeded; "they are specialty varieties released for their high protein content so probably should be put in a different category. This will be a growing category in the future–i.e., soybeans with special compositional traits."

"Three of those on your list [of large-seeded varieties], Hiro, Suru, and Chame, are not in the germplasm collection since there was no seed available under these names in 1949. Interestingly all 3 PI strains to which the record equates them are in the collection. I didn't change them to the cv. [cultivar] name when I was rearranging the collection in the 1950s since there was doubt about the trueness to type of these old accessions (2 of these 3 differed distinctly from an old inviable seed sample of the original PI strain). I guess none of this affects your handling of these 3 since you are dealing with the written record.

"Your listing of the old introduced varieties as 'New U.S. domestic soybean variety' requires some explanation I should think (or perhaps better terminology) since many of these are simply renamed foreign cultivars (often by simply shortening the foreign name or perhaps not changing it at all, e.g., Rokusun).

Also some of these are not very large seeded but I have no reason to doubt that they may be considered to be 'vegetable type.' There are two missing from your list that you may want to include: Hidatsa and Pando.

Page 3 is "Comments on your list of 16 possible candidates for the large seeded vegetable-type list." The following are grain types (not vegetable types): Delsta, Delnoshat, Mandell, Perry, Shore, Yelnanda, and [Yelnando]. Anwei, Chuku and Kirin were from the La Choy Co. in Ohio according to Morse [1948] and so one might think they were food types but I have no record of them and would not include them [as vegetable types] (they could be sprout types!). Fiskeby V is foreign and should not be included (its also a grain type in my estimation). Burwell, Kabott, and Portugal are in the collection but I have no info on their intended use. Kabott is quite large (100 seeds weigh 27 gm) and so on that basis should probably be considered a vegetable type. Burwell and Portugal are a little large for grain type (100 seeds weigh 22 gm) and Burwell is black, so I am on the fence on these and would depend on your written sources to decide. Hidatsa should be included (see above). I have never heard of 'Ra.' It's not in Morse's 1948 very inclusive list and I wonder if it is a misprint.

Note: Ra was first tested in 1975 as a "vegetable soybean" by Rodale's Organic Gardening and Farming (OGF) Research and Development Group in Pennsylvania.

There follow two handwritten reports: "Report #1: Bernard's date is earlier than Shurtleff." Delsoy, Emerald (1975), Funk Delicious (1937), Harovinton (1989), Kahala, Kaikoo, Kailua, and Mokapu Summer (All were released in 1969 by the University of Hawaii Agric. Exp. Station in Honolulu), Protana (1969), Provar (1969), Proto (1989),

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Sanga (1945), Verde (1967, 1968), Vinton (1978), Vinton 81 (1981).

"Report #2: Soyfoods Center date is earlier than Bernard." Aoda, Sioux (1938), Chame, Hiro, Suru (lost, discarded, or not in collection, therefore not in Technical Bulletin 1746), Cherokee, Disoy (did *Soybean Digest* jump the gun? Disoy was in regional tests before its 1967 release; three documents enclosed), Easycook, Giant Green, Imperial. Willomi, Jackson (Which "Jackson"? "This confusion illustrates clearly why variety names should not be used again... As for the old Jackson, I don't know of a description of it other than our germplasm evaluation report {Technical Bulletin No. 1844}, copy enclosed {as PI 82581}. For the germplasm collection we simply turned the original Jackson back into a PI strain and maintain it as PI 82581 [Chontekon, PI 82581, was Chontekon, from Rep. of Korea, introduced in 1929]. The Jackson released in 1953 is an entirely different variety"). Mendota, Rokusun, Seminole. Address: Prof. of Plant Genetics (Retired), Dep. of Crop Sciences, AW-101 Turner Hall, Univ. of Illinois, Urbana, IL 61801-4798.

1536. Han, Ouk-Kyu; Abe, Jun; Shimamoto, Yoshiya. 1999. Genetic diversity of soybean landraces in Korea. *Korean Society of Crop Science* 44(3):256-62. Sept. [25 ref. Eng]
• ***Summary:*** "In Korea, soybean cultivation can be traced back to about 2,500 years ago (Kwon, 1972). Consequently various landraces of different morphological and agronomic traits have been established, and are very useful as genetic resources for improvement of modern cultivars (Kwon, 1972). However, most such indigenous soybeans have been rapidly replaced by newly released improved varieties. This will doubtless cause a loss of genetic diversity in the Korean soybean population." Address: School of Plant Resources, College of Agriculture, Dankook Univ., Chonan 300-714, Korea.

1537. *Honolulu Star-Bulletin* (*Hawaii*). 1999. Wraps, skewers and sushi from Hanaki. Dec. 22. p. 24.
• ***Summary:*** The recipe for "Spicy Tuna" calls for (among other things):
"1 cup mayonnaise
"¼ cup chile pepper sauce
"¼ cup chile Kochujan Miso (hot chili miso sauce)"

1538. Choi, Shin-Yang; Cheigh, M.J.; Lee, J.J.; Kim, H.J.; Hong, S.S.; Chung, K.S.; Lee, B.K. 1999. [Growth suppression effect of traditional fermented soybean paste (doenjang) on the various tumor cells]. *J. of the Korean Society of Food Science and Nutrition* 28(2):458-63. [33 ref. Kor; eng]
• ***Summary:*** "Methanol extract and its fraction of traditional fermented soybean paste (doenjang) from Soonchang area were studied for growth suppression on the various tumor cells and suppression components, by using HPLC and GC were analysed. Hexane fraction of methanol extract was indicated 79%, 76%, 67%, 66%, 78% of growth suppression on L1210, P338D1, HepG2, WiDr and SNU-1 tumor cells, respectively. Ethylacetate fraction of methanol extract also showed 81%, 75%, 75%, 76% and 82% of growth suppression on the same tumor cells, respectively. Peak 8 obtained from HPLC of ethylacetate fraction indicated 81%, 77%, 77%, 75% and 79% of growth suppression on the same tumor cells and identified as a genistein, by comparing with standard one by HPLC analysis. Hexane fraction of methanol extract contained oleic acid, linoleic acid and palmitic acid." Address: Korea Food Research Inst., Songnam 463-420, Korea.

1539. Chung, S.H.; Suh, H.J.; Hong, J.H.; Lee, H.K. 1999. [Characteristics of Gochujang prepared by Monascus anka koji]. *Korean J. of Food Science and Nutrition* 28(1):61-66. [Kor; eng]*

1540. Lee, C.H. 1999. Dongbukasia wonsitogimunhwasidaeeu teukjinggwa sikpumsajeok chungyoseong [The primitive pottery of Northeast Asia and its importance in Korean food history]. *Minjok Munhwa Yeonku* [*Korean Culture Research*] 32:325-457. [21 ref. Kor; eng]*

1541. Lee, Jae-Jung; Lee, D.S.; Kim, H.B. 1999. [Fermentation patterns of Chungkookjang and Kanjang by *Bacillus licheniformis* B1]. *Korean J. of Microbiology* 35(4):296-301 [19 ref. Kor; eng]
• ***Summary:*** "A Bacillus strain from Korean soil was isolated and identified to be *Bacillus licheniformis* B1 through various biochemical tests... This study demonstrated successive fermentation of Chungkookjang and Kanjang by B. licheniformis B1 isolated from nature, and suggested possible development of food rich in browning and nucleic acids." Address: Dep. of Life Sciences, Hoseo Univ., Asan-Si, 336-795, Changnam, Korea.

1542. Lim, Sun-Young; Park, K.Y.; Rhee, S.H. 1999. [Anticancer effect of doenjang in *in vitro* sulforhodamine B (SRB) assay]. *J. of the Korean Society of Food Science and Nutrition* 28(1):240-45. [24 ref. Kor; eng]
• ***Summary:*** "Growth inhibitory effect of doenjang (Korean soypaste) methanol extracts in SRB assay using AGS human gastric adenocarcinoma cell, Hep 3B human hepatocellular carcinoma cell and HT-29 human colon cancer cell was studied. The treatment of doenjang methanol extracts (2mg/assay) to the AGS, Hep 3B and HT-29 cancer cells inhibited the growth of the cancer cells by 55%, 60%, and 71%, respectively. Doenjang methanol extracts exhibited the highest inhibitory effect among other soybean fermented foods and original materials in the SRB assay. In addition, to separate active compounds of

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doenjang methanol extracts, we fractionated the doenjang with hexane, methanol, dichloromethane, ethylacetate and butanol. Growth inhibitory effect on the AGS, Hep 3B, HT-29 and MG-63 cancer cells was the highest in the fractions of dichloromethane and ethylacetate among other solvent fractions of the doenjang. These results showed that some compounds contained in the fractions of dichloromethane and ethylacetate might play a role on the anticanceric effect of doenjang." Address: Dep. of Food Science and Nutrition, Pusan National Univ., Pusan 609-735, Korea.

1543. Park, Kun-Young; Son, M.H.; Moon, S.H.; Kim, K.H. 1999. [Cancer preventive effects of doenjang in vitro and in vivo. 1. Antimutagenic and in vivo antitumor effect of doenjang]. *J. of the Korean Association of Cancer Prevention* 4(2):68-78. [36 ref. Kor; eng]
• ***Summary:*** "Antimutagenic and in vivo antitumor effects of doenjang (hexane, methanol and boiling extracts) were studied by using Ames test, SOS chromotest and Sarcoma-180 tumor cell-transplanted mice. The hexane, methanol and boiling extracts from doenjang showed strong antimutagenic activities (90-91% inhibition) toward aflatoxin B1 (AFB1) in Salmonella typhimurium TA98 and TA100." Address: Dep. of Food Science and Nutrition, and Pusan Cancer Research Center, Pusan National Univ., Pusan 609-735, Korea.

1544. Yoo, Seon-Mi; Chang, C.M. 1999. [Study on the processing adaptability of soybean cultivars for Korean traditional Chonggugjang preparation]. *J. of the Korean Society of Agricultural Chemistry and Biotechnology* 42(2):91-98. [23 ref. Kor; eng]
• ***Summary:*** "Eight soybean varieties including Danyeobkong, Danbaegkong, Kwanankong, Pureunkong, Manlikong, Sinpaldalkong 2, Jinpeumkong and Hwankeumkong were used for experiment. On the basis of quality characteristics of raw materials, such as seed coat weight rate, hydration swelling, and the content of fructose, glucose and sucrose, and chonggugjang, such as hardness, gamma-glutamyltranspeptidase, activity, free amino acid content, and amino type nitrogen content, Sinpaldakong 2 and Danyeobkong were desirable soybean cultivars for high quality chonggugjang processing." Address: National Rural Living Science Inst., Suwon 441-100, Korea.

1545. Ang, Catharina Yung-Kang Wang; Liu, KeShun; Huang, Yao-Wen. 1999. Asian foods: Science & technology. Lancaster, Pennsylvania: Technomic Publishing Co. 546 p. See p. 468. Illust. 24 cm.
• ***Summary:*** Contains 16 chapters by various authors. Chapters 6, 15 and 16 are cited separately.

Page 234: In Korea, meats are often flavored with *denjang,* a fermented soybean paste. *Gochu jang,* is a very hot fermented chili paste. Tofu is called *tobu.* Address: PhD, R.D., Research Chemist, National Center for Toxicological Research, U.S. Food and Drug Administration, Jefferson, Arkansas.

1546. Bladholm, Linda. 1999. The Asian grocery store demystified: A food lover's guide to all the best ingredients. Los Angeles, California: Renaissance Books. 234 p. Foreword by Jonathan Eismann. Illust. Index. 23 x 13 cm. Series: A Take it With You Guide.
• ***Summary:*** An original, well-researched and well-written book–though some of the terminology (such as "beancurd") is outdated. Soyfood products include: Beancurd noodles (p. 38). Kinako (p. 47. "A Japanese soybean flour, that is a light tan powder made by roasting and grinding soybeans. This flour is mixed with sugar and used to coat mochi (pounded rice cakes), ohagi (rice balls), and wagashi (a type of confection [Japanese confections]). Look for the Shirakiku brand and Assi roasted soybean flour, both in 1-pound bags"). Soy sauce, mushroom soy sauce, kecap manis (p. 53). Hoisin sauce (p. 54).

Chapter 10, titled "Soybean products" (p. 93-99) includes: Black bean sauce, dried soybeans, tempeh, beancurd (pressed beancurd, deep-fried beancurd, savory grilled beancurd {yaki-tofu}, freeze-dried beancurd [sic] {koyadofu}, bean curd sheets {fu pei, yuba, fu jook; the latter are "rolled-up, long, rumpled, cream-colored sticks of bean curd skin, bent in two"}), fermented beans (preserved black beans {fermented black beans, tau see}, bean sauce, toen-jang, chili/hot bean sauce, fermented beancurd), okara, edamame, soybean sprouts, soy milk.

Note: This is the earliest English-language document seen (March 2009) that uses the word "toen-jang" (or "toen jang") to refer to Korean-style soybean jang (miso).

Concerning preserved black beans: "Also called salted or fermented black beans or 'tau see,' this is made by steaming small black soybeans, then fermenting them with salt and spices. Used in a variety of dishes to add a pleasant rich aroma and salty taste... Crush or mash beans slightly to release more flavor or mix with garlic, fresh ginger, or chilies. Available in small glass jars, cans, and plastic bags. They should feel soft and not be dried out... Look for Pearl River Bridge brand labeled 'Yang Jiang Preserved Beans' in a 1-pound yellow canister, and Koon Chun Sauce Factory, Double Parrot, and Zu Miao Trademark brands all in 8-ounce bags." Note: This is the earliest English-language document seen (Nov. 2011) that uses the term "tau see" to refer to Chinese-style fermented black soybeans (preserved black beans).

Concerning bean sauce: "Varieties of this Asian staple include yellow bean sauce, brown bean sauce, bean paste (tau jeong), or sweet bean condiment. All are made from yellow or black soybeans, fermented with salt and in the sweet Northern Chinese type, with sugar-sweetened crushed yellow [soy] beans. Two forms are found: whole beans in

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a thick sauce and bean paste, which is mashed, ground or pureed beans. The whole bean type has a rounder flavor and adds texture, while the pastes are very salty and should be used sparingly... The yellow bean paste is tau cheo... Sold in glass jars and cans. Look for Koon Chun Sauce Factory, Kon Yick Wah Kee bean sauce, Amoy, or Yeo's.

Chapter 18, titled "Japanese food products" (p. 168-81) includes: Tsukemono (pickled in miso), miso paste, shiromiso, akamiso, mamemiso, natto, miso soup, noodle dipping sauce base (memmi), tamari sauce, teriyaki sauce, tonkatsu sauce.

Interesting non-soy products include: Sesame paste (p. 57). Satay sauce (with peanuts), gado-gado-dressing (p. 58). Peanut oil (p. 64). Sesame oil (p. 65). Amaranth (vegetable, p. 72). Winged beans (p. 76). Pickled wheat gluten (p. 108). Sesame seeds, peanuts, roasted peanuts (p. 118). Red/azuki beans, agar-agar (p. 121). Wheat gluten (p. 127). Sesame candy, peanut roll (p. 136). Sesame seed and peanut cookies (p. 137). Sweet red bean paste (azuki *an*, p. 139). Coix seed (Job's tears, p. 165). Japanese seaweed and kelp (p. 169-70). Umeboshi (p. 171). Fu (dried wheat gluten cakes), mochi (p. 177).

Note: Although angkak / ang-kak is not mentioned by name, under "red yeast rice" part of the description is "Did you ever admire those glowing red ducks and spare ribs in Chinese restaurants? The red color comes from powdered red yeast rice which is an ingredient in the marinade and barbecue sauce." Since this product is made with a mold (*Monascus purpureus*) and not a yeast, we prefer the term "red rice koji" in English. Address: Writer, designer, illustrator and photographer, Miami Beach, Florida.

1547. Joshi, V.K.; Pandey, A. eds. 1999. Biotechnology: food fermentation; microbiology, biochemistry and technology. 2 vols. New Delhi, India: Educational Publishers & Distributors. Exclusive distributors: Asiatech Publishers Inc. Illust. Index. 25 cm.

• ***Summary:*** In Vol. II ("Applied"), Chap. 13, "Oriental Fermented Foods" (p. 523-82; 212 references) starts with the following contents: 1. Introduction. 2. Legume dishes: Soy sauce, miso, tempeh, natto, sufu, ontjom, dawadawa. 3...

Table 1 contains these additional soybean fermented foods: Chee-fan (China); Hamanatto (Japan). Kecap / Ketjap (Indonesian soy sauce). Kinema (Nepal, Sikkim & Darjeeling). Meitauza (China, Taiwan; Fermented okara). Meju (Korean soybean koji). Soybean milk (China; sometimes fermented).

The index to Vol. I contains entries for natto, miso (chiang), and tempeh.

1548. Okura Boeki-cho (Ministry of Finance, Division of Trade). 1999. Miso yûshutsu tsûkan jisseki–Heisei 10 nen [Japan miso exports worldwide in 1998]. Tokyo, Japan. 1 p. [1 ref. Jap]

• ***Summary:*** This 1-page table, written in Japanese, gives the exports of miso to various countries, in calendar year 1998, by region. We will list them here in descending order of volume by region–in kilograms. Asia: Taiwan 349,591. Hong Kong 332,325. Korea 232,115. Singapore 120,681. Thailand 100,459. Philippines 44,605. Malaysia 40,129. Indonesia 26,585. China 23,024.

Middle East: United Arab Emirates (*Arabu*) 9,895. Israel 4,887. Kuwait 1,256.

Europe (Western and Eastern): Netherlands 115,703. Germany 102,724. England 74,231. France 45,971 Sweden 40,170. Italy 20,283. Belgium 17,932. Austria 13,370. Spain 6,118. Denmark 4,090. Canary Islands (Spain) 2,000. Russia 1,715. Finland 1,310. Switzerland 450.

North America: United States: 2,297,893. Canada 242,240.

Latin America: Argentina 12,589. Brazil 12,338. Costa Rica 400.

Africa: South Africa 2,678.

Oceania: Australia 164,601. Guam 31,553. New Zealand 27,621. Mariana Islands 6,578 (of which the largest is Guam). Palau Islands 650.

Note: This is the earliest document seen (March 2010) concerning soybean products (miso) in Palau; soybeans as such have not yet been reported.

Total exports. 4,531,300 kg. Total amount of miso made in Japan in 1998: 548,750,000 kg. Percent of miso made that is exported: 0.82%. Address: Japan.

1549. Wolff, David. 1999. To the Harbin Station: The liberal alternative in Russian Manchuria, 1898-1914. Stanford, California: Stanford University Press. xiv + 276 p. Plus 15 unnumbered pages of plates. Foreword by Nicholas V. Riasanovsky. Illust. Index. 24 cm. [300+ ref]

• ***Summary:*** This is the author's PhD thesis transformed into a book. He speaks Russian, Chinese, and Japanese, and has done extensive archival research in each.

From the publisher: "In 1898, near the projected intersection of the Chinese Eastern Railroad (the last leg of the Trans-Siberian) and China's Sungari River, Russian engineers founded the city of Harbin. Between the survey of the site and the profound dislocations of the 1917 revolution, Harbin grew into a bustling multiethnic urban center with over 100,000 inhabitants. In this area of great natural wealth, Russian, Chinese, Japanese, Korean, and American ambitions competed and converged, and sometimes precipitated vicious hostilities.

"Drawing on the archives, both central and local, of seven countries, this history of Harbin presents multiple perspectives on Imperial Russia's only colony. The Russian authorities at Harbin and their superiors in St. Petersburg intentionally created an urban environment that was tolerant not only toward their Chinese host, but also toward different kinds of 'Russians.' For example, in no other city of the

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Russian Empire were Jews and Poles, who were numerous in Harbin, encouraged to participate in municipal government. The book reveals how this liberal Russian policy changed the face and fate of Harbin."

"As the history of Harbin unfolds, the narrative covers a wide range of historiographic concerns from several national histories. These include: the role of the Russian finance minister Witte, the building of the Trans-Siberian Railroad, the origins of Stolypin's reforms, the development of Siberia and the Russian Far East, the 1905 Revolution, the use of ethnicity as a tool of empire, civil-military conflict, strategic area studies, Chinese nationalism, the Japanese decision for war against the Russians, Korean nationalism in exile, and the rise of the soybean as an international commodity. In all these concerns, Harbin was a vibrant source of creative, unorthodox policy and turbulent economic and political claims."

Soybeans are mentioned on pages 18, 91, 160, 169, 233. Address: PhD.

1550. Yi, Han-ch'ang. 1999. Chang: Yoksa wa munhwa wa kongup Soul T'ukpyolsi: Sin'gwang Ch'ulp'ansa. 267 p. Illust. (some color). 26 cm. [Kor]*

• ***Summary:*** Discusses: The history of fermented soyfoods and the fermented soyfoods industry in Korea. Soy sauce and hot pepper sauces in Korea. Address: South Korea.

1551. [Science of soybeans]. 1999. Seoul, Korea: Daekwang Publishing Co. See p. 1-14. *

• ***Summary:*** The cultivation of soybeans has been traced back to the ancient Kokuryo [Koguryo, Goguryeo] dynasty in Korea, in what is presently southern Manchuria in China. It is believed that soybeans and soyfoods have been consumed in Korea since the 3rd century B.C.

Note: According to Wikipedia (March 2009), the Goguryo state was founded in 37 BCE, long after the 3rd century B.C. The source of this information is two documents, the *Samguk Sagi* (*History of the Three Kingdoms,* completed in AD 1145; it is Korea's oldest extant history. Its chief compiler was Kim Pu-sik) and the *Samguk Yusa* (*Memorabilia of the Three Kingdoms,* in the late 13th century, a century after the *Samguk Sagi*). Unlike the more factually-oriented *Samguk Sagi*, the *Samguk Yusa* focuses on various folktales, legends, and biographies from early Korean history. Many of the founding legends of the various kingdoms in Korean history are recorded in the book.

1552. Hansen, Barbara. 2000. Beyond Korean cuisine: Kang Nam, with casseroles and barbecue, also has a sushi bar, Japanese menu. *Los Angeles Times* (*California*). Feb. 3. p. 182.

• ***Summary:*** We warmed up "with cups of barley tea. Then we ordered a series of Korean casseroles. The first, tofu *chigae* was little cubes of tofu, bits of beef and zucchini slices..."

"Next came *daen jang chi gae,* more tofu chunks in a heavy black stone pot so hot we didn't dare touch it."

"... a sort of Korean frittata accompanied by a soy dipping sauce with sesame seeds. The side dishes... included beef brisket boiled in seasoned soy sauce with fresh green shishito chiles." Address: Counter Intelligence, Times staff writer.

1553. Shurtleff, William; Aoyagi, Akiko. comps. 2000. Soy sprouts–Bibliography and sourcebook, 2nd century A.D. to 1999: Detailed information on 957 published documents (extensively annotated bibliography), 62 commercial soy sprout products, 59 original interviews (many full text) and overviews, 48 unpublished archival documents. Lafayette, California: Soyfoods Center. 408 p. Subject/geographical index. Author/company index. Language index. Printed 25 Oct. 1999. 28 cm. [1065 ref]

• ***Summary:*** This is the most comprehensive bibliography ever published on soy sprouts. It is also the single most current and useful source of information on this subject available today, since 88% of all references (and most of the current ones) contain a summary/abstract averaging 247 words in length.

This is one of more than 40 bibliographies on soybeans and soyfoods being compiled by William Shurtleff and Akiko Aoyagi, and published by the Soyfoods Center. It is based on historical principles, listing all known documents and commercial products in chronological order. It features: 37 different document types, both published and unpublished, every known foreign language publication on the subject, extensive translations of many Japanese and European works, and many original interviews. Thus it is a powerful tool for understanding the development of this subject and related products from its earliest beginnings to the present, worldwide.

Compiled one record at a time over a period of 24 years, each reference in this bibliography features (in addition to the typical author, date, title, volume and pages information) the author's address, number of references cited, original title of all non-English publications together with an English translation, month and issue of publication, and the first author's first name (if given).

It also includes details on 60 commercial soy sprout products, including the product name, date of introduction, manufacturer's name, address and phone number, and (in many cases) ingredients, weight, packaging and price, storage requirements, nutritional composition, and a description of the label. Sources of additional information on each product (such as references to and summaries of advertisements, articles, patents, etc.) are also given.

Details on how to use the bibliography, a complete subject and geographical index, an author/company index, a language index, and a bibliometric analysis of

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the composition of the book (by decade, document type, language, leading periodicals or patents, leading countries, states, and related subjects, plus a histogram by year) are also included. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1554. Tokyo Abura Tonya Ichiba [Tokyo Oils & Fats Wholesalers Cooperative Union]. 2000. Tokyo Abura Tonya Shi: Abura sho no rutsu on tazuneru [History of the Tokyo Oils and Fats Wholesalers: Searching for the roots of the merchants of oils and fats]. Tokyo: Tokyo Oils & Fats Wholesalers Cooperative Union. vi + 158 p. Illust. (some color). No index. 26 cm. [5 ref. Jap]

• ***Summary:*** Contents: Part I: The oil and fats business–an account of its history (p. 11). Note that the members of this union market both vegetable oils and animal fats (lard from pigs and tallow from cattle). 1. Roots (origin) of oil (p. 13): Origin of oil (p. 14), merchants of middle ages (p. 23), commerce of the middle ages (p. 29).

2. Edo period–Thriving wholesale oil dealers (p. 34): Economy of the Edo period (p. 35), sea transportation during the Edo period (p. 41), innovations in pressing out oil (p. 47), establishment of a fellow trader of stocks (p. 50), policy of the military government of the Edo period for wholesale dealers (p. 62).

Part II: 100 year history of the Tokyo wholesale oil dealers market (p. 95). 1. The beginning of the Tokyo wholesale oil dealers market (p. 97). 2. Tribulations of the Taishô period (p. 116). 3. Talking about wholesale oil dealers–memories / stories (p. 124). 4. Leaping wholesale oil dealers of the Shôwa period (p. 129). 5. History (steps) of wholesale oil dealers after World War II (p. 137).

Photos show: (1) First color photo–Cover of both volumes of a Japanese-language book titled *Seiyuroku* [Records of making oils and fats / Records of the crushing industry], issued in the 19th century. It describes the history of crushing in Japan. The illustrations on page 22 are from this book.

(2) The 2nd page of color photos titled *Edo-jidai no Seiyu Dogu* [Instruments used for crushing in the Edo period {mostly in the 1800s}] contains 4 separate photos Top left is a receptacle for grinding seeds. Top right is an air blower like a bellows below the pan to steam the ground seeds. Bottom left is a wooden bucket and a furnace for steaming ground seeds. Bottom right is a wedge press named a *shimegi* in Japanese.

The 3rd page of color photos shows the cover of two books issued after World War II. The left one, titled *Kogane no Hana*, describes the history of rapeseed in Japan. *Kogane* means "golden" and *hana* means "blossoms." The book on the right is titled *Rikyu Hachimangu*, referring to a shrine in Kyoto. It is said that a priest from this shrine developed the first crushing instrument named *Chogi* in 859.

The 4th page of color photos shows two illustrations of famous places in Edo (the old name for Tokyo) in 1800s. The top one shows the Nihonbashi area where a long and famous bridge crosses the river crosses the Nihonbashi River. The bottom one shows Isemachi-Kashi Dori; the buildings were the warehouses of goods and the market place.

On page 1-5 are the names of five Japanese who are important figures in this book: (1) Mr. Tatsuaki Kaneda, the President of Tokyo Oils & Fats Wholesalers Cooperative Union in 2000.

(2) Mr. Keishiro Fukushima, Director General, Foods Policy Planning Bureau, Ministry of Agriculture, Forestry and Fisheries. Describes his congratulatory remarks for 100 Year Jubilee of the Union.

(3) Mr. Masaji Shima, the President of Japan Oilseed Processors Association (JOPA) in 2000. His congratulatory remarks are also described.

(4) Mr. Yukio Sakaguchi. He is the Honored Chairman of Council for *Sukei-kai*, which is the Adoration Group for *Yamazaki Rikyu Hachimangu.* He passed away in 2002 when he was 101 years old.

(5) Kinzaburo Shiraishi, the President of Japan Oils & Fats Wholesalers Association in 2000.

Page 22 shows 4 line drawings from the book *Seiyuroku*, mentioned above. The two on the left show the wedge press. The top right shows several instruments used for crushing. The bottom right shows instruments used for refining, or (more precisely) filtration.

Two books on page 76 also describe the history of the crushing industry in Japan. The left one, issued in 1810, describes the origin and history of crushing industry. The right one, issued in 1716, describes the history of mainly wholesalers of vegetable oils.

Note from Y. Komura, who sent this book as a gift to Soyinfo Center: The editor of this book is Mr. Takayoshi Shimada, the CEO of the wholesale cooperative union, and the writer is Mr. Takahashi Shirashi, a professor emeritus of Keio University and scholar of Japanese history. In the old days, merchants of oils & fats used to work as seed crushers, refiners, wholesalers and retailers. However, the current meaning of *abura tonya* is mainly a wholesaler. Therefore I express it as "Wholesale Business" in the title. The book was published in celebration of the 100th anniversary of the Tokyo Oils & Fats Wholesalers Cooperative Union though, the Union has no formal title of the book in English. Therefore I myself translate the title of the book into English. As you know, the center of policy, business and culture of Japan used to be Kyoto and Nara in the old days. At that time Tokyo was the countryside with no industrial development. It is said that the crushing industry originated in Kyoto in 859. The priest of Yamazaki Rikyu Hachimangu, a shrine, developed a crushing instrument named a *Chogi*. This indicates that the other businesses concerning with seed crushing also developed in or around these areas. Merchants of oils and fats initially developed in Kyoto and expanded

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throughout Japan. It is said that rapeseed was introduced into Japan from China or Korea in the 16th century when the Tokugawa era [1600-1867] started–or perhaps somewhat earlier. Since then crushing rapeseed became popular even in the Tokyo area. Compared with a long history of the oilseed crushing industry in Japan, Tokyo has a very short history of this industry. Address: Tokyo, Japan.

1555. *ADM Nutrition & Health Update* (*Decatur, Illinois*). 2000. Successful soy conference. 2(1):4. Winter.
• ***Summary:*** "Evidence of the interest in the health benefits of soyfoods and soybean isoflavones was clearly apparent from the number of delegates attending the Third International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, which was held October 31–November 3, 1999, in Washington, DC. During the four days of the conference nearly 600 researchers and health professionals heard presentations that focused on a range of topics. That attendance figure represents a twofold increase over the first symposium held in 1994. In addition to 48 oral presentations, there were over 100 poster presentations, which is three times more than were presented at the first meeting. Furthermore, in addition to cholesterol reduction, cancer, and osteoporosis, topics covered at the previous symposia, research at this third symposium addressed areas such as hot flashes, hypertension, and cognitive function.

"The number of exhibits was also impressive and clearly illustrated that soy products have become mainstream. During the Tuesday luncheon, six pioneers of the field were recognized for their contributions: Herman Adlercreutz, University of Helsinki (Finland); Chai-Won Chung, Dr. Chung's Food Company (Korea); Cesare Sirtori, University of Milan (Italy); David Kritchevsky, Wistar Institute (Philadelphia, Pennsylvania); Kenneth D.R. Setchell, Children's Hospital (Cincinnati, Ohio); and Doyle Waggle, Protein Technologies International (St. Louis, Missouri). The session on coronary heart disease was held in honor of the late Kenneth K. Carroll, for his work on the cholesterol-lowering effects of soy protein.

"As is always the case with scientific meetings, the research presented probably raised more questions than it answered but there is no doubt that those who attended left with greater enthusiasm for their field. The abstracts from the conference are expected to be published in the *Journal of Nutrition* sometime next year."

1556. **Product Name:** Jamae Soynut Crunch Bar.
**Manufacturer's Name:** Jamae Natural Foods Inc. (Marketer-Distributor).
**Manufacturer's Address:** 5958 West Pico Blvd., Los Angeles, CA 90035. Phone: 323-937-3670.
**Date of Introduction:** 2000 May.




**Ingredients:** Roasted soynuts, crisp rice, honey, sesame seeds, brown rice syrup, coconuts, natural flavor.
**Wt/Vol., Packaging, Price:** 1 oz (28 gm) individually wrapped in cellophane.
**How Stored:** Shelf stable.
**Nutrition:** Per bat (28 gm.): Calories 120, calories from fat 50, total fat 6 gm (9% daily value; saturated fat 2 gm), cholesterol 0 mg, sodium 0 mg, total carbohydrate 14 gm (dietary fiber 1 gm [4%], sugars 6 gm), protein 5 gm. Vitamin A 0%, vitamin C 0%, calcium 2%, iron 4%. Percent daily values are based on a 2,000 calorie diet.
**New Product–Documentation:** This product is listed in the Natural Flavors! (Brewster, New York) wholesale price list of 21 Sept. 2000. It is a snack bar sold in only one flavor. Talk with Meghan Merry of Health Flavors. For more

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information contact Jamae in California. Phone: 223-937-3670. Talk with Crystal Yu of Jamae. The company name is pronounced jah-MAY, the Korean word for "kinship." She took the product to the Natural Products Expo (Anaheim, California) in March 2000, and it was first sold in May. She is Korean American. Soyfoods Center taste test. The best tasting nutrition/energy bar we have ever tasted, and also the one with the most natural (cleanest) ingredients.

Talk with Tom Mosk of Heaven Scent Natural Foods. 2001. Oct. 1. His company owns a bakery where this bar used to be made.

1557. Kang, Min-Jung; Kim, S.H.; Joo, H K.; Lee, G.S.; Yim, M.H. 2000. Isolation and identification of microorganisms producing the soy protein-hydrolyzing enzyme from traditional mejus. *Journal of the Korean Society of Agricultural Chemistry and Biotechnology* 43(2):86-94. May. [29 ref. Kor; eng]
• ***Summary:*** "In order to develop the enzymatic hydrolysis system concerned with taste and flavor, strains having the high hydrolyzing activity on the soy protein were selected from some traditional Mejus. Two molds and one bacterium producing enzymes which were different in character of hydrolysis were isolated and identified. Leucine and azodye enzyme activities of both M4 and M5 were relatively high among in the isolated molds. And, leucine enzyme activity of B16 was the lowest in the isolated bacteria. These strains were isolated as microorganisms having a dissimilar hydrolysis pattern on the soy protein by enzymatic reactions." Address: Div. of Food, Biological and Chemical Engineering, Taegu Univ., Kyungsan 712-714, Korea.

1558. Lee, Cecilia Hae-Jin 2000. The rituals of barbecue cross all boundaries: Fourth of July. *Los Angeles Times* (*California*). June 28. p. 50-51 (D8-D9).
• ***Summary:*** "The traditional way to eat Korean barbecue in a restaurant is to take a piece of red-leaf lettuce (*sangchi*), place in it a piece of smoking meat, a slice of garlic (grilled or raw), a small dollop of chile paste (*kochujang*) or fermented soy paste (*dwenjang*), wrap the whole thing up and shove it into your mouth.

"In lieu of the *kochujang* and *denjang* you can dip the 'wrap' into a light sauce that the restaurant has provided for you."

Note the two ways of spelling *denjang*. Address: Daily News staff writer.

1559. Kim, Dong-Ho; Lee, K.H.; Yook, H.S.; Kim, J.H.; Shin, M.G.; Byun, M.W. 2000. [Quality characteristics of gamma irradiated grain shape improved meju]. *Korean Journal of Food Science and Technology* 32(3):640-45. June. [20 ref. Kor; eng]
• ***Summary:*** Meju [soybean koji] treated with gamma irradiation maintained better quality in storage than that of the control. Address: Team for Radiation Food Science and Biotechnology, Korea Atomic Energy Research Inst.

1560. Kono, Makoto. 2000. Life after the "Liefde": Dutch influence in Japan. *Look Japan* (*Tokyo*) 46(531):35-37. June.
• ***Summary:*** In 1600, the Dutch ship *Liefde* drifted ashore in Usuki Bay in Bungo Province (now Oita prefecture). Of the original 110 crew members, only 24 were still alive, and only six of these could walk ashore unassisted. The arrival of this ship marked the beginning of relations between Japan and the Netherlands, and the 400th anniversary of this key event is being celebrated in Japan this year. Two of the surviving crew were to earn important places in Japanese history: William Adams and Jan Joosten.

Adams, an Englishman, became Tokugawa Ieyasu's advisor on diplomacy and trade. He adopted the Japanese name Miura Anjin, married a Japanese woman, Oyuki, and was given the social rank of samurai. Two monuments and a festival commemorate the site of his residence in Tokyo and the grave of his wife. Jan Joosten became Ieyasu's advisor on military affairs. He, too was given a Japanese name, Yaôsu, and that name survives today in a slightly modified form as Yaesu, a district on the eastern side of Tokyo Station.

In 1633 the Tokugawa shogunate adopted a policy of national isolation which continued for 221 years until 1854 when the American Commodore Perry forced the country to open its doors to Western trade. During this time Japan maintained contact with only three nations: China, Korea, and the Netherlands. The Dutch were restricted to an artificial island named Dejima [Deshima], built by the shogunate in Nagasaki Harbor. This was the sole source of "Western Learning" which was more commonly called "Dutch Learning" (*rangaku*). The first area of interest to Japanese scholars was Western medicine, starting with anatomy. In 1774 a 5-volume anatomy was translated into Japanese by a team headed by Gempaku Sugita.

At the Dutch trading post in Dejima, three doctors were employed; each had a strong impact on the relationship between Japan and the West. Engelbert Kaempfer, a German, came to Japan early in the Edo period (1603-1867). Philipp Franz von Siebold, also a German, came in the middle years of the Edo period, and Carl Peter Thunberg, a Swede, came near the end. Besides medicine, all three taught natural history, focusing on the flora and fauna of Japan, and all three became well known in Europe for disseminating their knowledge of Japan.

1561. Sim, John. 2000. Update on Pulmuone (Interview). *SoyaScan Notes.* July 24. Conducted by William Shurtleff of Soyfoods Center. Followed by a letter dated 14 July 1997.
• ***Summary:*** John Sim recently returned to Pulmuone as marketing director. His company sells 95% of its tofu to the Korean-American market. Their factory in Southern California now makes 24,000 18-ounce blocks/cakes of tofu

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a day. They sell these through a distributor and they retail for $1.05 per cake, which is a very low price.

Pulmuone's tofu is now in the Ralph's supermarket chain in Southern California, and they have been advertising it regularly with Ralph's and doing promotions where the tofu retails for $0.79 for an 18 ounce cake. This has shaken up the competition (such as House Foods), causing competitors to lower prices and start advertising as well.

In late May of this year Pulmuone introduced their first nigari tofu. Their customers love the great, fresh flavor. The label reads simply "Premium Tofu" but soon they plan the add the word "nigari"–a work that many Koreans understand.

Pulmuone has also developed a marketing innovation–a disposable [resealable] lid. They place this next to the pack of tofu, and give it away free of charge. A message will be printed on it.

John would like to get his tofu into more supermarket chains over a wider geographical area. Go works with a broker, who has access to the buyers and who makes the presentation; John goes along to supply expertise on tofu.

John is looking for statistics on the tofu market in the USA. Peter Golbitz has lowered the price of his report to $4,000. SPINS wants $12,000 for their data. Address: Marketing Director, Pulmuone, 4585 Firestone Blvd., Southgate, California 90280. Phone: 213-564-2000.

1562. Choi, Yong-Soon; Lee, Bung-Hoon; Kim, Jong-Hwa; Kim, Nam-Soo. 2000. Concentration of phytoestrogens in soybeans and soybean products in Korea. *J. of the Science of Food and Agriculture* 80(12):1709-12. Sept. 15. *
• ***Summary:*** Five soyfoods contributed 96% of total genistein and daidzein intake in Korea; soy sprouts, chungkukjang (Korean natto), tofu, denjang (Korean soybean miso), and kochujang (red pepper and soybean paste), respectively. Average Korean daily intake of isoflavones from soyfoods is estimated as 21 mg per day.

1563. Bae, J.S.; Park, Y.H.; Jun, T.H.; Woo, J.S.; Lee, S.H. 2000. Genotype and environment interactions on isoflavone content in soybean seed. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 112-113. [5 ref]
• ***Summary:*** "Isoflavones in soybean [*Glycine max* (L).] seeds are considered to have some medical properties such as antitumor effects. The objective of this study was to estimate genotype x environment interactions for isoflavone concentration in soybean seed. Significant G x E interactions were observed in four major types of soybean seed isoflavones over three locations and over two years. The mean contents of daizein and genistein were lower in 1995 than 1996 over three locations. The response of the genotypes was not consistent over location and years, indicating that multiple testing should be required to make unbiased genotypic selection." Address: College of Agriculture and Life Sciences, Seoul National University, Suwon, Korea.

1564. Ha, B.K.; Lee, H.S.; Lee, S.H. 2000. Molecular mapping of resistance gene to bacterial pustule in soybean. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 110-111. [3 ref]
• ***Summary:*** "The objective of this study was to map the *Rxp* gene using simple sequence repeat (SSR) markers. The parents and 75 $F_8$ lines from the cross of `Suwon 157' (susceptible) x `Danbaekkong' (resistant) were scored for bacterial pustule reaction in the greenhouse after inoculation with an isolate of *X. campestris pv. glycines* (8ra). Major QTL mapped to LG D2 of the USDA soybean map. The gene was closely linked to SSR markers, Satt372 and Satt458, in LG D2." Address: Div. of Plant Science, Seoul National Univ., Suwon 441-744, Korea.

1565. Kim, Jung-In; Han, Jung-Hee; Kang, Min-Jung; Kwon, Tai-Wan. 2000. The hypoglycemic effect of *Chongkukjang* in normal rats. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 171-172. [3 ref]
• ***Summary:*** *Chongkukjang* is fermented Korean soybean paste very similar to natto.

Note: This is the earliest document seen (May 2021) that uses the spelling "Chongkukjang" to refer to Korean style natto. Address: Dep. of Food and Nutrition, Inje Univ., Kim-Hae, Kyung-Nam province, South Korea.

1566. Kim, Seok Dong; Kim, K.H.; Park, H.K. 2000. Soybean breeding for processing and utilization in Korea. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 23-28. [9 ref]
• ***Summary:*** Contents: Introduction. Procedures of soybean breeding in Korea: Soybean breeding before the Uruguay Round [of trade negotiations]. Soybean breeding after the Uruguay Round (from late 1993). Recent knowledge and technologies in soybean breeding for processing and utilization: Breeding of sprout soybeans, breeding of soy-sauce and soy-paste soybeans, breeding of bean-curd and soy-milk soybeans, breeding of specific soybeans, breeding of vegetable and early soybeans, breeding of high protein soybeans, breeding of lacking lipoxygenase soybean, utilization of biotechnology for breeding, studies on the application of radiation for genetic transformation. Prospect of soybean breeding in Korea: Sprout soybean, soy-sauce and soy-paste soybean, specific soybean, vegetable soybean,

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seed component.

Page 23: "Soybean cultivation in Korea is mainly based on self-sufficiency with a small area planted per farm house and it was enough for self-sufficiency up until the end of 1960s. But along with the rapid national economic development, the national demand of soybeans has greatly been increased from about 268,000 tons in 1970 to nearly 1.4 million tons in 1998 with the mean annual increase rate of over 10%. On the contrary, the area planted to soybeans showed a continuous decreasing trend from about 300,000 hectares in the early 1970s to 98,000 hectares in 1998 mainly due to farmers' low income from soybeans compared to other competing summer upland crops such as red pepper, sesame, potato, and vegetables, etc. Accordingly, the ratio of national self-sufficiency was lowered below 10% in 1998.

"Yield of soybeans in Korea has greatly increased from about 0.79 tons/ha in the early 1970s to 1.44 tons/ha in 1998; the yield nearly doubled during this periods. The yield increase was partially indebted, of course, to the improvement of cultural practices but mainly to the dissemination of the newly developed varieties to farmers.

"Soybean cultivation in Korea is suffering from many kinds of severe diseases and pests. But most soybean varieties developed by hybridization have fairly good resistance to most of the troublesome diseases and pests. Seventy more soybean varieties have newly been developed and released to the soybean growers since the first variety Kwangkyo, developed by hybridization, was released in 1969. Some of the soybean varieties are known to be widely used as useful genetic materials for disease resistance even in several foreign countries.

"Also, it is quite beneficial to soil fertility and cropping systems with other crops. It is worth while to review extensively soybean breeding for processing and utilization at present and in the near future in preparation for the possible food crisis in the 21st century." Address: National Honam Agric. Exp. Station, R.D.A. Iksan, 570-080, Republic of Korea; e-mail: kimsa@nhaes.go.kr.

1567. Ku, Ja-Hwan; Moon, Jung-Kyung; Yoon, Hong-Tae; Park, Keum-Yong; Lee, Yeong-Ho. 2000. Composition ratios of cyanidin-3-glucoside and delphinidin-3-glucoside in Korean soybean with black seed coat. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 155-156. [2 ref]
• ***Summary:*** "Major compounds of anthocyanin in soybean with black seed coat have been known as cyanidin-3-monoglucoside (C3G) and de1phinidin-3-monoglucoside (D36), The objective of this study was to provide basic information on the content and composition of C3G and D3G in Korean black soybean, In seed coat of 199 accessions, C3G content ranged from 0.05% to 2.62% with a mean value of 0.84%, and D3G content ranged from 0.00% to 0.75% with a mean value 0.15%, The proportion of D3G in the total anthocyanin ranged from 0.00 to 0,68 with a mean value of 0.14." Address: Upland Crop Div., National Crop Experiment Station, RDA, Suwon 441-857, Republic of Korea.

1568. Yan, Jeong-lye; Kwon, Tae-wan; Song, Young-sun. 2000. Enhancement of the fibrinolytic activity in plasma by oral administration of *Chongkukjang.* In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 175-176. [2 ref]
• ***Summary:*** *Chongkukjang* is Korean-style natto fermented with *Bacillus circulans* K1 that produces strong fibrinolytic enzymes. The fibrinolytic activity of *chongkukjang* was tested in spontaneously hypertensive rats (SHR) by acute and chronic administration of *chongkukjang* extract and *chongkukjang* base. A graph shows that the fibrinolytic activity peaked 1 hour after administration. Address: 1. Dep. of Food Science and Technology, Kyugsung Univ., Pusan 608-736; 2. Dep. of Food Science and Nutrition, Inje Univ., Kimhae 621-749, Korea.

1569. Yang, Jeong-Lye; Kim, H-S.; Song, Y-S. 2000. Purification of fibrinolytic enzyme from *chongkukjang.* In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 220-21. [2 ref]
• ***Summary:*** *Chongkukjang* is a traditional Korean fermented soybean paste. A new method of treating thrombosis has been widely sought, due to the limitations of present thrombolytic agents. "If a fibrinolytic enzyme is produced by food-grade microorganisms in a fermented food, the food can be consumed to prevent thrombosis and other related diseases." In this study the writers report a novel fibrinolytic enzyme from *chongkukjang* fermented with *Bacillus circulans* K-1.

This enzyme was smaller than that of nattokinase (27,700 Daltons) or *chongkukjang* kinase (28,200 Daltons).

Note: *Chongkukjang* appears to be a relative of Japanese natto, which is fermented by *Bacillus subtilis* (natto). Address: 1-2. Dep. of Food Science and Technology, Kyungsung Univ., Pusan 608-736; 3. Dep. of Food Science and Nutrition, Inje Univ., Kimhae 621-749, Korea.

1570. Yoshida, Shuji. 2000. The origins of fermented soybeans and their distribution. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 697-700. [8 ref]
• ***Summary:*** The origins of two types of fermented soybeans will be discussed: (1) *Jiang* is used in preserving meat. (2) *Dou-chi* is used in brewing.

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Jiang existed in the lower Huang-He [Yellow River] area before the Yin dynasty, ca. 1500 BC. Doujiang, jiang made of soybean, seems to have been invented much later, during the Han dynasty, around 300 B.C.

However *dou-chi* was already known in the middle and lower reaches of the Chang Jiang River [Yangtze River, which enters the ocean {East China Sea} near Shanghai, in southern China] before the Han dynasty. *Dou-chi* [fermented black soybeans] spread northward to the northeastern part of China, westward to Nepal, southward to Indonesia, and eastward to Japan.

1. Dou-chi and dou-jiang. Dou-chi is the oldest type of fermented soybean made by fermenting soybeans with species of *Aspergillus* mold. "'Dou-chi with ginger' was found in the ancient Ma Wang Dui Tomb no. 1 which was probably built in BC 186. Thus, dou-chi appeared in the Han Dynasty and was supposedly invented before the Qin dynasty (Bo 1984)."

The idea of culturing a "koji" mold on cooked soybeans was probably derived from the brewing process. Thus, instead of fermenting a cereal grain (such as rice for saké) they attempted to ferment soybeans. But as often happens, the final product was different from what had been expected. The result was a soybean covered with a mycelium of yellowish mold (*dou-huang*, where dou = soybean + huang = yellow). "Dou-chi is a sophisticated form of dou-huang; douchi is soaked in a little water and fermented for more than one month."

"Jiang, on the other hand, is probably derived from meat preservation. In the early days, meat was preserved simply by adding salt. Later, koji mold was employed for preservation and koji was produced. Jiang existed in the northern part of China during the Yin dynasty, about 1500 BC. Soybean jiang (*dou-jiang*), however was a relatively new product. It never existed before about the 3rd century B.C., during the early Han dynasty (Ishige & Raddle 1990)."

Dou-chi and dou-jiang each are connected with brewing. "I am not concerned here with the history of brewing in China but I will briefly introduce the hypothesis on koji mold development. There are two types of koji, the grain type and the cake type." The grain type was first introduced in the Chang Jiang [Yangtze] River area of southern China; from there it migrated to northern China. The cake type of koji, however, was invented in northern China (Yoshida 1993a).

Following this hypothesis, dou-chi was derived from the grain-type of koji, not from the cake type. "Therefore I assume that dou-chi originated in the Chang Jiang [Yangtze] River area of southern China, where the grain type was invented and is still popular. In practice, dou-chi is preferred in southern China." The dou-chi method of culturing mold on cooked soybeans was practiced before dou-jiang was invented. When the molded soybean method was introduced to northeastern China via northern China, it became common to produce dou-chi using the local soybeans produced in that area I assume that northeast China is the second center of dou-chi production; from there it spread to Korea and Japan. In Japan, dou-chi is known as "miso" [sic]. Address: National Museum of Ethnology, Osaka (Kokuritsu Minzokugaku Hakubutsukan), Japan.

1571. *Canadian Soybean Bulletin* (*OSG, Chatham, Ontario, Canada*). 2000. Canadian soybean exports. 14(2):3. Nov.
• ***Summary:*** A large table shows statistics in tonnes (metric tons) of soybeans exported to various countries, and regions, each year from 1996/97 to 1999/2000. The countries are: In Asia–China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, and Thailand. In Western Europe–Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, and Spain. By continent–Africa, Central America, Eastern Europe, Middle East, Oceania, South America, and United States.

In 1999/2000 the countries to which the largest amount of Canadian soybean exports went were (in tonnes): Japan 179,708, United States 121,860, Malaysia 99,919, Indonesia 64,426, Denmark 47,444, Germany 43,410, and Netherlands 36,392.

1572. Cho, Y.J.; Cha, W.S.; Bok, S.K.; Kim, M.U.; Chun, C.S.; Choi, U.K. 2000. Production and separation of anti-hypertensive peptide during chungkookjang fermentation with *Bacillus subtilis* CH-1023. *J. of the Korean Society of Agricultural Chemistry and Biotechnology* 43:247-53. *

1573. Choi, Jin-Young; Lee, T.S.; Noh, B.S. 2000. [Quality characteristics of the Kochujang prepared with mixture of meju and koji during fermentation]. *Korean J. of Food Science and Technology* 32:125-31. [27 ref. Kor; eng]
• ***Summary:*** Note: Koreans were taught about koji during the Japanese annexation of Korea, 1910-1945. Address: Natural Science Inst., Seoul Women's Univ.

1574. Choo, J.J.; Shin, H.J. 2000. [Sensory evaluation and changes in physiochemical properties and microflora and enzyme activities of pumpkin added Kochujang]. *Korean J. of Food Science and Technology* 32(4):851-59. [Kor; eng]*

1575. Hsiao, K.; Lyons-Wall, P.M. 2000. Soy consumption in Taiwanese children in Taipei. *J. of Nutrition* 130:705S. In Proceedings of the 5th International Soy Symposium. *
• ***Summary:*** Estimated adolescent soyfood and isoflavone intake: 66 boys and girls were enrolled, ages 8-9. Intake of soyfoods was 150.1 gm/day, including a mean intake of 36.6 mg/day of isoflavones. Soy products were introduced at a mean age of 1.9 years, primarily as soymilk (40%), tofu (40%), soybean curd jelly (9%), and other products (11%).

1576. **Product Name:** Soylove Soymilk and Tofu Maker. **Manufacturer's Name:** Ionmag Corporation. Renamed

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Ronic Corporation by March 2005.
**Manufacturer's Address:** Korea.
**Date of Introduction:** 2000.
**New Product–Documentation:** Leaflet (3 panels each side. Each panel: 22.5 x 20 cm, glossy color) sent by Patricia Smith from Natural Products Expo West. 2003. March. On the front panel: "Soylove: For your health." With a photo of the top of the plastic machine. Inside 3 panels: (1) "Make it easy by yourself" (8 different types of food, including tofu soup and soymilk). (2) "Modern design" (for the IOM-201B and the IOM-501A). (3) "Soylove is consist of [sic] in this way" (diagram of the six key parts of the machine) and "Operating principles of soymilk maker." 5th panel: "Making with one-touch button." A business card from H.B. Kim of Ionmag is attached with a staple.

Leaflet (3 panels each side. Each panel: 21 x 10 cm, color) sent by Patricia Smith from Natural Products Expo West. 2005. March. "Soylove.com." On the front panel is




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a photo of the plastic machine. The inner three panels: "To make flavored punches" [and soymilk / ricemilk]. "To make soup (porridge)." "To make tofu & soy noodles."

Back panel: Patented in Korea, USA, Japan, Taiwan. The patent number for each country is given.

Awards: "2000 Int'l Institute of Invention and Innovators in Germany (Gold Award).

"2001 Int'l Institute of Invention and Innovators in England (Silver Award)."

1577. Jeong, Yong-Jin; Seo, J.G.; Lee, G.D.; Yoon, S.R. 2000. [Changes in quality characteristics of traditional Kochujang prepared with apple and persimmon during fermentation]. *J. of the Korean Society of Food Science and Nutrition* 29(4):575-81. [18 ref. Kor; eng]
• ***Summary:*** "Quality characteristics of kochujang prepared with apple and persimmon were investigated during 14 weeks of fermentation. The water activity decreased slightly during fermentation and was higher in kochujang (I) prepared with apple than in kochujang (II) prepared with persimmon." Address: 1. Dep. of Food Science and Technology, Keimyung Univ., Taegu 704-701, Korea.

1578. Kim, J.Y.; Kim, J.H.; Kim, J.K.; Moon, K.D. 2000. [Quality attributes of whole soybean flour tofu affected by coagulant and theirs concentration]. *Korean J. of Food Science and Technology* 32:402-09. [Kor; eng]

1579. Kim, Soo-Hee; Lee, Y.B.; Hwang, I.K. 2000. [Studies on volatile compounds in lipoxygenase deficient-soybean and its products]. *Korean J. of Food and Nutrition* 13(2):118-124. [11 ref. Kor; eng]
• ***Summary:*** "Lipoxygenase (LOX) in soybeans is responsible for beany flavors which limit the wide utilization of soybeans to foods. This study was conducted to analyze beany flavor compounds of the normal Hwang-keumkong and LOX-deficient soybean cultivars, Jinpumkong which lacks L-2, L-3, and Jinpumkong 2 which lacks all L-1, L-2, L-3." Address: 1. Dep. of Food and Nutrition, Kyungmin College, Kyonggi-do, Korea.

1580. Park, Seok-Kyu; Seo, K.I.; Choi, S.H.; Moon, J.S.; Lee, Y.H. 2000. [Quality assessment of commercial doenjang prepared by traditional method]. *J. of the Korean Society of Food Science and Nutrition* 29(2):211-17. [32 ref. Kor; eng]
• ***Summary:*** "To standardize quality characteristics of commercial doenjang prepared by traditional method, general components, organic acids, amino acids and fatty acid composition were investigated. Moisture, crude protein, crude lipid, titratable acidity (expressed as milliliter of 0.1 N NaOH), acid value and salinity were 54.7%, 13.8%, 8.0%, 14.4 mL, 45.7 mg/g and 11.8%, respectively. The content of amino type nitrogen was 345.3 mg% (w/w) in the range of 207.6 to 443.5 mg% being 1.1 to 2.2-fold for all samples. Average value of Hunter color for L (lightness), a (redness) and b (yellowness) were 37.4, .1-9.7 and +21.3, respectively. Browning index value (expressed as optical density at 425 nm) of water-soluble compound (2.58) was above 7.1 times higher than that of the water-insoluble compound (0.38). Total contents of free and total amino acid were 3.81 and 9.72%, respectively, and then the former (about 1.1 to 3.7 times) was more different in all samples tested than that of the latter (about 1.1 to 2.0 times). Among amino acids, glutamic acid was abundant and its content of free and total amino acids was 0.57 and 1.24%, respectively. Of organic acids, lactic acid was the most abundant being 0.34% (average) and ranged from 0.15 to 0.86%. Linoleic acid (52.17%, as area%) was the highest content of the total fatty acids. Unsaturated and polyunsaturated fatty acids were 83.89 and 61.18%, respectively. Polyunsaturated fatty acid was markedly different among all samples and ranged from 51.52 to 64.91%." Address: Korea Fermented Food Research Inst., Sanchung 666-800, Korea.

1581. Yoo, Seung-Ku; Kang, S.M.; Noh, Y.S. 2000. [Quality properties on soy bean pastes made with microorganisms isolated from traditional soybean pastes]. *Korean J. of Food Science and Technology* 32(6):1266-70. [19 ref. Kor; eng]
• ***Summary:*** "Quality properties of soy bean pastes made with *Aspergillus oryzae* and 5 Bacillus strains isolated from traditional soy bean pastes were examined. The pH decreased gradually and contents of amino-type nitrogen increased during fermentation." Address: 1. Dep. of Biotechnology, College of Engineering and Bioproducts Research Center, Yonsei University, Korea.

1582. Cost, Bruce. 2000. Asian ingredients: A guide to foodstuffs of China, Japan, Korea, Thailand, and Vietnam. New York, NY: HarperCollins. xiv + 322 p. Illust. 24 cm. *
• ***Summary:*** The contents of this book is almost identical to that of the original 1988 edition. This is not a new edition.

1583. Delissen, Alain. 2000. Denied and besieged: the Japanese of Korea, 1876-1945. In: Robert Bickers and Christian Henriot, eds. 2000. New Frontiers: Imperialism's New Communities in East Asia, 1842-1953. Manchester (England) and New York: Manchester University Press. xiv + 290 p. See p. 125-45. [35 ref]
• ***Summary:*** Contents: Introduction ("Persistent denials of colonisation have characterized Japan's discourse regarding its sixty years' presence in Korea"). Birth and development of a community, 1876-1945. From migrants to colonists, 1876-1910 (The Nippon-Korean Treaty of Kanghwa {29 Feb. 1876} was a major breakthrough for the Japanese; it opened the port of Pusan to Japanese free trade and residence. "Still more important, however, were international treaties signed in the following two decades which opened up many more ports and cities–Wonsan {1881}, Inch'on

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{1883}, Mokp'o {1897}, Kunsan {1899}–and were all modelled on the Sino-Korean treaty of 1882. Patterns borrowed from Chinese `unequal treaties' were transferred to Korea to accommodate foreign communities and regulate their activities").

From colonists to gaichijin, 1910-1945 (Formal colonisation followed the annexation of Korea in 1910. It was accompanied by a shift in terms from colonist (*shokumin*) to "overseas Japanese" (*gaichijin*)). Territories within territories (The two main centers of Japanese population from 1915 to 1944 were Seoul and Pusan. See p. 138 for a map of the distribution of Japanese settlement in Korea, ca. 1940). Conclusion. Address: Assoc. Prof. of Korean History, Ecole des hautes études en sciences sociales.

1584. Kulp, Karel; Ponte, Joseph G., Jr. eds. 2000. Handbook of cereal science and technology. 2nd ed., revised and expanded. New York, NY: Marcel Dekker. ix + 790 p. Illust. Index. 29 cm. Series: Food Science and Technology, No. 99.
• ***Summary:*** Chapter 26, "Fermentation and microbiological processes in cereal foods," by Pierre Gélinas and Carole McKinnon (of Food Research and Development Centre, Agriculture and Agri-Food Canada, St. Hyacinthe, Quebec, Canada) (39 refs) (p. 741-54) contains a long table (p. 742-46) titled "List of foods prepared from fermented cereals." The four columns are: (1) Food name (synonym or related food). (2) Food type (characteristics). (3) Area (country or continent). (4) Main microorganisms.

Under "Soybeans" the following foods are listed: Chee-fan. Chinese yeast. Hama-natto. Kenima. Ketjap. Meitauza. Meju. Miso (chiang, doenjang, kochujang, tauco). Natto. Soy sauce (kanjang, kecap, kicap, shoyu, taosi [sic]). Sufu (tahuri, taokoan tao-hu-yi). Tairu (taire–fermented soybean milk, like yogurt, from Malaysia). Taotjo. Tempe (tempeh).

"Chee-fan" is described as "Curd-like" [fermented tofu] from China. Main microorganisms: *Mucor* spp., *Aspergillus glaucus.*

Note 1. Taokoan (listed under Sufu, above) is not a fermented food. It is the Filipino equivalent of Chinese *doufu-gan* or "pressed tofu." Filipino fermented tofu is *tahuri* (also spelled *tahuli*).

Table 2, "List of representative microorganisms associated with fermented cereal foods" (p. 74-48) contains two columns: (1) Type of microorganism (and within type, genus and species, listed alphabetically by genus). (2) Food produced.

Under "Bacteria" are: *Bacillus natto*–Hama-natto [sic], natto. *Lactobacillus delbrueckii*–Miso, soy sauce. *Pediococcus* spp.–Hamanatto. *Pediococcus halophilus*–Soy sauce. *Streptococcus* spp.–Hama-natto.

Under "Bacteria" are: *Actinomucor elegans*–Meitauza, sufu. *Aspergillus glaucus*–Chee-fan. *Aspergillus oryzae*–Hama-natto, ketjap, meju, miso, saké, soy sauce. *Monascus purpureus*–Anka (ang-kak, beni-koji, red rice), hong-ru (lao-hong). *Mucor* spp.–Chee-fan, ruhi, sufu. *Mucor hiemalis*–Sufu. *Rhizopus oligosporus*–Tempe.

Under "Yeasts" are: *Candida* spp.–Soy sauce. *Zygosaccharomyces rouxii*–Miso, soy sauce.

The section on "Major commercial fermentation processes" includes (p. 752-53) soy sauce (from wheat and soybeans) and miso (from rice and soybeans).

Note 2. Koji, the basis of soy sauce, miso, and saké fermentations, is not mentioned in either of the first two tables. However it is mentioned by name on p. 753. Address: 1. American Inst. of Baking; 2. Prof. Emeritus, Kansas State Univ. Both: Manhattan, Kansas.

1585. Kurlovich, B.S.; Rep'ev, S.I.; Petrova, M.V.; Buravtseva, T.V.; Kartuzova, L.T.; Voluzneva, T.A. 2000. The significance of Vavilov's scientific expeditions and ideas for development and use of legume genetic resources. *Plant Genetic Resources Newsletter* (*FAO/IBPGR*) No. 124. p. 23-32. [78 ref. Eng; fre; spa]
• ***Summary:*** This article is a summary of Vavilov's principal expeditions and their significance for scientific research and practice. "Nikolai I. Vavilov (1887-1943) is recognized as the foremost plant geographer, botanist, and geneticist of contemporary times." He "was the first to recognize the necessity for intensive plant collecting and preservation." He was very interested in the sites of ancient agricultural civilizations and of mountainous regions. In 1929 he organized an expedition to China, Japan, and Korea. After these expeditions, wild and cultivated soybean species were added to his collection. However the principal legumes he collected were mung beans, chickpeas, lentils, peas, and lupins.

His main contributions to the theory of plant introduction were: Centers of origin and diversity, law of homologous series, differential systematic- geographical methods, and geographical and ecological differentiation. The latter concept has enabled scientists from VIR (N.I. Vavilov Inst. of Plant Industry–St. Petersburg, Russia) to develop interspecific classifications for almost all leguminous crops, including soya bean (Korsakov 1971; Teplyakova 1997). Korsakov has also clarified the centers of origin of various soya bean species.

Presently the VIR germplasm collection has 43,000 accessions belonging to 15 genera and 160 species of the Fabaceae including soya beans.

A photo shows: (1) N.I. Vavilov and his wife, E.I. Barulina, in 1926, before the expedition to the Mediterranean. Address: N.I. Vavilov Inst. of Plant Industry (VIR), B. Morskaya str. 44, St. Petersburg 190000, Russia.

1586. Bladholm, Linda. 2001. Seoul food: pickled cabbage and other Korean specialties are always on the shelves at Won Wang's Oriental Grocery in Hollywood. *Miami Herald* (*The*) (*Florida*). March 25. p. 1266 (4).

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• ***Summary:*** Many comforting meals start with *naengmyun*–long, pale brown buckwheat noodles. They can be cooked "and chilled for salads or added to soups based on *denjang* (fermented soy bean paste) and *gochu jang* (not fermented chili paste), both sold in tubs and jars." Address: Ethnic explorer.

1587. Nielsen (A.C.) (IRI). 2001. Nielsen data on tofu in supermarkets, 52 weeks ending May 19, 2001. Chicago, Illinois. 8 p.
• ***Summary:*** Total selected tofu products: $46.214 million. Total units sold: 27.690 million.

Note: We find it very hard to interpret the data in this table. How is it sorted? How does one find or calculate the total tofu sales of a particular company? For some companies (Azumaya) this is clear but for others (Hinoichi) it is not. For those that are clear (in descending order by total tofu sales):

Nasoya $16,016,000. Mori-Nu $8,187,000. Azumaya $6,760,000. Hinoichi $4,164,949. White Wave $1,459,000. Wildwood Natural Foods $881,000. Marjon $877,000. The Soy Deli (Quong Hop) $830,487. Frieda's Finest $824,000 + $209,046. Denver Tofu $551,000. House Tofu $489,000. Kikkoman $393,000. Sun Luck $338,439. LEASA $330,000. Happy Tofu $271,000 + $111,468. Melissa's $245,000. Pacific Tofu $222,000. Soy Shop $213,900. Pulmuone $199,000. Mu-Tofu $181,000 Quong Hop & Co. $161,000. Island Spring $154,000. Surata Soyfoods $125,151. Farm Soy Dairy $108,000. Ctl Br. $107,000. Bountiful Bean $92,100. Vitasoy $89,871. Pacific Soy $81,100. Stow Mills $78,526. Banyan Tofu $77,600. Wo Chong $73,189. Harvest Light $70,000. Golden Gate $64,700. Cleveland Tofu $58,200. Panda Farms $54,000. Sacramento Tofu $52,900. China Rose $47,400. Fuji $47,000. Midwest Harvest, $44,000. Fresh Tofu Inc. $39,100. Furama $38,800. Spring Creek $24,400. Calco $7,700. Address: Chicago, Illinois.

1588. SPINS. 2001. SPINscan data on tofu in the natural / health food market, 12 months ending April 2001. San Francisco, California. 32 p.
• ***Summary:*** (1) Top ten brands–Natural products supermarkets. Tofu–Ranked by dollar sales. Total US. 1. White Wave ($6.7 million). 2, Nasoya, 3. Wildwood Natural Foods. 4. Mori-Nu (Morinaga). 5. Soy Deli (Quong Hop). 6. Smoke. 7. Soy Boy (Northern Soy). 8. Dae Han. 9. Tree of Life. 10. Island Spring ($421,642). Note: The top ten tofu brands have total annual sales of $22.76 million.

(2) Top ten items–Natural products supermarkets. Tofu–ranked by dollar sales. Total US. 1. Nasoya tofu extra-firm organic 16 oz. ($1.96 million). 2. White Wave Tidal Wave tofu organic 16 oz. 3. Nasoya tofu firm organic 16 oz. 4. White Wave baked tofu Italian organic 8 oz. 5. White Wave baked tofu Sesame Peanut Thai Style organic 8 oz. 6. White Wave baked tofu Oriental Style organic 8 oz. 7. Wildwood tofu organic 20 oz. 8. Mori-Nu Tofu Lite Extra Firm 12.3 oz. 9. White Wave tofu WP hard organic 16 oz. 10. Mori-Nu Tofu Lite Firm 12.3 oz. ($531,257).

(3) Dollar share by subcategory. Tofu–Natural products supermarkets. Total US. Unseasoned tofu: 62.4%. Seasoned tofu 37.6%. Seasoned tofu has grown by 6.3% over the past year compared with the previous year; unseasoned has grown by 1.5%.

Seasoned tofu subcategory–12 months ending April 2001.

(4) Top ten brands–Natural products supermarkets. Seasoned tofu–Ranked by dollar sales. Total US. 1. White Wave ($3.878 million). 2. Wildwood Natural Foods, Inc. 3. Soy Deli. 4. Smoke. 5. Soy Boy. 6. Tree of Life. 7. Small Planet. 8. Sunergia. 9. Dae Han. 10. Nasoya.

Unseasoned tofu subcategory–12 months ending April 2001.

(6) Top ten brands–Natural products supermarkets. Unseasoned tofu–Ranked by dollar sales. Total US. 1. Nasoya ($4.77 million). 2. White Wave. 3. Mori-Nu. 4. Wildwood Natural Foods. 5. Soy Deli. 6. Island Spring. 7. Dae Han. 8. Hinoichi. 9. Spring Creek. 10. Pulmuone.

(7) Brand within total tofu category rank. Total US projected data. 1. White Wave ($6.69 million). 2. Nasoya. 3. Wildwood Natural Foods. 4. Mori-Nu. 5. Soy Deli. 6. Smoke. 7. Soy Boy. 8. Dae Han. 9. Tree of Life. 10. Island Spring. 11. Hinoichi. 12. Spring Creek. 13. Small Planet. 14. Pulmuone. 15. Soy Power. 16. San Diego Soy Dairy. 17. Fresh Tofu. 18. Rosewood. 19. Sunergia. 20. Surata Soyfoods. 21. Ota. 22. Denver Tofu. 23. Central Soy Foods. 24. Jack and the Beanstalk. Address: San Francisco, California.

1589. Bernard, Richard L. 2001. Breeding vegetable soybeans in the Midwest. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 21.
• ***Summary:*** "In recent years there has been a great deal of publicity on human nutritional and health value of soybeans, but this has resulted mostly in emphasis on consumption of soy products including traditional East Asian foods such as tofu and soy milk and modern products such as protein-enriched pastries and imitation meats with little recognition of whole soybeans as a potential food. The common attitude in the Midwest, the major soybean producing area in the world, is that soybeans are not suitable for eating–due to bad taste, anti-nutritional factors, or perhaps just tradition.

"Nevertheless there is a long history of trying to promote soybeans as a vegetable crop in this country. A number of large-seeded Japanese and Korean varieties along with a few from China were renamed and released in this country during the 1930's and 1940's and promoted for growing in the vegetable garden. Fifty of these are maintained in the USDA germplasm collection. Some of these were picked up by commercial vegetable seed companies, listed in their

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catalogs, and widely distributed, but vegetable soybeans remained largely unknown to the American public."

Fifty large-seeded vegetable type soybeans, mostly from Japan and Korea, are maintained in the USDA germplasm collection at the University of Illinois. When these vegetable cultivars are grown in the Midwest, they are more subject to our disease and insect pests, and to drought stress and shattering at maturity. Address: Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois 61801.

1590. Choi, Y.H.; Choi, B.T.; Lee, W.H.; Rhee, S.H.; Park, K.Y. 2001. Doenjang hexane fraction-induced G1 arrest is associated with the inhibition of pRB phosphorylation and induction of Cdk inhibitor p21 in human breast carcinoma MCF-7 cells. *Oncology Reports* 8(5):1091-96. Aug. *

1591. Lee, Yeong Ho; Ryu, Y.H.; Kim, W.; Kim, S.D.; Hwang, Y; Chung, K. 2001. Selection for vegetable soybean and development of its production techniques in Korea. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 79-82. [1 ref]
• ***Summary:*** Contents: Introduction and methods. Results: Selection for vegetable soybean, development of production techniques for vegetable soybean. Summary. Address: 1. yhlee13@rda.go.kr 2. ryuyh@rda.go.kr 3. kimwhsoy@rda.go.kr 4. kim2101@rda.go.kr 1-4: National Crop Experiment Station, RDA, Suwon 441-857, Korea 5. hwangyh@knu.ac.kr 6. soychung@anseo.dankook.ac.kr.

1592. *Ontario Soybean Growers Newsletter.* 2001. Market scan [Total soybean imports and total foods soybean imports to selected Asian countries]. Aug. p. 12.
• ***Summary:*** A table shows total soybean imports / total foods soybean imports to selected Asian countries. All figures are in tonnes (metric tons):

Japan 4,800,000 / 980,000.
Hong Kong 35,000 / 35,000.
Singapore 26,000 / 26,000.
Malaysia 200,000 / 70,000.
Taiwan 2,400,000 / 350,000.
Indonesia 600,000 / 350,000.
South Korea 1,200,000 / 200,000.
Philippines: 100,000 / 28,000.
Thailand 900,000 / 100,000.
Total for these countries: 10,261,000 / 2,139,000.

"Canada has been exporting soybeans to Asia for 30 years."

Source: Statistics Canada, Cereal and Oilseeds Review Series.

Note: Statistics for China and Vietnam are not available. Address: Chatham, ONT, Canada N7M 5L8.

1593. Park, Ho Ki; Kim, K.H.; Oh, Y.J.; Kim, S.C. 2001. Selection of vegetable soybean and development of year-round production system in Korea. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 143-146. [8 ref]
• ***Summary:*** Contents: Introduction and methods: Selection of vegetable soybean for early seasonal cultivation, development of year-round production system in vegetable soybean. Results: Selection of vegetable soybean for early transplanting cultivation, development of year-round production system in vegetable soybean. Summary. Address: National Honam Agric. Exp. Station RDA, 381 Songhak-Dong, Iksan 570-080, Republic of Korea. E-mail: parkhk@rda.go.kr.

1594. Shanmugasundaram, S. 2001. Global extension and diversification of fresh and frozen vegetable soybean. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 161-165. [9 ref]
• ***Summary:*** Contents: Introduction. Extension of vegetable soybean. Diversification of fresh and frozen vegetable soybean. Conclusions. Acknowledgement.

World maps show: (1) Progress in evaluation and release of AVRDC vegetable soybean [varieties] from 1979 to 1983. Countries include England, France, Niger, Nigeria, Pakistan, India, Thailand, Malaysia, Indonesia, Philippines, Taiwan, Japan, and Korea. (2) AVRDC vegetable soybean evaluation, commercial production and export as of 2000. Symbols show: On-station tests, varieties released, commercial production, and exporting. [Note: The term "Vegetable soybean" here means whole, dry, vegetable-type soybean varieties, not green vegetable soybeans]. Countries include England, Germany, France, Italy, Ukraine, Ghana, Nigeria, Congo [formerly Zaire], Zambia, Namibia, Lesotho, Swaziland, Zimbabwe, Mauritius, Malawi, Tanzania, Kenya, Uganda, Saudi Arabia, Pakistan, Bhutan, Bangladesh, India, Nepal, Thailand, Cambodia, Sri Lanka, Malaysia, Singapore, Indonesia, Australia, Fiji, Solomon Islands, Papua New Guinea, Marshall Islands, Guam, Philippines, Laos, Vietnam, Taiwan, China, Korea, USA, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Ecuador, Argentina, Chile, Brazil, Suriname, Guyana, West Indies, Granada, St. Vincent, Honduras, and Belize.

Note: This is the earliest document seen (March 2019) concerning soybeans in Namibia. This document contains the earliest date seen for soybeans in Namibia (2001). Address: Plant Breeder and Director, Program I, Asian Vegetable Research and Development Center, P.O. Box 42, Shanhua, Tainan 741, Taiwan, ROC. Email: sundar@netra.avrdc.org.tw.

1595. Shurtleff, William; Aoyagi, Akiko. 2001. The book of miso: Savory, high-protein seasoning. 2nd ed. Revised.

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Berkeley, California: Ten Speed Press. 278 p. Illust. by Akiko Aoyagi Shurtleff. Index. Aug. 28 cm. [223 ref]
• ***Summary:*** This revision has completely new front and back covers, designed and illustrated by Akiko. It contains a completely new "Appendix D–Miso Manufacturers in the West" (p. 255, updated to 10 May 2001). The page "About the Authors" (autobiographical) has been updated, and the original photographs have been replaced with more recent ones–reflecting the fact that Bill and Akiko separated in Nov. 1993 and their marriage ended in May 1995.

The last page, "Soyfoods Center," has been updated.

The inside back cover has been updated, and now includes current information about: (1) *Miso Production*, a book published by Soyfoods Center about how to start and run a company making miso on any of various scales and budgets. (2) *Miso and Soybean Chiang: Bibliography and Sourcebook*, published by Soyfoods Center. (3) SoyaScan, the unique computerized database produced by Soyfoods Center. This database now contains more than 62,000 records from 1100 B.C. to the present, and more than 76% of all records have a summary / abstract averaging 146 words in length. A description of the four different types of records (published documents, commercial soy products, original interviews and overviews, and unpublished archival documents), and the number of each type, is given.

The title page, copyright page, and table of contents have been redesigned and updated to give the book a much more contemporary look. Other small changes have been made throughout the book. Still contains 130 vegetarian recipes–both western and Indonesian.

Ten Speed Press gave this book a new ISBN: 1-58008-336-6. Yet despite the many changes described above, the authors preferred not to have this called a "new edition" or "revised edition." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1596. Brooks, Patricia. 2001. A Japanese cuisine with style & spark. *New York Times.* Oct. 28. p. CT16.
• ***Summary:*** A restaurant review of Yooki Yama ("snow-capped mountain"), 1018 Main St., Branford, Connecticut. The "silk tofu casserole, a Korean dish whose contents were steamy hot and included "custard-soft bean curd cakes" which "floated in a batch of red-hot pepper sauce that made our eyes smart. The tofu was like a sponge, absorbing all the fire of the peppery broth. Wow!" Yooki Yama's owner is Japanese Korean, which explains the spicy hot dishes on the menu.

One of the "recommended dishes" is "Age-dashi tofu" [age-dashi-dofu]–"deep-fried soy bean cakes [tofu] served with a perky ginger scallion dip."

Note: Branford is a seaside town with many lively restaurants just east of New Haven, Connecticut, midway between New York City and Providence, Rhode Island.

1597. Ashiuchi, M.; Kamei, T.; Baek, D.H.; Shin, S.Y.; Sung, M.H.; Soda, K.; Yagi, T.; Misono, H. 2001. Isolation of *Bacillus subtilis* (chungkookjang), a poly-gamma-glutamate producer with high genetic competence. *Applied Microbiology and Biotechnology* 57(5-6):764-69. Dec. [Eng]*
• ***Summary:*** Chungkookjang (also spelled chung-kook-jang) is a traditional Korean seasoning, fermented with *Bacillus subtilis* [the natto bacterium]. A bacterium with high poly-gamma-glutamate (PGA) productivity was isolated from this fermented food. Address: Dep. of Bioresources Science, Kochi Univ., Nankoku, Japan.

1598. Choung, Myoung-Gun; Baek, I.Y.; Kang, S.T.; Han, W.Y.; Shin, D.C.; Moon, H.P.; Kang, K.H. 2001. Isolation and determination of anthocyanins in seed coats of black soybean (*Glycine max* (L.) Merr.). *J. of Agricultural and Food Chemistry* 49(12):5848-51. Dec. [25 ref]
• ***Summary:*** The black pigmentation is due to accumulation of anthocyanins in the soybean's seed coat. "The results obtained in this study imply that the seed coats of black soybean can be used as a good source for cyanidin-3-glucoside and delphinidin-3-glucoside." Address: National Yeongnam Agric. Exp. Station, Rural Development Administration, 1085, Naidong, Milyang, 627-803, Gyeongnam, Republic of Korea (South Korea).

1599. Bae, T.J.; Kim, K.E.; Choi, O.S.; Kim, H.S.; Kang, D.S.; Kim, K.S. 2001. [Changes of enzyme activities in Kochujang added sea tangle powder during fermentation]. *Korean J. of Life Sciences* 11:393-99. *

1600. Choung, M.G.; Baek, I.Y.; Kang, S.T.; Han, W.Y.; Shin, D.C.; Moon, H.P.; et al. 2001. Isolation and determination of anthocyanins in seed coats of black soybean (*Glycine max* (L.) Merr.). *J. of Agricultural and Food Chemistry* 49:5848-51. *
• ***Summary:*** Anthocyanins are especially abundant in the seed coat of black soybeans.

1601. Jeong, Do-Youn; Song, Mi-Ran; Shin, Dong-Hwa. 2001. [Prevention of swelling and quality improvement of Sunchang traditional kochujang by natural additives]. *J. of the Korean Society of Food Science and Nutrition* 30(4):605-10. [29 ref. Kor; eng]
• ***Summary:*** "To suppress the gas forming caused by some yeast in the pack of traditional kochujang prepared at Sunchang area, which is the most severe problem during distribution of commercial products, mustard or horseradish powder as natural preservatives was mixed to the ingredients of kochujang and left for fermentation in clay pot as commercial scale for 180 day. The composition changes including quality and gas forming in the kochujang containing those additives were monitored

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physicochemically and organoleptically... The overall quality of the kochujang containing 0.6% horseradish was superior to that of the other treatments." Address: Sunchang County, Chollabuk-do 595-800, Korea.

1602. Kwon, Tai-wan; Kwon, S.H.; Lee, C.H.; Hong, E.H. 2001. Kukjekyumoeu kongbakmulkwan konripe kwanhan tadangsung josayeonku [Studies on the justification for constructing a soybean museum in Korea]. *Korea Soybean Digest* (*Hankuk Kong Yeonguhoegi*) 18(1):1-25. [39 ref. Kor]*

• ***Summary:*** Dr. Cherl-Ho Lee (2016, p. 9) states: Botanical and historical research indicates that it was the region covering South Manchuria and the Korean Peninsula where soybeans originated with the most abundant wild varieties.

The Korean soybean museum opened in April 2015. It was paid for by The city of Youngju, Kyungsang bukdo, which paid ca. 6 billion won (US $5 million). The basic message of the museum is that soybean cultivation originated on the Korean Peninsula–not in Manchuria or in China.

In the book *Soybean Storytelling* (2017, Foreword) we read: "The cultivation and usage of soybeans began in Korea, but because most ancient histories of Korea are intermingled with Chinese culture, this fact has not been properly disseminated to the world. Dr. Kwon Tai-wan, the founding director of the Korea Food Research Institute, formed the Committee for the Establishment of a Korean Soybean Museum in 2001 in order to begin the work on a museum that would inform visitors of the true history and use of soybeans. Below is the letter of intent penned at the Promotion Committee's inception:

"Purpose of Promoting the Establishment of a Korean Soybean Museum: "We wish to illuminate the research we have done, which indicates that in the history of humanity, Koreans were the first to plant soybeans and use them for food. Soybeans were used as food in Northeast Asia more than 3000 years ago; from the 3rd century BC soybeans were disseminated to the southern region of China, Southeast Asia, and Japan; they were introduced to Europe in the 18th century; and during World War II they were cultivated as a cash crop in the United States. Today soybean cultivation has spread all around the world:

"It is known that soybeans supplemented with rice comprise a nutritionally complete meal but recently it has come to light that soybeans also help prevent and cure cancer, heart disease, and other adult-onset diseases. Some cultures have already been supporting their health by consuming soybeans as a staple in their diets, and now in the West, where soybeans have long been used for oil or fodder, the cytological value of soybeans is being revealed; thus quickly ushering in an era of dietary soybean consumption. Due to the spread of cultivation and the variety of its uses, the soybean, though it originated in Northeast Asia, has now become a global-crop as well as a food item for people all around the world.

"Soybeans, which helped sustain the health of our ancestors where they lived on the Korean Peninsula and in Manchuria, as well as that of their descendants through a long passage of time, have now been introduced on the world stage. The 21st century can be called the culture century, or an era in which culture is judged to be the conscience and capacity of nations. Many museums have been established here and there on this earth, each a symbol of its given culture, and yet nowhere is there a museum about soybeans. Is it not appropriate that a museum specializing in soybeans should be established in the origin nation of soybeans? By establishing a museum on an international scale that focuses on soybean culture and utilization techniques, we hope to broadly inform the global village of soybean culture and development, and by so doing contribute to humanity's health.

"Going beyond simply amassing and exhibiting artifacts relating to soybean culture from days long past, research and analysis will be done on global data and literature relating to soybeans, thus creating a forward-looking, creative museum that provides informational exchange on an international scale and focuses on research education. There will be an all-weather greenhouse, a soybean products manufacturing lab, and even a soybean specialty café, such that everything about soybeans can be seen, learned, pondered, eaten, and experienced all in one place. In this way the museum will be self-supporting in its operations and development.

"From this viewpoint we wish to establish a soybean museum that will revive our culture of the past thousand years and thereby bequeath the wise and creative spirit of our ancestors to future generations in the 2000s. We will marshal all of our abilities for the work at hand

"September 2001

"Committee for the Establishment of a Korean Soybean Museum Promoters: Kwon Tai-wan, Kim Seok-dong, Kim Seok-min, Kim Jun-young, Ryu Yong-hwan, Lee Cherl-ho, Lee Young-tack, Chang Hak-gil; Jeong Jang-seop, Jung Chai-won, Cho Se-young, Hong Eun-hi

"With the support of research funds from the Daesan Agricultural Foundation in 1998, this work began with a study written by Kwon Tai-wan, Kwon Sin-han, Lee Cherl-ho, and Hong Eun-hi, "The feasibility study on the establishment of a World Soybean Center," which began an all-inclusive research project into the history and scientific development of soybeans.

"In 2005 the committee, which included most of the major soybean specialists in the country, published the book Soybeans (15 chapters, 794 pages, published by Korea University Press)..."

1603. Lim, Sangbin; Kim, Bong-O; Kim, Soo-Hyun; Mok, Chulkyoon; Park, Young-Seo. 2001. [Quality changes during storage of kochujang treated with heat and high hydrostatic

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pressure]. *J. of the Korean Society of Food Science and Nutrition* 30(4):611-16. [24 ref. Kor; eng]
• ***Summary:*** "Effects of high pressure and thermal pasteurization on the survival of microorganisms and quality changes of kochujang during 120 days of storage at 37ºC were investigated. Viable cell counts were 1.43 x 106 CFU/g in heat-treated, and 1.56 x 103 CFU/g in pressure-treated, and decreased up to 3 log cycle, compared with 3.78 x 106 CFU/g in the untreated kochujang."

Note: CFU = Colony Forming Units. Address: Dep. of Food Science and Engineering, Cheju National Univ., Jeju 690-756, Korea.

1604. Shon, M.Y.; Kwon, S.H.; Sung, C.K.; Lee, S.W.; Park, S.K. 2001. Isolation and microbiological characteristics of *Bacillus megaterium* SMY-212 for preparation of black bean Chungkugjang. *J. of Life Sciences* 11:304-10. [Kor; eng]*

1605. Tamang, Jyoti Prakash. 2001. Kinema. *Food Culture* (*Kikkoman Inst. for International Food Culture, Noda, Japan*) No. 3. p. 11-14. http://kiifc.kikkoman.co.jp. [7 ref. Eng]
• ***Summary:*** Contents: Introduction. Hypothesis of the origin of kinema. Methods of preparation. Kinema dishes. Socio-economic factors. Microbiology and nutritive value of kinema. Transition in food culture.

"The common word kinema is derived from 'kinambaa' of the Limboo dialect (Limboo, being one of the major ethnic communities of Nepalis), 'ki' means fermented and 'nambaa' means flavor. The kingdom of 'Limbuwan' (presently the eastern Nepal districts of Therathum, Taplejung, Panchthar, Dhankuta, and Ilam) was established by the Limboo earlier than the seventh century and remained independent till the unification of Nepal in the seventeenth century. Though there is no historical document on the origin of kinema, it is certain that among the Nepalis, the Limboo started production and consumption of this unique fermented flavorful soybean food."

A flow chart shows the traditional method of kinema production practiced in Sikkim–starting with 100 gm dry soybeans. Clean and wash. Soak in water overnight. Drain excess water. Add clean water. Boil. Drain excess water. Crack lightly in a wooden mortar with a wooden pestle. Sprinkle with wood ash (up to 1% by weight). Wrap in fern leaves and keep in a bamboo basket, covered. Allow to ferment at 25-45ºC for 2-3 days. Result: About 230 gm kinema.

Photos show: (1) A plate of kinema. (2) A woman pounding cooked soybeans with a heavy, 4 foot long pestle in a large wooden mortar (14 inches wide by 18 inches high). (3) The woman adding firewood ash to the pounded soybeans in the mortar. (4) The cooked soybean grits are placed in the leaves of a local fern (*Glaphylopteriopsis erubescens*) prior to wrapping and fermentation. (5) Wrapped in fern leaves, the grits are kept in a bamboo basket, covered with a jute bag. (6) Kinema curry served in a side dish next to a plate of the ingredients.

(7) Jyoti Prakash Tamang, Ph.D., born in Darjeeling, India, in 1961. A pioneer in the study of varieties of kinema / natto in the states of Northeast India and the southern Himalayan foothills.

The most common recipe for kinema curry is given. Heat vegetable oil in a frying pan and add 1 chopped onion and fry until it becomes tender. Add 1 sliced tomato and ¼ tablespoon turmeric powder; fry for two minutes. Add 250 gm fresh kinema, 1 teaspoon salt, and 3 sliced green chilies; fry for three to five minutes. Pour in a little water to make a thick curry, and cook for 5-7 minutes more. Kinema curry is now ready for serving with boiled rice.

A map shows kinema diversity in the Eastern Himalayan regions. It is called "kinema in eastern Nepal, the Darjeeling hills, Sikkim and Bhutan, aakhuni in Nagaland, hawaijar in Manipur, turangbai in Meghalaya, and bekanthu in Mizoram... These fermented soybean foods are similar to the natto of Japan, chungkok-jang of Korea, thua-nao of northern Thailand and pe-poke of Myanmar."

Note 1. This is the earliest document seen (Jan. 2012) that mentions "aakkhuni," a close relative of Nepalese kinema and Japanese natto.

Note 2. This is the earliest document seen (Jan. 2012) that mentions "bekanthu," a close relative of Nepalese kinema and Japanese natto.

Note 3. This is the earliest document seen (Jan. 2012) that mentions "turangbai," a close relative of Nepalese kinema and Japanese natto from Meghalaya.

Note 4. This is the earliest document seen (Jan. 2012) that uses the alternative spelling "pe-poke" to refer to pepok, a close relative of Nepalese kinema and Japanese natto from Myanmar.

Note 5. This is the earliest English-language document seen (Jan. 2012) that uses the alternative spelling "chungkok-jang" to refer to Korean natto. Address: Ph.D., Professor, Sikkim Government College / Director, Darjeeling Centre for Traditional Food Research.

1606. Tamang, Jyoti Prakash. 2001. Food culture in the Eastern Himalayas. *Himalayan and Central Asian Studies: J. of Himalayan Research and Cultural Foundation* (*New Delhi*) 5(3-4):107-18. [6 ref]
• ***Summary:*** Various fermented soybean foods are made and consumed in the eastern Himalayas and its adjoining foothills. They include kinema, which is prepared in eastern Nepal, the Darjeeling hills, Sikkim, and Bhutan. Close relatives of kinema are *aakhuni* in Nagaland, *hawaijar* in Manipur, *turangbai* in Meghalaya, *bekanthu* in Mizoram, and *pe-poke* in Myanmar.

Table 1, "Ethnic fermented foods of the Eastern Himalayas and its adjoining foot-hills," gives details about

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each of these foods: Food name, substrate, nature and use, region of use.

Table 2 shows that a non-fermented food consumed by Nepalis is *Vatamas ko achar,* a seasoning whose main ingredient is ground roasted soybeans.

Consumption of fermented soyfoods is uncommon in the Western and Hindu-Kush Himalayas, and even in other parts of India. These fermented soyfoods are similar to *natto* of Japan, *thua-nao* of northern Thailand, and *chungkok-jang* of Korea. Address: Food Microbiology Lab., Dep. of Botany, Sikkim Government College, Gangtok, Sikkim 737 102, India.

1607. Hart, Dennis. 2001. From tradition to consumption: Construction of a capitalist culture in South Korea. Seoul, South Korea: Jimoondang Publishing Company. xx + 200 p. Index. 23 cm. Series: Korean Studies Dissertation Series, No. 2. [380* ref]

• ***Summary:*** A profound and very insightful book. Chapter 5 (p. 83-114) is "Creating the Korean housewife." For centuries, the making and storage of foods [such as fermented soyfoods (*jang*)] have been a key responsibility of women, who were completely in charge of the preparation and cooking of food. Through this complex and demanding work she gained appreciation and status in the home. And her foods were unique, with a unique taste, which was the taste of her household and family.

Now all that has changed; she has become a consumer in a convenient, shiny modern kitchen where industrialized foods can be prepared by the flick of a switch. What will replace the old ways? How will she find real satisfaction and meaning? As the divorce rate rises and urbanization increases, what bonds will hold families together? (p. 98-103). Address: Korea.

1608. Hepinstall, Hi So Shin. 2001. Growing up in a Korean kitchen: A cookbook. Berkeley, California: Ten Speed Press. 254 p. Illust. Index. 26 cm.

• ***Summary:*** The best book seen to date for information and recipes on soyfoods in Korea. The author grew up in Cheongju, South Korea, in her ancestral home. Families made sauces in earthenware crocks (p. 7). A list of ingredients with descriptions includes: Bean curd (Tubu [tofu]). Beans, dried (K'ong, incl. yellow and black soybeans, mung beans and red [azuki] beans). Koch'ujang (Korean hot red pepper paste [with soybeans]). Kudzu (Ch'ik). Meju (Korean fermented soybean paste block [soybean koji]). Piji (Bean curd dregs [okara]). Red bean paste (P'at komul). Soy sauce (Kanjang). Soybean powder (K'ong karu; a yellow powder sold in 1-lb plastic bags). Soybean sprouts (K'ong namul). Toenjang (Korean fermented soybean paste).

Essential sauces and pastes: Recipe for: "Homemade soy sauce and fermented soybean paste: Kanjang and toenjang." It makes 10 gallons and takes about 2 months to prepare. Unusual ingredients include: 3 pieces oak wood charcoal, 1 gallon white grain syrup (choch'ung), 10 toasted jujubes, and 5 dried hot red peppers. For about 60 days, let the crock stand in the open without a lid; cover when it rains. At the end of 60 days the mash is filtered through a bamboo basket lined with a fine-mesh cloth into a crock to yield two products: The fermented soybean paste (toenjang) remains in the strainer, whereas the soy sauce filters through into the crock. Store the paste in a sterilized crock; sprinkle a thin layer of coarse salt on top. "Pour the soy sauce liquid into a caldron, bring to a boil, and allow to simmer over low heat until it is reduced to one-third of its original volume." Adjust saltiness. The paste and the sauce or now ready to be aged, but we are not told for how long.

Soy sauce at this stage (unaged) is called *ch'ongjang* (clear soy sauce) or *Choson* kanjang (Korean soy sauce). A plain and somewhat salty brown sauce, it is used mostly in base seasonings and clear soups. To make *chin kanjang,* a superior thin, syrupy, jet-black soy sauce, similar to the dark soy sauce sold in today's markets, submerge a large-mesh cloth pouch containing black soybeans, p'yogo mushrooms, and strips of kelp (*Miyok*) in the clear, unaged soy sauce and simmer over low heat for about an hour. The longer it is aged, the mellower it becomes, and the more intense the flavor.

Homemade hot red pepper paste (*Koch'ujang,* with 1 cup fine meju powder and ½ cup soy sauce). Instant fermented soybean paste (*Makjang;* uses 5 cups powdered meju and takes 10 days to mature). Vinegar soy sauce (*Ch'o kanjang*). T'ang soybean paste (*T'anggukjang;* "the best tasting soybean paste among all toenjang). Fermented soybean paste with garlic and bean curd (*Ssamjang;* "Probably the tastiest soybean paste made in the Korean kitchen," p. 32).

Main dishes: Five grain rice (*Ogkpap or Chapgokbap,* with ½ cup dried black soybeans, p. 41. Koreans traditionally eat this dish on the 15th day of the 1st month of the lunar year). Soybean sprouts with steamed rice (*K'ongnamulbap,* p. 44). Ceremonial soup (*T'ang,* with medium firm tofu, p. 62). Seaweed soup (*Miyokguk,* with tofu, p. 65). Kimchi soup (*Kimchiguk,* with tofu and soybean sprouts, p. 67). Soybean porridge (*K'ongjuk,* with 1 cup soybean powder, p. 78). Noodles in chilled soybean milk (*K'ong kuksu,* with 1 quart soy milk, p. 86). Stuffed dumplings (*Mandu,* with medium-firm tofu, p. 90-91). Soy sauce kimchi (*Chang kimchi,* p. 103).

Side dishes: Seasoned soybean sprouts (*K'ong namul,* p. 122, incl. Chilled soybean sprouts, and Soybean sprout soup). Sauteed cabbage kimchi with beancurd and pork (p. 130). Bean curd and vegetable stew with fermented soybean paste (*Tubu toenjang tchigae,* p. 138). Bean curd and vegetable hot pot (p. 152). Soybean pancakes (p. 163). Stuffed pan-fried bean curd (p. 167). Stuffed pan-fried

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p'yogo mushrooms (with bean curd, p. 168). Stuffed pan-fried peppers (with bean curd, p. 169).

More tofu recipes are on pages 170, 171, 172, 196-97, 199, 200, 204-05, 217. Many recipes call for kelp, kim (laver, nori) or seaweed (see index). Address: Washington, DC.

1609. Huang, Guiyou. ed. 2001. Asian American autobiographers: A bio-bibliographical critical sourcebook. Westport, Connecticut: Greenwood Press. xiii + 446 p. See p. 281-85. Index. 24 cm. [200+* ref]

• ***Summary:*** Pages 281-85: Contains an excellent biography of Ilhan New (1895-1971), by Seiwoong Oh. New was one of the two founders of La Choy Food Products, Inc. Born in Korea on 15 Jan. 1895, New was the eldest son of a moderately successful entrepreneur who eventually settled in Pyongyang, the present capital of North Korea, where New grew up, as he describes in his autobiography *When I Was a Boy in Korea.* Most of his childhood memories are from Pyongyang. The intended audience for the book was American children.

In Pyongyang, New's father started selling imported products and became interested in Western culture and religions; he was eventually baptized as a Christian. Inspired by what missionaries in Pyongyang told him about the West, New's father decided to send his son, now age 9, to live in a Presbyterian household in Kearney, Nebraska, and to receive an American education. During this time his name was accidentally changed to "Ilhan" from "Ilhyung." First in Kearney, then in Hastings, Nebraska, New attended high school, playing center on the football teams and debating on the debate team. In 1919 he graduated from the University of Michigan, with a B.A. degree, then worked for the Michigan Central Railway and General Electric in New York. In 1922, with a friend from the University of Michigan, Wally Smith, he co-founded La Choy Food Products, Inc. in Detroit. The business grew steadily. In 1925 New married Mary Woo, an American-born Chinese, whom he met at the University of Michigan and who later became a physician. In 1926 he and his new wife returned to Korea (which had been ruled and occupied by Japan since 1910), where (like his father) he opened an import company, first in dyeing materials then later in pharmaceutical products. While in Korea, he was asked by Lothrop, Lee and Shepard Publishing Co. to write a book about his childhood. He consented and in 1928 his book, *When I was a Boy in Korea,* was published in English. This book later came to be widely recognized as the earliest literary work in English by a Korean American. Yet it was not an autobiography, and contains "little information about the author's life except bits and pieces to be gleaned from his passing remarks."

Note: In 1930 New left La Choy Food Products, probably selling his share to his partner and friend, Wally Smith.

In Korea, New's import business grew rapidly. But in 1936, during one of his trips abroad, he decided to stay in California to join the Korean movement for independence from Japan and to study for an M.B.A. [Master of Business Administration] degree from the University of Southern California.

After World War II, in 1946, New returned briefly to Korea, but came back to the USA to study law at Stanford University (in California) and reconsider his future plans. In 1953 he returned to Korea, where his pharmaceutical company had grown steadily in his absence. New resumed his position as chairman and worked to expand the business. By the 1970s his firm's net profit ranked among the top ten in Korea–a remarkable achievement. He had earned a reputation in Korea as a model entrepreneur, who supplied the people with products they strongly wanted and who returned his profits to the public, "as a pioneer in applying modern management science to his business, and as a philanthropist who, among others, founded and fully financed New Han Engineering High School, offering full scholarship for all students.

He died in 1971 at about age 76. In his will, de donated all his money to the Korea Social and Educational Trust Fund, except for $10,000 to be given to his granddaughter for her college tuition. His museum, located in Seoul, houses his personal correspondence, personal possessions, and other historical records of his life.

The bibliography for this chapter (p. 285) cites 5 studies of Ilhan New and his book, from 1929 to 1999. Address: Oh: PhD, English Dep., Rider Univ., Lawrenceville, New Jersey.

1610. Kang, In-hui. 2001. Kankoku shoku bunkashi: genshi kara gendai made [History of Korean food culture: from the past to the present]. Tokyo: Fujiwara Shoten. [Jap]*

1611. Lee, Cherl-Ho. 2001. Fermentation technology in Korea. Seoul, Korea: Korea University Press. iii + 330 p. Illust. Index. 26 cm. [Eng]

• ***Summary:*** Korea has a long history of eating fermented soyfoods. Early documents indicate that the cultivation of soybeans originated in Manchuria, which was part of Korea in ancient times.

Contents: 1. Evolution of Korean Dietary Culture. 2. Primitive Pottery Age (B.C. 8000 to about 3000)–the era of fermentation experiments. 3. History of Cereal Fermentation Technology. 4. Korea, the land of soybean fermentation: the origin of soybean as food, history of soybean fermentation, *meju* preparation–the fermentation starter, Korean soysauce [kanjang, made at home] vs. Japanese soysauce [shoyu, made industrially], *chongkukjang:* a fermented soybean paste as an instant military paste of the old days, *kochujang:* a wonderful harmony of hot, sweet, meaty and salty tastes.

5. Effect of soybean fermentation on the protein quality. 6. Kimchi, Korean fermented vegetable food. 7. Fish

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fermentation technology. 8. Lactic acid fermented foods and their benefit in Asia. 9. Present status and prospect of Korean fermentation industry. Appendix: Collection of research paper abstracts in Korea–I. Alcoholic fermentation. II. Soybean fermentation. III. Kimchi fermentation. IV. Fish Fermentation. V. Other fermentations. Authors index.

Page 79. The earliest known document that mentions *kochujang* (fermented red pepper paste) is the *Chungbosanlimkyungje* written by Chung-Im in 1765. It describes several varieties of fermented soybean products including *jeupjang* and *chongkukjang* besides *kochujang* and their processing methods practiced in Korea at that time. date from the 2nd half of the 17th century.

Shell mounds along the coastline of the Korean Peninsula and the Japanese archipelago show that the dietary habits of the people changed from less hunting and more gathering at the beginning of the Holocene period (ca. 10,000 BCE) as the dwellings moved to the coastline.

Interestingly the increased consumption of marine products coincided with the invention of primitive pottery. Around the late Paleolithic, by 6000 BCE, the use of *Jeulmun* (Korean) or *Jomon* (Japanese) pottery has spread over the Korean Peninsula and the Japanese Archipelago. Archaeologists call this period the *Jeulmun* period in the Korean Peninsula and the *Jomon* period in the Japanese archipelago (from ca. 8000 BCE). Agriculture had not yet begun.

Page 6: Table 1-1 "Chronology of early Korean culture" includes the following:

ca. 2,333-108 B.C. Traditional date of the founding of the Kingdom of Chosum by Tangun.

ca. 1,200 B.C. Beginning of the Bronze Age, black pottery, Megalithic culture, dolmens, menhirs, agricultural tools.

ca. 1,122 B.C. The establishment of Kija Chosun.

ca. 800-700 B.C. The rise of the Chin state and the Han tribes in the south [of Korea].

ca. 500 B.C. The beginning of the Iron Age.

ca. 194 B.C. The rise of Wiman Chosun in the north and the three federations of the Han tribes in the south.

109-108 B.C. Invasion of Korea by the Han dynasty of China, the fall of Wiman Chosun.

57 B.C. to 699 A.D. The Three Kingdoms period.

57 B.C. The founding of the state of Saro (later Silla).

ca. 37 B.C. The emergence of Koguryo.

ca. 18 B.C. The emergence of Paekche.

372 A.D. Official adoption of Buddhism and the establishment of a school of Confucian studies in Koguryo

384 A.D. Official adoption of Buddhism in Paekche.

527 Official adoption of Buddhism in Silla.

663 The destruction of Paekche by Silla.

668 The destruction of Koguryo by Silla.

668-918 Unified Korea of Silla.

About the author (inside front dust jacket): Cherl-Ho Lee earned his PhD in Food Science at the Royal Veterinary and Agricultural University, Denmark. He was a postdoctorate research associate at the Massachusetts Institute of Technology in the USA. His previous works include:

1. Extrusion Technology I and I (1987, 1988, in Korean).
2. Fish Fermentation Technology (UNU Press, 1993).
3. Lactic Acid Fermentation of Non-dairy Food and Beverages (1994, in Korean).
4. Food Evaluation and Quality Control (1999, in Korean).
5. Introduction to Korean Food Science (Korea University Press, 2003). Address: Prof. of Food Engineering, Graduate School of Biotechnology, CAFST, Korea Univ., Seoul, 136-701, Korea.

1612. Namkoong, Joan. 2001. Go home, cook rice: A guide to buying and cooking the fresh foods of Hawai'i. Honolulu, Hawaii: Namkoong Publishing. 104 p. Illust. (color photos by Rae Huo). Index. 28 cm. [28 ref]

• ***Summary:*** "A collection of food stories that appeared in the *Honolulu Advertiser* from 1994 to 2001 and information about food products." "Guide to buying and cooking the fresh foods of Hawai'i" (from the publisher).

The Foreword begins: "'Go home, cook rice' is what we say at the end of the day when we're heading home;..."

The section titled "Soy" (p. 67-71) begins with brief definitions of tofu, fresh soybeans [edamame], soy sprouts, miso, natto, and "fermented black beans." Then come recipes: Basic miso sauce (with "white or red miso"). Spicy soy beans (with "1 pound soybeans"). Soy bean sprouts (*kong na mul* in Korean, with "1 {8-ounce} package soy bean sprouts"). Page 69 titled "Soybean curd," with a sidebar of "Tofu tips" describes more soyfoods: Tofu (incl. okara and silken tofu). Aburage (thicker, denser slabs of fried tofu are called *Dau hu chien* in Vietnamese). Then we read this unusual statement: "Before a coagulant is added to form tofu, a thin skin forms on the surface of soybean milk as it stands. This skin is lifted off and allowed to dry, forming a product that has a firm, chewy texture when reconstituted in water. Known in Chinese as *fu jook* [dried yuba sticks], bean curd skin is used as an edible wrapper, and in braised and vegetarian dishes. They come in large flat sheets or in 'bamboo' sticks that are pleated."

Tempeh. Fermented bean curd (which can be red or white in color. Fermentation in rice wine and salt produces a pungent flavor). A color photo shows 3 forms of tofu: fresh tofu, aburage, and *dau hu chien* [which resembles Japanese deep-fried tofu cutlets–*atsuage / namaage*]. Then a recipe for Lemon grass tofu (Vietnamese). Page 71 discusses "Soy bean sauces" such as hoisin, bean sauce, and shoyu (made with koji). Page 72: "The flavors of soy sauces." Chinese soy sauces (tend to be saltier than Japanese shoyu). Tamari. Kecap manis. Light or sodium reduced soy sauces. Dashi

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soys. How to use soy sauces. This section ends with recipes for: Basic Korean sauce (with "1 cup soy sauce"). Basic teriyaki sauce (with "1 cup soy sauce, mirin, sake, raw white sugar, smashed garlic, and a piece of smashed ginger). Basic hoisin sauce (with "6 tablespoons hoisin, 2 tablespoons soy sauce, brown sugar, sesame oil, minced garlic, minced ginger, and Sriracha sauce {a Thai, Vietnamese, or Chinese hot sauce}). Address: Former *Honolulu Advertiser* food editor, Hawaii.

1613. Jeon, Min-Sun; Sohn, K.H.; Chae, S.H.; Park, H.K.; Jeon, H.J. 2002. [Color characteristics of Korean traditional soy sauces prepared under different processing conditions]. *J. of the Korean Society of Food Science and Nutrition* 31(1):32-38. Feb. 10. [28 ref. Kor; eng]
• ***Summary:*** "The characteristics of brown color of Korean traditional soy sauces under different processing conditions were investigated in this research. As for meju type, traditional and modified mejus were used. The samples were produced from four levels of aging time, 0 day, 60 days, 120 days and 180 days in both clay jar and glass jar." Address: 1. Dep. of Food and Nutrition, Yonsei Univ., Seoul 120-749, Korea.

1614. Cho, Seung Yong; Rhee, C. 2002. Sorption characteristics of soy protein films and their relation to mechanical properties. *Lebensmittel-Wissenschaft + Technologie* (*Zurich*) 35(2):151-57. March. [25 ref]
• ***Summary:*** "Appropriate selection of plasticizer type and concentration will be helpful in controlling moisture content and the moisture adsorption rate of a film, thereby improving the film stability under varying RH conditions." Address: Korea Univ., Inst. of Life Science and Natural Resources, College of Life and Environmental Sciences, 5-1, Anam-Dong, Sungbuk-Ku, Seoul, 136-701 (Korea).

1615. Pulmuone USA Inc. 2002. Pulmuone, a plate full of nature. South Gate, California. 16 p. Each page: 18.3 x 26 cm.
• ***Summary:*** Brochure (glossy color) sent by Patricia Smith from Natural Products Expo West. 2002. March. On the cover are five small rectangular photos of foods (including whole dry soybeans) against a white background.

Contents: 1. An Asian approach to natural food. 2. Pulmuone foods bring out the nature to your meals. 4-5. Tofu: Better protein source than meats. A photo shows the company's tofu products: Four types of basic tofu (each 18 oz. / 510 gm, regular, firm, silken, and soft). Two types of extra soft (10 oz / 300 gm) in round tubes. Tofu broth seasoning (1.6 oz / 45 gm). Two private label types of tofu for Japanese markets (firm and soft). Egg tofu (4.3 oz / 122 gm).

6-7. Fresh noodles (uncooked). Ten different types, incl. 2 Ramen and 1 udon.

8-9. Dry noodles / Instant rice noodles. Twelve different types (5 cup type, 3 bowl type, and 4 traditional straight types).

10-11. Traditionals. 4 sizes of hot pepper paste, 3 sizes of soybean paste, 2 sizes of hot bean sauce, 1 cho jang (sashimi sauce), 1 chungkukjang [Korean natto], 9 types of grains and beans, including soybean, red bean, black soy bean, mung bean, sweet brown rice, brown rice, etc.

12-13. Other. Three types of tea, 4 flavors of farm pudding, 2 types of sauce (black bean sauce, and curry sauce mix). Three types of vinegar. 3 types of pickled radish. Imitation crab meat [vegetarian]. Sesame oil.

14. Frozen foods. Beef dumpling and Kimchi dumpling. Frozen udon in tubs (3 types). Buns & pancakes (5 types).

Page 16. Important dates in the history of Pulmuone: (actually chronology).

1981 May–Pulmuone Organic Foods opened to sell organic vegetables from its own farm.

1984 May–Pulmuone Foods Co., Ltd. incorporated.

1984 June–Tofu and Bean Sprout Plant: Yangju, east of Seoul.

1986 Nov.–Mineral spring water plant opened in Chungju, South of Seoul.

1987 May–Pulmuone Kimchi Museum opened in Seoul.

1988 Dec.–Natural House opened (Natural foods chain stores) in Korea.

1989 Jan.–Pulmuone Food Standards Committee started to work (To set up standards for food formulas, ingredients and manufacturing processes): Korea.

1990 Jan.–Soybean paste [jang] plant opened in Doan, south of Seoul.

1991 Jan.–Pulmuone USA Inc. founded.

1991 June–Fresh noodle plant opened in Chuncheon, northeast of Seoul.

1993 Aug.–Ilsongjung Foods Ltd., Korean-Chinese joint venture, opened in China.

1995 June–Tofu Plant opened in Los Angeles.

1995 Sept.–ISO 9002 certificate obtained.

1997 Sept.–Fresh Noodle Plant opened in Los Angeles, USA.

1999 Sept.–Tofu plant opened in Shanghai, China.

Below the chronology small photos show: (1) Inside of the Pulmuone Tofu Plant in Los Angeles. (2) Inside the Pulmuone Fresh Noodle Plant in Los Angeles.

"Pulmuone was founded in 1981 with 40 employees. It has grown to become a multinational company of 2,000 employees with annual sales volume of $250 million." "The secret to success lies in uncompromising commitment to better foods and better life." Address: 4567 Firestone Blvd., South Gate, California.

1616. Pulmuone USA Inc. 2002. Pulmuone. Soga (so good!!) (Portfolio). South Gate, California. 12 inserts. 31 cm. Inserts 28 cm.

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• ***Summary:*** Portfolio (glossy color) sent by Patricia Smith from Natural Products Expo West. 2002. March. On the cover are the Pulmuone and Soga logos plus various scattered stylized green leaves against a white background.

Inserts: (1) Soga Organic Tofu (firm, soft, or silken). (2) Quick and handy tofu cookbook (15 x 9 cm, 16 p., mostly recipes). (3) Soga Non-dairy Soy Smoothie Base (in a round plastic tube). (4) Non-GMO Nigari Tofu, firm or silken.

(5) Katsuo [dried, shaved fish] udon noodle soup and Katsuo tempura udon. (6) Star-K Kosher certification, for 9 tofu products. (7) OCIO organic transaction certificate, for soybeans. (8) Pulmuone to open 2nd tofu plant in New York (in Tappan, New York, on March 16, 2002. News release, dated 26 Feb. 2002). (9) Overview of company. "We will have a production capacity of 20 million units per year from our new plant facility in New York, opening in March 2002."

(10) Industry facts on soyfoods and health. 69% of Americans recognize soyfoods as healthy, 22% have no opinion and only 9% feel soy is unhealthy. 42% of Americans report that they consume soyfoods once a month or more. 27% consume soyfoods weekly. During the year 2000 the soyfoods category as a whole grew by 21.1% to reach $2.77 billion; during the year 2001 sales are expected to grow by 15-15%, Since 1995 dollar volume has grown by 250% for the category, hitting double digit increases in each year. (11) A natural tofu (firm, soft, or silken). (12) "Pulmuone, a plate full of nature" (color booklet, 16 p.). Address: 4567 Firestone Blvd., South Gate, California.

1617. **Product Name:** Soga Organic Twin-Pack Tofu.
**Manufacturer's Name:** Soga Soyfoods [Pulmuone U.S.A.].
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 866-356-2800.
**Date of Introduction:** 2002 March.
**Ingredients:** Feb. 2007: Water, organic soybeans, calcium sulfate, glucono delta lactone, magnesium chloride. Certified by Quality Assurance International.
**Wt/Vol., Packaging, Price:** 15.5 oz (439 gm) packed in molded plastic tray with heat-sealed, peel-off plastic film lid. Retails for $0.99 (2007/02 Lafayette, California).
**How Stored:** Refrigerated.
**Nutrition:** Per 3 oz (85 gm): Calories 80, calories from fat 45, total fat 5 gm (8% daily value; saturated fat 1 gm), cholesterol 0 mg, sodium 5 mg (<1%), total carbohydrate 2 gm (dietary fiber <1 gm [3%], sugars 0 gm), protein 9 gm. Vitamin A 0%, vitamin C 0%, calcium 15%, iron 6%.. Percent daily values are based on a 2,000 calorie diet.
**New Product–Documentation:** Talk with John Sim, head




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of sales at Pulmuone. 2003. Nov. 10. This product was introduced in March 2002 at the Natural Products Expo West, at Anaheim, California.

Product with Label purchased at Trader Joe's in Lafayette, California. 2007. Feb. 4. "Organic Extra Firm Twin Pack Tofu." This packaging innovation is one of the most original and important since water-packed tofu started to be packaged in plastic tubs with a heat-sealed film lid. The front panel is red, white, pink, blue, black and green. The product name is in both English and Korean. The ingredients (black on pink) are in English, French, and German. In the upper right corner is a color photo of diced tofu served with veggies on a blue dish. An illustration shows the twin packs, with large arrows on each pointing in opposite directions: (1) "Enjoy now." (2) "Enjoy later." Logo: USDA organic. Each No. 5 PP plastic tub is 5.5 by 11 by 5 cm deep.

1618. **Product Name:** Soga Healthy Toppers [Diced Deli Ham, Chicken Style Strips], and Healthy Tenders [Breaded Chicken Style with BBQ Dipping Sauce] (Meat Alternatives).
**Manufacturer's Name:** Soga Soyfoods [Pulmuone U.S.A.].
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 866-356-2800.
**Date of Introduction:** 2002 March.
**Ingredients:** Chicken Style Strips: Textured soybean protein, whey protein, soybean oil, evaporated cane juice, salt, white pepper, vitamin E, mustard, lemon juice, sage, thyme.
**Wt/Vol., Packaging, Price:** 6 oz. package.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with John Sim, head of sales at Pulmuone. 2003. Nov. 10. This product was introduced in March 2002 at the Natural Products Expo West, at Anaheim, California.

Leaflet (front and back, 8½ by 11 inch, color) sent by Patricia Smith from Natural Products Expo West (Anaheim, California). 2003. Oct. The front shows the front panel of three packages. The rear gives nutrition facts and ingredients.

1619. Steinkraus, Keith H. 2002. Fermentations in world food processing. *Comprehensive Reviews in World Food Science and Food Safety* 1(1):23-32. April. [96 ref]
• ***Summary:*** The section titled "Alkaline fermentations" (p. 28) states that highly alkaline fermentations are generally safe. These include *dawadawa* in Nigeria, *soumbara* in the Ivory Coast, and *iru* in West Africa–each made by fermentation of the soaked and cooked seeds of the African locust bean tree (*Parkia biglobosa*). This is a bacterial fermentation; the bacteria belong to the genus *Bacillus*, typically *Bacillus subtilis.* No inoculum is used.

Soybeans can be substituted for the locust beans.

Protein-rich alkaline fermentations also include several based traditionally on soybeans; natto from Japan, thua-nao from northern Thailand, and kinema from Nepal and environs. In each food, the essential microorganism is *Bacillus subtilis* and related bacilli. The enzymes produced are highly proteolytic; the proteins in the substrate are hydrolyzed to peptides and amino acids. Ammonia is released and the pH rapidly rises to 8.0 or higher. The combination of high pH and free ammonia plus the rapid growth of the essential microorganisms at relatively high temperatures (above 40ºC) make it difficult for spoilage microorganisms to grow. Therefore the products are quite stable and well-preserved. They are safe to eat even when made in an unhygienic environment.

The section titled "High salt savory flavored amino / peptide sauces and pastes" (p. 28) discusses sauces and pastes including Chinese soy sauce, Japanese shoyu and miso, Indonesian kecap, Korean kanjang, Taiwanese inyu, and Filipino taosi.

"The ancient discovery of how to transform bland vegetable protein into meat-flavored amino acid / peptide sauces and pastes was an outstanding human accomplishment." Address: Prof. Emeritus, Microbiology and Food Science, Cornell Univ., Ithaca, New York 14853.

1620. Park, Eunnie. 2002. A Korean fare-thee-well. *Record* (*The*) (*Hackensack, New Jersey*). May 17. p. 91.
• ***Summary:*** This about the Korean Food Festival to be held from now until May 31 at the Delegate's Dining Room, The United Nations, First Avenue and 45th Street, Manhattan, New York.

Women wearing colorful *hanbok*, traditional Korean dress, will be on hand to interpret the food.

"The most common condiments used in Korean cuisine are soy sauce [*kanjan*], sesame oil, red pepper paste or powder [*gochujang*], *doenjang* (soybean paste), garlic and ginger. Combinations of these condiments can be found in almost any dish." Address: Staff writer.

1621. *NSRL Bulletin* (*National Soybean Research Laboratory, Urbana, Illinois*). 2002. World food aid representatives visit NSRL for soy workshop. 9(2):4-5. June.
• ***Summary:*** "Representatives from international organizations, such as Save the Children and Africare, recently participated in an intensive workshop at the National Soybean Research Laboratory (NSRL) on increasing the use of soy in their aid efforts. The session was organized by the World Initiative for Soy in Human Health (WISHH).

"'One of the major goals for the WISHH program is to introduce soy protein products in food aid programs,' says Pradeep Khanna, program coordinator at the NSRL. 'Activities range from developing ways soy can increase the protein in breads suitable for Afghanistan and central Asian countries to identifying new uses for soy protein isolates and concentrates.'

"Primary funding for the program is provided by

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the United Soybean Board and the American Soybean Association. Additional funding has come from the Illinois Soybean Checkoff Board and state soybean organizations from across the country. The NSRL provides technical support and program leadership for a wide range of projects sponsored by WISHH.

"Khanna notes that one important project resulted when the relief efforts in Afghanistan uncovered an important need to increase the protein content of the local diet.

"'The increase in protein ideally should come in the form of flat bread, which is the major staple in the country,' Khanna says. 'WISHH has directly responded to this need by collaborating with the North American Millers Association to field test soy-fortified wheat flour, which has 12 percent soy flour in the blend. The two groups are working to ensure the product will suit local tastes.'

"The intensive training program at the NSRL was specially designed to meet the needs of private voluntary organizations in their food aid efforts. Topics included demonstrations and evaluations of soy foods made from defatted soy flour, textured soy protein, soy milk, and other soy protein products. During their trip, the participants also visited a soybean farm, the Central Soya facilities in Gibson City, Illinois and Fort Wayne, Indiana, and the Bunge plant in Danville, Illinois.

"'This workshop allows international hunger fighters to gain first-hand knowledge of how soy and soy protein products can play an important role in feeding the world,' Khanna says. 'Many of those in attendance represent aid organizations that already use thousands of tons of U.S. soybeans and soybean oil. It further provided them with the opportunity to interact with industry representatives and evaluate how soy protein products can fit both their immediate food aid efforts and their long-term economic development programs.'

"As part of the workshop, representatives from private voluntary organizations also discussed ways that soy can fit with new government initiatives to fight world hunger and how it can provide much-needed protein for those suffering from HIV and AIDS. An estimated 36 million people worldwide have HIV or AIDS. Some African countries have infection rates as high as 25 to 35 percent of their populations.

"'WISHH has been working to make the nutritional benefits of soy available to people with HIV and other devastating diseases around the world,' Khanna says. 'In many cases, nutrition intervention may be the primary effort to assist those people. The importance of nutrition intervention is amplified where medications are unavailable. The vast majority of recommended calorie-containing nutritional supplement products contain soy ingredients for optimum nutrition.'

"The activities to assist people living with AIDS include collaborating with leading nutritionists to better understand and develop the benefits of soy for targeted programs and communicating these results domestically and internationally. Other efforts are aimed at supporting private voluntary organizations, such as Humana People to People, to create soy restaurants as part of its Total Control of the Epidemic program.

"'Additional activities have led to the development of demonstration feeding programs to provide new scientific research and best practices for using soy in target countries,' Khanna says. 'Another major focus is on working with nongovernmental agencies to develop testing and feeding programs with value-added soy products that can provide badly needed protein in the diet, especially for children and young mothers.'

"As part of this effort, WISHH is also building long-term relationships in countries that could grow to become customers for U.S. soy products. More than a million metric tons of U.S. soybeans have annually gone into food aid in recent years, representing 3 percent of total U.S. soybean exports. Many former food aid recipients, such as the Philippines and Korea, are now important long-term commercial customers for U.S. soybeans products.

"'Most future growth in food demand will be in developing and middle-income countries,' Khanna says. 'Almost all of the world's projected increase of 1.2 billion people by 2020 will be in these countries. The middle-income classes of developing countries are also expected to grow by 68 percent from mid-1990s levels during the next four years. That represents an increase equal to the current combined populations of Japan and the European Union.'

"Khanna further points out that the WISHH program routinely leverages the soybean checkoff funds by cooperating with humanitarian groups and government agencies, as well as the international marketing staff at the American Soybean Association.

"'The project offers a win-win situation for soybean growers,' he says. 'It can provide a better diet for millions of people around the world, while reducing the current surplus of soybeans in the U.S. By working with private voluntary organizations, we can ensure that soy products go to the places where they will do the most good.'

"Additional information about a wide range of WISHH activities and programs is available on the internet at www.wishh.org."

Note: As of March 2019 this website is still working and the organization appears to be very active worldwide. The executive director is Jim Hershey, and the WISHH Committee has 18 members, including 3 women. Many new programs concern establishing aquaculture projects in developing countries, and working with businesses to add defatted soy flour to baked goods.

1622. *Record* (*The*) (*Hackensack, New Jersey*). 2002. Classified ad: Cook / Korean-Japanese. Oct. 6. p. 99.

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• ***Summary:*** "Restaurant: Plan & prepare a menu such as Kalbitang, Gomtang, HaeJangKook, YookgaeJang, Swenjang, Soon Du Boo, Kim Chi Jigae,..."

1623. Tamang, Jyoti Prakash. 2002. Lesser-known ethnic fermented soybean foods of the eastern Himalayas. In: K. Liu, et al., eds. 2002. Proceedings China & International Conference & Exhibition on Soybean Technology & Development Cooperation (CISCE) 2002 [Extended abstracts]. Beijing, China: Chinese Cereals and Oil Association (CCOA). [7] + 474 p. See p. 232-33. Held 6-9 Nov. 2002, Beijing, China. [Eng]
• ***Summary:*** The food culture of the people of the Eastern Himalayas is somewhere between the food culture of East Asia and the food culture of Southeast Asia. Soybean is a leguminous summer crop, which has been used for centuries to prepare both fermented and non-fermented foods in the Eastern Himalayan regions of Nepal, India, and Bhutan. The fermented foods prepared in this region are *kinema, aakhuni, hawaijar, turangbai,* and *bekanthu.* These fermented soyfoods are similar to natto of Japan, *thua-nao* of northern Thailand, *douchi* of China [sic], *chungkok-jang* of Korea, and *pe-poke* of Myanmar. All of the above foods have a bacterium, *Bacillus subtilis* as their dominant organism.

A detailed discussion of kinema, its history and its microorganisms, is given. Address: Food Microbiology Lab., Sikkim Government College, Gangtok, Sikkim 737 102, India.

1624. *Canadian Soybean Bulletin* (*OSG, Chatham, Ontario, Canada*). 2002. Canadian soybean exports. Winter. p. 2.
• ***Summary:*** A large table shows statistics in tonnes (metric tons) of soybeans exported to various countries, and regions, each year from 1998/99 to 2001/2002. The countries are: In Asia–China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand. In Western Europe–Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, and Spain. By continent–Africa, Central America, Eastern Europe, Middle East, Oceania, South America, and United States.

In 2001/2002 the countries to which the largest amount of Canadian soybean exports went were (in tonnes): Japan 126,619, Malaysia 101,698, United States 60,244, Germany 29,377, Indonesia 26,836, Hong Kong 22,800.

Total Canadian soybean exports have declined dramatically during the past two years, from a peak of 946,360 in 1999/2000, to 746,241 in 2000/2001, down to 471,492 in 2001/2002.

1625. An, S.-M. 2002. [Archeological records on the origin of legumes cultivation in East Asia]. *Korea Soybean Digest* (*Hankuk Kong Yeonguhoegi*) 19(2):24-33. [Kor]*
• ***Summary:*** In *Soybean Storytelling* (2017, p. 25) we read: "Excavated Remains of Soybeans on the Korean Peninsula: Numerous remains of soybeans are currently being discovered in dozens of excavation sites across the Korean Peninsula, which range in time from the Neolithic Age [before 1500 BCE] to the Bronze Age and Early Iron Age, as well as the Proto Three Kingdoms and the Three Kingdoms Periods." Source: An (2002).

1626. Kim, J.K. 2002. [Biological active compounds of soy-fermented foods]. *Korea Soybean Digest* 19:1-7. [Kor]*

1627. Kim, Yong-Ho. 2002. Current achievement and perspectives of seed quality evaluation in soybean. *Korean J. of Crop Science* 47(Suppl.):95-106. [27 ref. Eng]
• ***Summary:*** "Soybean is one of the most important sources of protein and oil in the world. Recently, emphasis has been laid on the chemical composition of soybean seeds for the processing soybean foods. Improvement of soybean components has been expected to improve food-processing quality for the processed soybean products such as soymilk and various edible ingredients as well as fur the traditional soyfoods." Address: Dep. of Life Science, Soonchunhyang Univ., Asan, Chungnamm 336-745, Korea.

1628. Kwon, Byung Sun; Shin, Jeong Sik. 2002. [Seed protein content and fatty acid composition of black seeded soybeans collected from southwestern islands]. *Korean J. of Crop Science* 47(3):240-43. [15 ref. Kor; eng]
• ***Summary:*** "A total of 135 black seeded soybeans genotypes were collected in 45 island locations from January to May 2001. Seeds of 135 genotypes collected were analyzed for crude protein and fatty acid compositions. The crude protein content was averaged to be 40.75%, and was ranged from 34.70% to 44.20%. The average palmitic acid, stearic acid, oleic acid, linoleic acid and linolenic add content were 11.41%, 3.93%, 22.75%, 53.55%, and 8.35%, and the ranges of those were 9.00% to 14.40%, 2.90% to 5.00%, 22.75% to 26.50%, 50.30% to 57.20% and 6.7% to 11.20%, respectively. Heritabilities of palmitic acid, oleic acid, linoleic acid, and crude protein were higher, but that of stearic acid and linolenic acid were relatively lower. Crude protein content was correlated positively with oleic acid content, whereas it was correlated negatively with linoleic acid, palmitic acid, stearic acid, and linolenic acid contents." Address: Dep. of Resources, Plant Development, Sunchon National Univ., Sunchon 540-742, Korea.

1629. Kwon, Yeong-Mi; Kim, Dong-Han. 2002. [Effects of sea tangle and chitosan on the physicochemical properties of traditional kochujang]. *J. of the Korean Society of Food Science and Nutrition* 31(6):977-85. [33 ref. Kor; eng]
• ***Summary:*** "In order to improve the quality of traditional kochujang, submaterials like sea tangle and chitosan were added to kochujang and their effects on microbial characteristics, enzyme activities and physicochemical

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characteristics were investigated for 24 weeks of fermentation." Address: Dep. of Food and Nutrition, Mokpo National Univ., Chonnam, 534-729, Korea.

1630. Lee, Jeong-Dong; Hwang, Y-H.; Cho, H-Y.; Kim, D-U; Chuong, M.G. 2002. [Comparison of characteristics related with soybean sprouts between *Glycine max* and *G. soja*]. *Korean J. of Crop Science* 47(3):189-95. [30 ref. Kor; eng]

• ***Summary:*** "Soybean sprout traits were evaluated for soybeans for sprout (*Glycine max*) and wild soybeans (*Glycine soja*). Soybeans for sprout are characterized with small seed size of 10-14 grams per 100 seeds and are traditionally used only for producing sprouts. No difference was observed in hypocotyl length and sprout yield between two types of soybean. (However total length, hypocotyl length, body weight, and the rate of good quality were greater in soybeans than in sprouts.) Number of lateral roots and root length were greater in wild soybeans. Contents of crude oil, oleic acid, and sucrose were higher in soybean for sprout, while that of protein and linoleic acid were higher in wild soybeans. There was no difference in sprout isoflavone content." Address: 1. Div. of Plant Biosciences Major in Agronomy, Kyungpook National Univ., Daegu 702-701, Korea.

1631. Park, H.K.; Gil, B.; Kim, J.K. 2002. Characteristics of taste components of commercial soybean paste. *Food Science and Biotechnology* 11:376-79. *

1632. Khachatourians, George G.; Arora, Dilip K. eds. 2002. Applied mycology and biotechnology. Vol. 2. Agriculture and food production. Amsterdam, New York: Elsevier. xvi + 428 p. Illust. Keyword index. 25 cm.

• ***Summary:*** See chapter on Cereals by Cherl-ho Lee.

1633. Lee, Cherl-Ho; Lee, Sang Sun. 2002. Cereal fermentation by fungi. In: George G. Khachatourians and Dilip K. Arora, eds. 2002. Applied Mycology and Biotechnology. Vol. 2. Agriculture and Food Production. Amsterdam, New York: Elsevier. 428 p. See p. 151-70. [50 ref]

• ***Summary:*** Contents: Summary. Introduction. Fermentation starters: History of solid state fermentation starters in northeast Asia, cereal alcoholic fermentation starters, soybean fermentation starters. Fungal fermented foods: Cereal alcoholic products (rice wine, rice beer, alcoholic rice paste, alcoholic rice seasoning), fermented soybean products (Korean kanjang and doenjang, Japanese shoyu and miso, tempe, Chinese sufu), other fermented products (Chinese red rice {Anka}, enzyme foods). Hygienic aspects of fungal fermented foods: Mycotoxins in fermentation raw materials, mycotoxin formed during fermentation. Conclusion.

Page 162: "... soybean sauce, *kanjang*, and soybean paste, *doenjang*, have been used in Korea for more than 2000 years and formed the characteristic flavor of Korean cuisine. The term "Shi" [fermented black soybeans], the Chinese letter [character] indicating *meju*, first appears in *Jijiupian* written in the Han period (206 B.C. to 208 A.D.) of China. *Bowuzhi* of Jin (265-420 A.D.) of China describes that *Shi* [fermented black soybeans] originated in a foreign country, and the letter is a dialect. *Xintangshu* of the Tang period (618-807 A.D.) in China names Shi as a special product of Balhai or Bohai (688-826 A.D.), a nation founded by the refugees from defeated Kokuryo (37 B.C. to 668 A.D.)

Note: The source for the very important information given above on page 162 is endnote 33: Lee, S.W. (1990). "A study on the origin and interchange of Dujang (also known as soybean sauce) in ancient Asia." *Korean J. of Dietary Culture* 5:313.

"It is generally recognized that Koreans were the first to experiment with soybean fermentation, sparking the beginning of the soy sauce culture of the Orient (Lee, C.H. 2001. *Fermentation Technology in Korea.* Seoul: Korea University Press). Their traditional fermentation technology was so advanced that they taught their techniques to neighboring countries."

Page 162-63: "*Meju* [soybean koji], the fermentation starter for Korean soysauce, *kanjang*, is made from soybean... The ripening of *kanjang* mash in the brine is ended in 1-2 months."

Figures: (12) A combination diagram and flowsheet [flow sheet] showing the process of making Korean kanjang and doenjang. Address: 1. Graduate School of Biotechnology, CAFST, Korea Univ., Seoul, 136-701, Korea; 2. Dep. of Biology, Korea National Univ. of Education, Chungbuk, 363-791.

1634. Ling, Kong Foong. 2002. Food of Asia: authentic recipes from China, India, Indonesia, Japan, Singapore, Malaysia, Thailand and Vietnam. Singapore: Periplus. 192 p. Illust. (color photos). Index. 31 cm.

• ***Summary:*** This oversized paperback book, loaded with glossy color photos, is an expanded version of the original 1998 edition. The introduction and essays are by Kong Foong Ling. The index, which is poor, makes the book hard to use if you are looking for particular foods found throughout Asia such as soybeans, soy sauce, miso, salted / fermented black beans, yuba [bean curd skin], etc.

Contents: The flavors of Asia. Ingredients. The Asian kitchen. Burma. China. India. Indonesia. Japan. Korea. Malaysia & Singapore. The Philippines. Sri Lanka. Thailand. Vietnam. Appendix.

The "Ingredients" section (p. 10-17) includes: Bean curd (incl. cotton or momen tofu, silken bean curd, deep-fried bean curd or aburage, grilled bean curd or yakidofu, fermented bean curd or nam yee). Bean curd skin [yuba]. Black beans, salted (and fermented). Hoisin sauce ("A

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sweet sauce made of soy beans, with spicy and garlicky overtones"). Miso (incl. red miso and white miso). Salted soy beans (incl. "yellow bean sauce"). Soy sauce (incl. light soy sauce, black soy sauce, red soy sauce, Kikkoman, tamari, thick sweet soy sauce (kecap manis–Indonesian)). Tempeh. Also: Red beans (dried azuki). Seaweed (incl. dried kelp, golden kelp, mozuku, salted dried kelp, laver or nori, wakame). Sesame (black and white seeds, tahina {tahini}). Sesame oil. Sesame rice crackers.

Korea (p. 109+). Page 110: There are also many fermented pastes and sauces for dipping, called *chang.* Every restaurant and home has its own formula for making chang. Based on a fermented mash of soy beans, the three most common varieties are *kan chang* (dark and liquid), *daen chang* (thick and pungent), and *gochu chang* (fiery and hot).

Soybean is mentioned on pages 8, 11, 68, 89.

Beancurd or bean curd is mentioned on pages 8, 10, 11, 26, 32, 33, 35, 36, 40-42, 68, 70-71, 74, 89, 90, 92, 93, 94, 96, 100, 102, 104, 107, 111, 112, 113, 119, 120, 127, 133, 158, 172, 175, 185, 189, 190, 191, 192.

Bean curd skin [yuba] is mentioned on pages 11, 35, 36.

Bean paste and bean paste sauces, p. 8, 32.

Fragrant soy sauce is mentioned on page 128.

Also: Red bean paste, p. 46 (canned, azuki).

1635. National Academy of Korean Language (Kungnip Kugôwôn). 2002. An illustrated guide to Korean culture: 233 traditional key words. Seoul, South Korea: Hakgojae. 479 p. Illust. (Color). Index. 24 cm. [79 ref]

• ***Summary:*** This is one of the most interesting books about Korean culture and foodways we have ever seen. It is divided into sections (such as "Korean food" or "Korean housing life") and each section contains a number of key Korean words. These words include each of the three different types of fermented soyfoods (*jang*).

*Jangajji* (p. 47-48 + p. 13) "is a fermented food made with various kinds of vegetables and stored in soybean sauce, soybean paste, or red pepper paste." Each of these is a fermented food which contains soybeans as a major ingredient. The good taste of vegetables will last more than a year if they are well prepared and pickled one of these three types of *jang.* On the Korean menu rice, which is the main dish, is clearly distinguished from the side dishes–one of which is *jangajji.* Vegetables used to make *janggajji* include garlic, sesame leaves, cucumber, turnip, green pepper and various roots. Each is prepared in its own special way, then placed in a gauze bag in the *jang.*

*Bulgogi* (p. 49-50) is marinated, grilled meat, usually beef, thinly sliced, mixed with soy sauce, chopped green onions, garlic, sesame, salt, pepper, sugar, etc., then marinated in a bowl before grilling.

*Dubu* (p. 55-56 + 82, 204) is the Korean word for tofu. "Koreans have traditionally made and eaten it a great deal at home. *Dubu* is said to have been first made in China around the second century B.C. It seems to have come into Korea at the end of the Goryeo Dynasty [918-1392–First unification of the Korean Peninsula]. Yet in the Joseon Dynasty [Choson Dynasty 1392-1897] the Koreans are recorded as passing the art of making *dubu* to neighboring countries, such as China and Japan. Even in China they are said to have highly praised Korean women for their cooking skills, especially for their making of *dubu."* Soymilk curds are called *sundubu.*

"Korean people sometimes eat *dubu* as it is or sometimes eat newly made hot *dubu* with soy sauce. They also cook it on a griddle, slightly seasoned with salt. Additionally, *sundubu* stew with very soft uncurdled bean curd is a popular dish." Koreans prepare *dubu* in more than fifty different ways.

Sayings: "'Losing a tooth while eating dubu.' It means that everybody should always be careful even about small matters, however easy they may seem, because absent-mindedness may cause a fatal error. It also means that anyone can make an unexpected error. Although *dubu* is so soft and tender that one can swallow it without chewing, this proverb says that while eating *dubu* a tooth may fall out,

"'If one hears a kind word, one may buy *dubu* instead of *biji* [okara], bean curd dregs.' Biji is cheaper than dubu. But if a seller speaks well of a buyer, the latter, pleased at the compliment, will certainly buy the more expensive *dubu* instead of the biji. It means that one will be willing to give more than expected, if one hears a warmhearted word from another person. This proverb emphasizes the importance of words.

"'Seek for *dubu* in the bean field.' This proverb indicates a person who is in such a hurry that he or she looks for *dubu* in the soy bean field, even though *dubu* is made through a long process after the beans are picked. It refers to an extremely hasty action.

A *dok* (p. 200-03) "is a glazed earthenware jar used to store soy sauce, soy bean paste, hot pepper paste, grain, wine or *gimchi."* A *dok* made in the traditional way is said to be able to breathe–which plastic containers cannot do. Doks from different parts of Korea have different shapes and sizes (3 color photos are shown). A large *dok* that holds soy sauce is called a *ganjangdok.* "The middle sized *dok* is used to store *doenjang,* soy bean paste, while the small *dok* is for storing hot pepper paste, sliced vegetables preserved in soy sauce.

The content of a *dok* also determines its cover and position. Thus, a *dok* containing soy sauce is usually given a cover of glazed earthenware or unglazed pottery and placed on a terrace for soy sauce jars.

Of the various different dok, the one used for making soy sauce, is the one given the greatest importance by Korean women. "As soy sauce determines the quality of meals in the family, incorrect storage of the *jangdok* will affect the taste of food and result in injuring the health of the family members." Everyone knows to put the lid on the

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*jangdok* when it rains or snows.

A *jangdokdae* is a terrace where *dok,* especially those containing soy sauce [*jang*], are stored. It is generally located in a well-ventilated and sunny place, usually in a back garden next to the kitchen. "From early times in Korea, the *jangdokdae* has been a criterion of good housekeeping. Thus, housewives pay great attention to the *jangdokdae* when an important guest is to visit their home. They tidy its surroundings and clean the *dok* again. In addition, housewives make a great effort to decorate the jangdokdae by planting flowers around it and giving it a separate gate. In some cases they enshrine a spirit of the soil to guard the house in the *jangdokdae.*

"In the past, most important religious rites for the peace of a family and to protect against misfortune were held at home. During these rites, the housewife prayed without fail to the guardian spirit of the house and to the three gods governing childbirth for the tranquility of her family and the success of her children and for the constant delicious taste of soy sauce.

Sayings: "'The taste of the soy sauce is good compared to the *jangdok.'* This saying points out that delicious soy sauce, the basic seasoning for Korean food, is contained in the outwardly coarse *jangdok.* It means that the content of something may be excellent, however humble its appearance."

A *maetdol* (p. 204-05) is a hand-turned stone mill, used to grind grains or beans. It is most often used for grinding soy beans for *dubu.* Continued. Address: Seoul, Korea.

1636. National Academy of Korean Language (Kungnip Kugôwôn). 2002. An illustrated guide to Korean culture: 233 traditional key words (Continued–Document part II). Seoul, South Korea: Hakgojae. 479 p. Illust. (Color). 24 cm. [79 ref]

• ***Summary:*** (Continued): This is one of the most interesting books about Korean culture and foodways we have ever seen. It is divided into sections (such as "Korean food" or "Korean housing life") and each section contains a number of key Korean words.

*Meju* (p. 63-64; soybean koji) "is a lump made by fermenting boiled soy beans, and is the basic material for *ganjang* or *doenjang. Meju* is one of the characteristic Korean foods which have existed since the era of the ancient states and have fascinated the appetites of Koreans for a long time.

"*Meju* is traditionally made on the first day of winter, about when *gimchi* making is finished and the very cold weather starts. To make *meju* of good quality, above all clear and well-ripened soy beans should be selected and kept fully soaked in water overnight. Next, the well-steeped beans are put in a pot and boiled until they no longer smell fishy and break down easily, After this, they are pounded in a mortar. They are considered fully mashed only after ridding them of the moisture generated in boiling. They have to be pounded only to the extent that pieces of beans can still be seen. The mashed beans are poured on a flat place and shaped into *meju* of moderate size. The shape may vary from family to family, but it is usually made into a flat block shape. Lumps of *meju* made in this way should be dried for two or three days, as they drain and become solid. When they are placed in a warm *ondol* room for about two weeks, their surfaces became evenly covered with mold. The temperature and humidity of the room must be kept at the proper level during this period. If the temperature or humidity is too high, the *meju* will rot. Lumps of *meju* over which a film of mold has formed are tied up with ropes of straw and suspended from the ceiling in a warm room during the winter. When spring comes, the lumps of *meju* are taken outdoors on a sunny day and dried. Only lumps of *meju* which have gone through all these processes can be used as the basic material for soy sauce [*jang*].

"*Ganjang, doenjang* and *gochujang* are the basic condiments of Korean food. Without these three, Korean food cannot be prepared properly. Meju is essential for the preparation of all three kinds of sauce. This is why meju, though never directly eaten itself, is indispensable for Korean food.

"In the past, as soon as winter set in, lumps of *meju* could be seen hanging at every door. Yet, as the process of making *meju* into *ganjang, doenjang* and *gochujang* is complicated and takes a lot of time, these various sauces and pastes gradually came to be produced in massive quantities by factories. Moreover as lumps of *meju* made by improved methods came on the scene, it has become harder and harder to see the traditional scene, However, *meju* is still an indispensable ingredient in Korean food. It is now being produced year round though its outward appearance is somewhat different from that of the past Sayings: "'To not believe a person, even if he makes *meju* of soy beans.' It means that one deliberately turns a deaf ear to the truth. This is how one makes such a truth claim: 'What I say is as true and natural as the fact that *meju* is made of soy beans.' On the other hand, it may have an opposite meaning; a person is so given to lying all the time as to never be believed, no matter what is said."

*Ganjang* (p. 65-66 + p. 16, 32, 63, 64, 67, 68, 69), or soy sauce, is a Korean traditional condiment made from fermented soybeans. With its unique aroma as well as its sweet and salty taste, the blackish liquid of *ganjang* is invariably added to most Korean dishes, The history of *ganjang* is so old that it dates back to ancient kingdoms. Some old documents say that *ganjang* was already contained in the list of a queen-elect`s gifts to her parents-in-law in a wedding ceremony in the Silla Dynasty (57 BCE to 935). Judging from this, it can be inferred that *ganjang* been a basic food for Koreans since the era of the Three Kingdoms.

"In early spring, Korean housewives make *ganjang*

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from soybean lumps [koji] which were prepared in the early winter of the previous year and fermented well during the winter. First they lightly wash the fermented soybean lumps in flowing water and dry them under the sun for two or three days. Next, they prepare salt water a day in advance to let its impurities precipitate, leaving pure salt water only. When everything is ready, they put the fermented soybean lumps one by one into clean vats and pour salt water of the proper concentration on them. After that, charcoal and red peppers are floated. The former helps to remove humidity and impurities, and the latter to sterilize the ingredients. Soy sauce made in this way can reveal its own taste only after maturing in the sun for forty to sixty days. When soy sauce is sufficiently mature, they pour only the stock [liquid] out of the vat and boil it down.

"Making *ganjang* was very important for Koreans. Hence, they observed various taboos and cautiously selected the day for making ganjang. Housewives were especially concerned with their own movements. They did not go out for three days before the selected day, and they tried to avoid all chance of meeting evil spirits. After making ganjang, of course, they made every effort to ripen it and store it properly, They festooned the entrance of the vat with a straw rope to keep off evil spirits, and they cleansed the vats every day. It was natural for them to exert themselves to the utmost, for ganjang, once made, would remain unspoiled for a year at least or even for several years.

"As times have changed, the number of households personally making ganjamg has decreased and most households use mass-produced ganjang. However, traditional home-made *ganjang* is much better than factory-made *ganjang* in its unique aroma and flavor.

Sayings: "'Like a small bowl of *ganjang* on a lord's dining table.' Ganjang is always located at the center of the dining table in Korean table settings. This proverb uses the fact that a small cup of *ganjang* meant only as a condiment, is located at the very center of a lord's dining table. On the other hand, it sometimes has the opposite meaning: an unimportant-looking person who holds an important post. This meaning derives from the idea that *ganjang* is an important condiment used to make the taste of Korean food better although it appears unimportant.

"'Ganjang in a mudhole.' The mudhole is a place dug out and covered with a straw mat where vegetables, *ganjang*, etc. are put. In this proverb, though the mudhole may seem humble, it contains *ganjang*, a most important condiment for Korean dishes. It means that the content of something is good although the appearance is not good" (Continued). Address: Seoul, Korea.

1637. National Academy of Korean Language (Kungnip Kugôwôn). 2002. An illustrated guide to Korean culture: 233 traditional key words (Continued–Document part III). Seoul, South Korea: Hakgojae. 479 p. Illust. (Color). 24 cm. [79 ref]

• ***Summary:*** (Continued): This is one of the most interesting books about Korean culture and foodways we have ever seen. It is divided into sections (such as "Korean food" or "Korean housing life") and each section contains a number of key Korean words.

*Doenjang* (p. 67-68 + 22, 26, 39, 41, 53, 64, 69, 70, 201; Korean soybean jang), "soy bean paste, is one of the Korean traditional seasonings; it is made as a thick sauce from ripened and fermented soybeans. Containing a unique flavor and aroma, it is generally used as the basic seasoning in Korean soups or stews. Additionally, when mixed with vegetable sprouts, it can create a special taste.

"People make *doenjang* along with *ganjang*, soy sauce. At the outset they make a mixture based on fermented soybeans, which does not differentiate between *ganjang* and *doenjang; doenjang* is separated from ganjang later. As it has a richer taste than ganjang and the fermented beans are also eaten, *doenjang* is excellent in nutrition.

"There are basically two ways to make *doenjang.* One is to use the remaining boiled soybean lumps [mash] after making *ganjang*, and the other is to make it without scooping out the *ganjang* at all. The process is the same as that of making ganjang, in that boiled soybean lumps are fermented. But after the *ganjang* is fermented, the *doenjang* will go through further processing in two ways.

"If the remaining boiled soybean lumps are used, then after scooping out the ganjang, the boiled soybean lumps are mixed with salt and packed tightly in a jar. They are exposed to the sun and fermented for a month or so.

"If *doenjang* is to be made directly without scooping the ganjang out, the soybean lumps are put in a small quantity of salt water from the outset and fermented, then mashed with the ganjang. The taste of *doenjang* made in this way is better, because the nutritious ingredients of the fermented soybeans are not scooped out with the ganjang.

"Koreans, having lived an agricultural life for a long time, could not easily obtain meat or fish, In this environment, soy beans were a good source of protein. Furthermore, people were able to maintain a well-balanced diet by eating condiments made from soy beans almost every day. In addition, while soy beans have the disadvantage of being hard to digest, doenjang, as a fermented food, is easily digested and absorbed. Recently, as its preventive effect against cancer has been suggested, it has turned out to be a scientifically valuable food.

"As the dwelling environment has changed and the *jangdokdae*, the soy-jar terrace, has disappeared today the number of Koreans who buy and eat factory produced *doenjang* rather than home-made is increasing. However, it seems apparent that *doenjang* will continue to provide the unique taste of Korean food."

*Gochujang* (p. 69-70 + 39, 53, 64, 71) "is a unique Korean indigenous food which is made by fermenting

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a mixture of grain, powdered soybeans and red pepper, malt, and salt. It is a thickly boiled red sauce, and has a characteristically hot spicy taste. Yet its sweet and savory flavor blends well with its hot taste. As it contains carbohydrate from the grain, protein from the soybeans, and vitamins from the red pepper, it is nutritious as well,

"People use *gochujang* for several purposes, from putting it into boiling soup or mixing it with sprouts as a condiment to eating it as a side dish. It is one of the three traditional jangs of Korea, along with ganjang and doenjang, in which fermented soybeans are used. As red pepper was introduced to Korea at the end of the sixteenth century it was the last of the three; it has been made since the middle of the eighteenth century.

"Gochujang is prepared after making ganjang, in the third or fourth months of the lunar calendar, before the weather gets hot. For grain it may use glutinous rice, barley, or flour, each of which make the gochujang somewhat different. It is *gochujang* made of glutinous rice that is considered the best and eaten most often even today. In order to make it, first, glutinous rice flour is kneaded into a doughnut-shaped cake, called *gumeongtteok* and then boiled. It is then mashed and spread out as the water it was boiled in is added little by little. Powdered soybeans and red pepper are added and mixed well, Finally salt is added and it is allowed to ferment for a month or so in the sun.

"Gochujang has a greater variety of uses than the other Korean jangs, just adding gochujang to cooked rice makes a good meal. Putting ground meat or vegetables into the mixture makes an excellent *bibimbap,* rice mixed with vegetables. In addition, it serves as a sauce for dipping various sprouts, dried fish, and slices of raw fish and as a condiment for cooked rice wrapped in lettuce or laver [nori]. Finally, it also makes soup or stew delicious along with *doenjang,* and it works as a seasoning for a salad, boiled food, and broiled meat or fish.

"With the modernization of Korean society *gochujang* is now being mass produced and the manufacturing process has changed somewhat. But its basic raw materials and taste are not at all different. Additionally Koreans' love of gochujang remains unchanged, and lots of Koreans carry *gochujang* with them if they will be away from the Korea for a long time. In foreign countries, Koreans find it easy to eat foods they don't like by adding a little gochujang. To that extent, *gochujang* is a very familiar food which suits the taste of Koreans.

Sayings: "'Even twelve pots of *gochujang* can't please a husband.' As mentioned, *gochujang* is an important condiment. A woman can prepare many delicious dishes if a family has as many as twelve pots of gochujang. This proverb says that delicious food alone cannot please a husband. It has another meaning: the husband is such a moody man that he cannot be pleased. It means that material goods alone cannot affect a persons mind.

"'Gochujang brought from a daughters house.' It means something extremely valuable. Gochujang itself is valuable; *gochujang* made by a married daughter herself and sent to her parents is all the more precious so they eat it sparingly and make it last a long time.

"'Can *gochujang* be omitted in cooked rice wrapped in lettuce?' It means that two things or two people are closely related to each other and are always seen together. This proverb has meaning because Koreans cannot eat cooked rice wrapped in lettuce without adding *gochujang.*

*Ondol* (p. 173-74 + 14, 63, 170), found only in Korea, is a heating system to warm the floor itself. Because of this warm floor, Koreans have developed a seated lifestyle.

*Kongnamul* (p. 43-44; soybean sprouts) is one of the vegetables Koreans eat most frequently. It is a good source of vitamin C and protein.

*Jjigae* (p. 39+) is a dish in which is put *gochujang,* hot pepper paste, or *doenjang,* soy bean paste, with meat or vegetables and boiled with spices into a thick stew. It is thicker and saltier than *guk.*

*Doenjangjjigae* (p. 41) "is a kind of *jjigae* in which vegetables, bean curd, and meat/shellfish are added in addition to its main ingredient *doenjang,* bean paste. Its ingredients vary from season to season. For example, in summer unripe hot peppers are added, in autumn a variety of mushrooms, and in winter dried radish leaves. The savory odor peculiar to doenjang blends well with the hot and salty taste of this *jjigae.* Especially in summer people enjoy *gangdoenjangjjigae* with its stronger taste of *doenjang. Gangdoenjangjjigae,* which uses somewhat unsalty but light *doenjang* as the main ingredient, is boiled with slices of unripe hot peppers and zucchini and bean curd in a small *ttukbaegi. Gangdoenjangjjigae* makes up for the lack of protein in the traditional Korean diet at a cheap price. It is easily found in the restaurants which ordinary people often frequent and is one of the favorite foods of all Koreans." Address: Seoul, Korea.

1638. Price, David Clive; Kawana, Masano. 2002. Food of Korea: authentic recipes from the land of morning calm. Singapore: Periplus; North Clarendon, Vermont: Distributed by Tuttle Pub. 120 p. Illust. (Color). 21 cm.
• ***Summary:*** In this attractive book, almost every recipe is accompanied by a glossy, full-page photo (usually of a prepared dish in an attractive table setting) on the facing page. The 60+ recipes were created by the chefs of the Sarabol Restaurant in The Shilla Hotel, Seoul.

Page 16: There are also many fermented pastes and sauces for dipping, called *chang.* Every restaurant and home has its own formula for making chang. Based on a fermented mash of soy beans, the three most common varieties are *kan chang* (dark and liquid), *daen chang* (thick and pungent), and *gochu chang* (fiery and hot).

Note: Soy sauce is also spelled *ganjang* (p. 23, 72).

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Korean-style miso (thick and pungent) is also spelled *doenjang* (p. 30, 60). Korean chili paste (fiery and hot) is also spelled *gochujang* (p. 23, 26, 31, 82, 106).

Bean curd [tofu] is mentioned on pages 9, 19, 24, 30, 44, 50, 56, 58, 60, 66, 68, 70, and 74.

Soybean sprouts (or bean sprouts) are mentioned on pages 6, 10, 11, 24, 40, 46, 64, 106.

Soy beans are mentioned on pages 6, 9-12, 19, 23-26, 30, 31, 44, 46, 50, 62, 106, and 120.

Fermented soybean paste (doenjang) is mentioned on pages 23, 25.

Soy sauce is mentioned on 27 pages (definition on p. 27). The two main types are light and dark.

1639. Tamang, J.P.; Thapa, S.; Dewan, S.; Jojima, Y.; Fudou, R.; Yamanaka, S. 2002. Phylogenetic analysis of *Bacillus* strains isolated from fermented soybean foods of Asia: kinema, chungkokjang, and natto. *J. of Hill Research* (*Sikkim*) 15(2):56-62. [22 ref]

• ***Summary:*** A total of 38 strains of dominant endospore forming and rod shaped bacteria were isolated from kinema, chungkokjang, and natto (three closely related fermented soyfoods), and studied phenotypically. All endospore forming rods were identified as *Bacillus subtilis.* The average load of endospore forming bacteria of the samples was about 100 million colony forming units (CFU) per gm.

Fig. 1 (p. 60) is a "Phylogenetic tree [also called a horizontal cladogram] showing the relationships of *Bacillus subtilis* strains to other strains of the genus *Bacillus* and related genera based on partial sequence of 16S rRNA gene."

This suggests that *B. subtilis* strains responsible for the fermentation of sticky Asian soyfoods might have originated from the same stock. Address: 1-3. Food Microbiology Lab., Dep. of Botany, Sikkim Government College, Gangtok, Sikkim 737 102, India.

1640. American Soybean Assoc. 2003. Bean beat: ASA reports U.S. soybean quality survey results. *Soybean Digest.* Feb. p. 56.

• ***Summary:*** The results of ASA's 17th U.S. Soybean Crop Quality Survey were presented in Dec. 2002 during a 2-week international mission to Korea, Japan, China, and Taiwan. The survey contained information about the protein (35.4%), oil (19.4%), and amino acids content of this year's U.S. soybean crop.

This was the first year that the survey gathered information about amino acids, according to author Tom Brumm of the Agricultural and Biosystems Engineering Dep. at Iowa State University. Livestock producers use amino acid content to determine the value of soybean meal. The report is based on a survey of 1,400 randomly selected ASA farmer-members across the USA; each submitted samples of their crop. For details see www.asasoya.org under "Current News & Events."

1641. *Bluebook Update* (*Bar Harbor, Maine*). 2003. Soybeans used as food will grow by 72% this decade: Soyatech releases new study. 10(1):2. Jan/March.

• ***Summary:*** "Whole Soybeans as Food Ingredient," a new study published [in January] by Soyatech, Inc., focuses on the market for soybeans for food.

Over the past 30 years, soybean production globally has grown over 400%. The production in 2002 was about 184 million metric tons, with the combined products of Argentina and Brazil looking like they might overtake the United States, the largest producer. The lower cost of production factors like land and labor in South America and the high value of the dollar are contributing factors.

Annually, 85% of soybeans are crushed into oil and meal and 9% are processed into human food, 95% of which is consumed in Asia. China, Japan, Korea, Indonesia, and Taiwan are the main consumers.

A small percentage of the beans crushed into meal are processed into soy protein ingredients for food. Examples include soy protein concentrates, soy flour, and isolated soy proteins. 3.2% of the crushed beans are used in this manner; however, use of crushed soybeans is food is expanding at 6 times the rate of the use of whole soybeans.

The use of soybeans for food will expand by 72% between the years of 2000 and 2010, requiring that additional soy protein plants be constructed. Distribution channels will also require expansion.

Although only 0.2% of the U.S. soybean crop is processed into human food domestically, 8.8% are when global exports are included. 6.3 million acres of soy beans therefore ultimately are used for food.

A pie chart titled "Soybean usage: 1996-2001" shows: Soybean crush 84.4%. Direct food use 8.6%. Feed/seed/residual 5.7%. Change in stocks. 1.4%.

1642. Park, Kun-Young; Jung, K.-O.; Rhee, S.-H.; Choi, Y.-H. 2003. Antimutagenic effects of *doenjang* (Korean fermented soypaste) and its active compounds. *Mutation Research* 523-524:43-53. Feb/March. [52 ref]

• ***Summary:*** *"Doenjang* (Korean fermented soypaste) is one of the important fermented foods of Korea. *Doenjang* has been traditionally manufactured from *meju,* which is fermented rectangular shape molded from crushed cooked soybeans. The main microorganisms involved for *meju* fermentation are *Bacillus subtilis* and molds such as *Rhizopus* sp., *Mucor* sp., and *Aspergillus* sp. We have already reported that *doenjang* is safe from mycotoxin, especially, aflatoxin contamination due to the manufacturing process of the *doenjang."* Address: Dep. of Food Science and Nutrition, Pusan National Univ., Busan 609-735, South Korea.

1643. *Non-GMO Source* (*The*) (*Fairfield, Iowa*). 2003. China increasing soy imports and domestic production. 3(5):8.

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May.

• ***Summary:*** "China's soybean imports are expected to reach 16.5 million metric tons (MMT) this year, a slight increase over 16.2 5 MMT last year. In 2001-2002, the US accounted for 43 percent of China's soybean imports followed by Argentina (30 percent), and Brazil (27 percent). In 2002-2003 Brazil is the dominant supplier with 45 percent market share followed by the United States with 37 percent and Argentina with 18 percent.

"China's soybean exports totaled 304,093 MMT in 2001-2002 with the majority of these going to Japan, North Korea, and South Korea.

"Domestic soybean production is expected to reach 17 MMT this year. Nearly all of soyfood products, such as tofu and soy beverages, which the Chinese consume in large quantities, are derived from domestically grown soybeans. Very few imported soybeans go for domestic food use.

"The Chinese government recently published a Five-Year Plan, which states the country's goal to increase the yield and oil content of domestic soybeans to that of imported soybeans. The Plan also mentions developing China's northeast area as a zone for producing non-GMO soybeans only.

"(Source: US Department of Agriculture–Foreign Agricultural Service)."

1644. *Ontario Soybean Growers Newsletter.* 2003. Canadian Soybean Export Association holds annual meeting. May. p. 6.

• ***Summary:*** "The Canadian Soybean Export Association (CSEA) held their 8th annual business meeting recently in Guelph. The following members were elected to lead the association in 2003-2004:

Chair: Brad Richmond, Maple Leaf Foods International

Vice-Chair: Marty Huzevka, Hensall District Co-operative

Past-Chair: Martin Vanderloo, Huron Commodities Inc.

Executive Member: Jim Gowland, OSG

Secretary / Treasurer: Kim Cooper, OSG

"CSEA is a voluntary association of members of the Canadian soybean industry, working to promote exports of Canadian soybeans and soya products into world markets. This year's activities included hosting a group of soybean industry members from Japan, Taiwan and Western Europe, participating in a technical mission to Japan, Taiwan, South Korea and Singapore, and the development of two resources to promote the Canadian soybean industry." Address: Chatham, ONT, Canada N7M 5L8.

1645. Wood, Marcia. 2003. USDA plant collectors' exotic expedition captured in historical photo albums. *Agricultural Research* (*USDA*). June. p. 18-19.

• ***Summary:*** Seven albums, containing more than 1,000 photographs from the Dorsett-Morse Expedition to East Asia, are now owned by Special Collections, National Agricultural Library at Beltsville, Maryland. The collection is officially named the "Palemon Howard Dorsett Collection." Researchers visiting the library can, by appointment, view the albums. Each print is pasted on heavy green paper, typical of that used for photograph albums of the early 1900s; below each is a handwritten caption in black ink which generally includes the date, location where the photo was taken, and the name of the plant or object shown–notes Susan H. Fugate, head of the library's special collections. For example: "Soja ussuriensis, Wild soy bean. View [of] the wild soy bean plants growing along road side on [the] outskirts of Heijo [today's Pyongyang / P'yongyang, the capital of North Korea]... These plants appear different from wild soy bean found in Manchuria and Japan. The leaves are larger and somewhat different [in] shape."

A selection of nearly 50 prints can be viewed on the Web at www.nal.usda.gov/speccoll/findaids/dorsett.

The major focus of this expedition was soybeans. "Today soybeans are the second largest U.S. farm crop, worth more than $14 billion in 2002." Food uses that Dorsett and Morse envisioned are part of that market. "What's more, studies are revealing the new benefits of soy compounds such as isoflavones."

"Some of the credit for this current success can be attributed to the Dorsett-Morse expedition. The team brought back about 4,500 soybean specimens as well as another 4,500 specimens of interest. Some of the soybean plants had prized traits, such as resistance to harmful microbes that could otherwise devastate the crop.

"Dorsett, born in Illinois in 1862 and educated at the University of Missouri, joined USDA in 1891. After more than a decade, he left the department to start his own business, then rejoined as a plant explorer in Washington, D.C., in 1909.

"The Dorsett-Morse Oriental Exploration Expedition was an unqualified success and further enhanced Dorsett's reputation as a premier plant explorer. In 1936, he won the Frank N. Meyer Medal from the Council of the American Genetic Association for his outstanding work. The award was named in honor of another USDA plant explorer, who died under what some claim were mysterious circumstances while on a collecting expedition in China.

"But that's another story."

A photo shows P.H. Dorsett (second from right) and his Chinese interpreter Peter Liu on the trail. No date is given. Address: USDA ARS.

1646. **Product Name:** Soga Puree Soy Smoothie / Soy Smoothie Base.
**Manufacturer's Name:** Soga Soyfoods [Pulmuone U.S.A.].
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 866-356-2800.
**Date of Introduction:** 2003 August.

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**Ingredients:** Filtered water, non GMO whole soybean, natural flavors, carrageenan, pectin, alginate.
**Wt/Vol., Packaging, Price:** 32 fl. oz (1 qt).
**How Stored:** Refrigerated.
**New Product–Documentation:** See next page. Talk with John Sim, head of sales at Pulmuone. 2003. Nov. 10. This product was introduced in Aug. 2003. It is still being test marketed.

Spot in *Vegetarian Times.* Aug. p. 17. "So good." "Add a nutritional boost to your home-made smoothies with Soga's non-dairy soy Smoothie Base. One package ($1.89 for 10 oz.) contains more than 16 grams of soy protein. Enjoy these healthful smoothies as an easy-to-make breakfast or as a cool midday treat. Just add fruit and juice and blend! 323.564.3000; www.pulmuone-usa.com. A photo shows a pouch of the Smoothie Base surrounded by bananas and strawberries.

Leaflet (8½ by 11 inch, single sided, color photocopy) sent by Patricia Smith from Natural Products Expo West. 2004. March. A photos shows a 1 quart Tetra Brik Aseptic carton of Soga Soy Smoothie Base. Eight bulleted benefits are listed. The ingredients and nutrition facts are given.

1647. Yang, Jeong-Lye; Lee, S.H.; Song, Y.S. 2003. [Improving effect of powders of cooked soybean and chongkukjang on blood pressure and lipid metabolism in spontaneously hypertensive rats]. *J. of the Korean Society of Food Science and Nutrition* 32(6):899-906. Aug. [31 ref. Kor; eng]
• ***Summary:*** "The effects of cooked soybean and a traditional fermented soy product, chongkukjang, on blood pressure and lipid metabolism were studied in spontaneously hypertensive rat (SHR). SHRs were divided into 3 groups (n=10, male), and fed casein, powders of cooked soybean, and chongkukjang as dietary protein sources for 6 weeks. Body weight gain was not different among experimental groups, but food efficiency was increased in groups fed cooked soybean and chongkukjang diets compared to control group." Address: 1. School of Food Science and Nutrition & Food Science Inst., Inje Univ., Kimhae 621-749, Korea.

1648. Cotter, Alice; Cashman, K.D. 2003. Genistein appears to prevent early postmenopausal bone loss as effectively as hormone replacement therapy (Open Access). *Nutrition Reviews* 61(10):346-51. Oct. [22 ref]
• ***Summary:*** "Recent data from a randomized, double-blind, placebo-controlled, year-long clinical trial suggest that supplementation with the dietary phytoestrogen genistein (54 mg/day) may be as effective as hormone replacement therapy in attenuating menopause-related bone loss without causing the associated side effects. These findings may have implications for the development of diet-based strategies aimed at osteoporosis prevention."

"The richest sources of dietary isoflavones are soy, soy products (in particular, tofu, miso, natto, and fried tofu), and other legumes. Owing to the regular consumption of soy-based products in Asian populations, daily intake of isoflavones in those countries can be between 20 and 50 mg (20) but may be as high as 150 mg/day, such as in Japan, Taiwan, and Korea (21)."

Thus, soy isoflavones (e.g., daidzein and genistein) are implicated in some health-enhancing properties such as improvement of bone health. Address: 1. B.Sc., Dep. of Food and Nutritional Sciences, University College, Cork, Ireland.

1649. *Iowa Soybean Review* (*Iowa Soybean Association, Urbandale, Iowa*). 2003. Top U.S. customers received assistance. 15(1):15. Oct.
• ***Summary:*** Every one of the top ten U.S. soybean customers was once a recipient of some type of U.S. foreign assistance. "Today these nations are powerful U.S. trade partners. A table shows export value in millions of U.S. dollars."

Whole soybeans: European Union $1,167 million. China $1,012. Mexico $755. Japan $724. Taiwan $385. Indonesia $245. Korea $226. Canada $130. Thailand $115. Israel $95 million.

Soybean meal: Canada $200 million. Indonesia $167. Philippines $138. Dominican Republic $71. Turkey $62. Saudi Arabia $59. Japan $59. Mexico $50. Egypt $49. Thailand $44 million. Source: U.S. Department of Commerce.

1650. Kim, M.-R.; Kawamura, Y.; Lee, C.-H. 2003. Isolation and identification of bitter peptides of tryptic hydrolysate of soybean 11S glycinin by reverse-phase high-performance liquid chromatography. *J. of Food Science* 68(8):2416-22. Oct. [33 ref]
• ***Summary:*** "The 21 peptides purified from the bitter fraction of tryptic hydrolysates of soybean 11S glycinin by using gel-permeation high-performance liquid chromatography (HPLC) and a series of 3 C18 reverse phase (RP)-HPLC were in the molecular weight range of 200-1400 Da and showed mostly the hydrophobicity of less than 1400 cal/mol. Although the primary structures of the bitter peptides from 11S glycinin were not exactly the same as those of the proglycinin, many bitter peptides were basic mimics of the common structure, indicating the significance of the primary structure of a peptide playing a role in the bitter taste perception." Address: 1, 3. Center for Advanced Food Science and Technology, Graduate School of Biotechnology, Korea Univ., Seoul, 136- 701, Korea.

1651. Lee, Hyun-Ju; Lee, Hye-Ok; Chang, Young-Eun; et al. 2003. [The effects of soy-based infant formula on growth and development, and the isoflavone concentration of plasma and urine in full-term infants]. *Korean J. of Nutrition* 36(8):841-50. Oct. [34 ref. Kor; eng]

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Pulmuone

SOGA™
so good!!

THICK N' HEALTHY

# Soy Smoothie Base

NON DAIRY SOY SMOOTHIE BASE

- 16g Protein per 8oz. Smoothie Base
- Enhances nutritional value of regular smoothies
- Makes a healthy "Dairy Free" smoothie
- Excellent size for multiple smoothies
- Flexibility to only make (one) smoothie
- One year SHELF LIFE(un-opended)
- Healthy Alternative treat
- "USE LESS"- Reduced cost vs. soymilk







**Nutrition Facts**
Serv. Size 8oz(240g)
Servings about 4
**Calories** 170
Fat Cal 90

| Amount / Serving | %DV* | Amount / Serving | %DV* |
|---|---|---|---|
| **Total Fat** 10g | **15%** | **Total Carb.** 6g | **2%** |
| Saturated Fat 0g | **0%** | Fiber 4g | **17%** |
| **Cholest.** 0mg | **0%** | Sugars 8g | |
| **Sodium** 240g | **10%** | **Protein** 16g | |
| **Potassium** 590g | **20%** | | |

*Percent Daily Values(DV) are based on a 2,000 calorie diet. Calcium 0% • Magnesium 0% • Thiamin 15% Iron 15% • Riboflavin 0% • Phosphorus 0%

**INGREDIENTS:** FILTERED WATER, NON GMO WHOLE SOYBEAN, NATURAL FLAVORS, CARRAGEENAN, PECTIN, ALGINATE, SALT.

| | Soga Smoothie Base |
|---|---|
| UPC Code | 53214 13010 |
| Purchase Pack | 12 |
| Unit Net Weight | 32 oz |
| Gross Case Weight | 30 lbs. |
| Case Dimension | 14.0"X8.1"X7.6" |
| Case Cube | 0.4036 |
| Pallet | 15LayerX5High |
| Shelf Life | 365days |

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• ***Summary:*** "Soy-based infant formula has been used for centuries in Korea. Soybeans contain phytochemicals with a biochemically active component, isoflavone. Isoflavone is a kind of phytoestrogens, structurally and functionally similar to estrogen. This study was conducted to investigate the effects of soy-based infant formula on growth, development, and isoflavone concentration in the plasma and urine. Thirty-nine healthy infants who were delivered at Korean university medical center were recruited." Address: 1. Dep. of Medical Nutrition, Graduate School of East-West Medical Science, Research Inst. of Clinical Nutrition, Kyunghee Univ., Seoul 130-701, Korea.

1652. Sim, John. 2003. Update on Pulmuone & Soga (Interview). *SoyaScan Notes.* Nov. 10. Conducted by William Shurtleff of Soyfoods Center. Followed by a letter dated 14 July 1997.

• ***Summary:*** About 3½ years ago T.J. Song, a native Korean who graduated with an MBA from Stanford Business School, joined the company and is now vice president and CEO. It had been an uphill battle to try to get Caucasian American consumers to recognize, pronounce, and buy Pulmuone. Late 2001 he proposed that Pulmuone start to develop tofu products that would be marketed to mainstream American consumers. All the sales and marketing people agreed with his idea. "It was a no-brainer." So Mr. Song spearheaded the idea to expand Pulmuone's focus beyond the Korean ethnic market and to keep the corporate office's basic philosophy of caring for the environment, caring for neighbors. The company motto is: "We do not sell products that we would not serve to our own family." They decided to use the name "Soga"–which has various association: Soy + garden, yoga, etc. The first products (Organic Twin-Pack Tofu) were introduced in March 2002 at the Natural Products Expo at Anaheim. They outsource their graphic design to RAP Communications. Pulmuone's full-time marketing director is Michael Bylinken. Several weeks ago there was a major article about Pulmuone in the Los Angeles Times business section. Address: Marketing Director, Pulmuone, 4585 Firestone Blvd., Southgate, California 90280. Phone: 866-356-2800.

1653. **Product Name:** Furée (Non-Dairy Natural Soy Smoothie) [Strawberry Banana, Raspberry, Tropical Blend].
**Manufacturer's Name:** Pulmuone U.S.A.
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 866-356-2800.
**Date of Introduction:** 2003 November.
**Wt/Vol., Packaging, Price:** 10.5 oz plastic chug (single serve bottle).
**How Stored:** Refrigerated.
**New Product–Documentation:** Small ad in Natural Foods Merchandiser. 2003. Nov. p. 43. "Pulmuone USA introduces Furée, a soy-based smoothie that offers a nutritious meal







alternative for people on the go. It is completely soy-based; contains 12 gm of soy protein and more than 22 vitamins and minerals; and is low-fat, nondairy, lactose-free, cholesterol-free and kosher. Consumers will find Furée thick, satisfying, refreshing and convenient. Furée comes in three all-natural fruit flavors: Strawberry Banana, Raspberry and Tropical Blend. Call 323.564.3000 or visit www.sogasoyfood.com."

Ad (8½ by 11 inches) by Soga in Natural Foods Merchandiser. 2003. Sept. p. 135. "The smoothie category is now complete–New. The only completely soy-based

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smoothie. Complete meal-in-a-bottle. More soy protein. More vitamins and minerals. 100% natural. Non-dairy." "New Furée is the most complete smoothie in the category.

Note: (1) Is this being introduced by Soga or by Pulmuone? Probably Soga since the Soga logo appears near the top of each plastic bottle. (2) Is it being introduced in place of or in addition to Soga Soy Smoothie Base? Probably in place of.

1654. Soga Soyfoods [Pulmuone U.S.A.]. 2003. New grilled and marinated Soga Gourmet Tofu: You'll never think of tofu the same way again (Ad). *Natural Foods Merchandiser.* Nov. p. 11.

• ***Summary:*** This 8½ by 11-inch color ad shows four products in this line: Santa Fe Chili & Lime, Sicilian Tomato Basil, Ginza Ginger Miso, and Korean Barbecue. "Ready to eat! Pre-diced. Pre-seasoned. Pre-grilled."

Talk with John Sim, head of sales at Pulmuone. 2003. Nov. 10. This product should be available in retail stores by Dec. 1.

1655. **Product Name:** Grilled and Marinated Tofu [Santa Fe Chili & Lime, Sicilian Tomato Basil, Ginza Ginger Miso, and Korean Barbecue].
**Manufacturer's Name:** Soga Soyfoods [Pulmuone U.S.A.].
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 866-356-2800.
**Date of Introduction:** 2003 November.
**Ingredients:** Incl. tofu. miso.
**How Stored:** Refrigerated.
**New Product–Documentation:** Ad (8½ by 11-inch color) in Natural Foods Merchandiser. 2003. Nov. p. 11. "New grilled and marinated Soga Gourmet Tofu: You'll never think of tofu the same way again" (Ad). Shows the labels of four products in this line: "Ready to eat! Pre-diced. Pre-seasoned. Pre-grilled."

Talk with John Sim, head of sales at Pulmuone. 2003. Nov. 10. This product should be available in retail stores by Dec. 1. Note: The company answers the phone: Pulmuone USA and Soga Soyfoods R&D Center.

Product [Ginger Miso–"Ginza" is not mentioned] with Label purchased at Trader Joe's in Lafayette, California. 2004. July 11. 3.75 by 6 inches. Vacuum packed. White, red, dark blue, green and yellow on blue. Retails for $2.49.

1656. Jang, H.S.; Yi, S.D.; Lee, K.T.; Oh, M.J. 2003. [Characteristics of soft soybean curds prepared with the ultra fine whole soybean flour and proteinases]. *Korean J. of Food Preservation* 10:192-99. [Kor; eng]

1657. Kim, J.H.; Ahn, H.J.; Kim, D.H.; Jo, C.; Yook, H.S.; Byun, M.W. 2003. Irradiation effects on biogenic amines in Korean fermented soybean paste during fermentation. *J. of Food Science* 68:80-84. *

• ***Summary:*** "Soybean paste was prepared and irradiated with doses of 5,10, and 15 kGy, and then fermented at 25ºC for 12 wk. *Bacillus* spp. and lactic-acid bacteria decreased by irradiation but increased during fermentation. Biogenic amines detected were putrescine, cadaverine, β-phenylethylamine, spermidine, spermine, tryptamine, histamine, tyramine, and agmatine.

Note: "This research was supported under the Nuclear R&D Program by the Ministry of Science and Technology in Korea." Address: Graduate School of Biotechnology, Korea Univ., Seoul 136-701, Korea.

1658. **Product Name:** [Tofu].
**Manufacturer's Name:** Oriente Alimentación.
**Manufacturer's Address:** Poligono Valmor, 2B, Carretera de Andalucía, km, 28,700 28340 (Madrid), Spain. Phone: 91 895 3622.
**Date of Introduction:** 2003.
**New Product–Documentation:** Letter from Dawn Toscano of Valencia, Spain. 2003. July 17. Survey of tofu makers in Spain. Oriente Alimentación is healthy. Soybeans come from Canada. They do not give tours to the public. Former address: Poligono Valmor, 2B. Founded 1987. Dawn says this is a Korean-run company but he will not give her his name.

1659. Park, So-Hee; Koo, Hae-Jin; Lim, Ho-Soo; Yoo, Jin-Hyun; Hwang, Sung-Yeon; Sihn, Eon-Hwan. 2003. [Effects of the red pepper powders dried in hot-air by various processing methods on quality of kochujang during fermentation]. *J. of the Korean Society of Food Science and Nutrition* 32(6):870-75. [30 ref. Kor; eng]

• ***Summary:*** "Physicochemical characteristics of Kochujang based on hot-air dried the red pepper powders with different treatments, were investigated during 90 days fermentation to obtain information for the industrial production of Kochujang. The pH was decreased gradually during fermentation, and pH of the control Kochujang was consistently higher than those of others... Appearance, taste and overall acceptability of Kochujang based on mash-dried red pepper powder were higher than others." Address: Dep. of Hotel & Restaurant Management, Daelim Univ., Gyeonggi 431-715, Korea.

1660. Seo, Ji-Hyung; Jeong, Yong-Jin; Suh, Chung-Sik. 2003. [Quality characteristics of apple kochujang prepared with different meju during fermentation]. *J. of the Korean Society of Food Science and Nutrition* 32(4):513-18. [21 ref. Kor; eng]

• ***Summary:*** "Three kinds of apple kochujangs were prepared using different commercial meju (normal commercial product, two commercial products from *Aspergillus* sp. and *Bacillus* sp.) and investigated about characteristics. The contents of total free sugar were the highest, 22.43%

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in apple kochujang (II) after 10 week fermentation... There was no significant difference for taste and color in apple kochujangs." Address: Div. of Food, Beverage & Culinary Arts, Yeungnam College of Science & Technology, Daego 705-703, Korea.

1661. Choe, Ji Sook; Moriyama, Yukiko. 2003. Korean cooking for everyone. Tokyo, Japan: Joie, Inc. 112 p. Illust. (many color). Index. 26 cm.
• ***Summary:*** A cookbook of "quick & easy recipes," each step of which is illustrated by numerous color photos. The Korean name of each recipe is given, written in both Korean characters and Roman letters. Many recipes are seasoned with soy sauce.

Soy related recipes: Assorted vegetables (Namool, with soybean sprouts and toasted sesame seeds, p. 44-45). Stuffed cabbage rolls (Cabbage sam, with firm tofu, p. 54-55). Seafood and vegetable omelet (Cheon, with firm tofu, p. 56-57). Tofu steak (Tuboo steak, with firm tofu, p. 60). Braised tofu (Tuboo chorim, with firm tofu, p. 61). Tofu hot pot (Tuboo cheongol, with firm tofu, p. 62). Tofu casserole with miso (Tuboo toenjang chige, with tofu, red miso and white miso, p. 63). Vegetables and beef on rice (Bibimpap, with soybean sprouts, p. 64). Rice with soybean sprouts (Kongnamul bap, and with light soy sauce, p. 68). Stir-fried rice (Bokkumbap, with soybean sprouts and kochu jang, p. 69).

In the section titled "Preparation" is a subsection on "How to make kochu jang (hot sauce)" (p. 95). The major soy ingredient is "meju [soybean koji] powder." "No one-pot dish, rice dishes, salads or stews are Korean without this sauce. Each Korean family has its own recipe, but the common method is the 'slow and steady' maturation to form a good harmony of hot, sweet and sour flavors. "Born from the severe weather and environment, *kochu jang* became the Korean's masterpiece of seasonings. Make a large amount and store as it keeps well."

The word "jang" is found in seasonings such as *kan jang* (soy sauce), *toen jang* (miso, soy bean paste), and kochu jang (hot fermented soy bean paste).

Koreans believe that "Food is a medicine." When there is any disorder, the first thing to do is to take revitalizing food, rather than medicine (p. 102).

The glossary of "Ingredients" (p. 107-09) describes miso, nori seaweed, sesame oil, sesame seeds, soybean sprouts, soy sauce, tofu, and wakame seaweed.

1662. Farnworth, Edward R. ed. 2003. Handbook of fermented functional foods. Boca Raton, Florida: CRC Press. 390 p. Illust. Index. 24 cm.
• ***Summary:*** An overview, with two chapters on fermented soyfoods (natto and miso) cited separately. Chapter 1, titled "History of fermented foods" (p. 1-25) includes brief and vague histories of "Soy foods" including (p. 18-19) soy sauce, miso, tempeh, natto, and sufu [fermented tofu].

Chapter 4, titled "Kefir: A fermented milk product" (p. 77+) states (p. 85-86) that kefir can be made by growing kefir grains in soybean milk (Abraham and de Antini 1999, p. 327-33).

Chapter 9 is "Natto–A food made by fermented cooked soybeans with *Bacillus subtilis* (*natto*)," (p. 227-245).

Chapter 11 is "Miso: Production, properties, and benefits to health" (p. 277-87).

Chapter 12 is "Korean fermented foods: Kimchi and doenjang" (p. 287-305). Soyfoods are mentioned on page 289 include ganjang (soy sauce), doenjang (fermented soybean paste), chongkukjang (quick fermented soybean paste), and gochujang (hot chili pepper soybean paste); each of these is a major condiment in Korean cuisine. Address: PhD, Senior Research Scientist, Food Research and Development Centre, Agriculture and Agri-Food Canada, St. Hyacinthe, Quebec, Canada.

1663. Food and Agricultural Organization of the United Nations. 2003. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production* (*Rome, Italy*) 57:115-16.
• ***Summary:*** The 2003 Production Yearbook, under "Soybeans" (p. 115-16, in English, French, and Spanish) gives area harvested (1,000 ha), yield (kg/ha), and production (1,000 metric tons), each for the years 1989-91, 1995, 1996, 1997, for the following places: World. Africa: Benin, Burkina Faso, Burundi, Congo–Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia PDR, Ethiopia, Gabon, Liberia, Madagascar, Morocco, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia, Zimbabwe.

North and Central America: Belize, Canada, El Salvador, Guatemala, Honduras, Nicaragua, Panama, USA.

South America: Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Suriname, Uruguay, Venezuela.

Asia (fmr = former). Asia: Azerbaijan, Bhutan, Cambodia, China, East Timor (1,000 MT), Georgia, India, Indonesia, Iran, Iraq, Japan, Kazakhstan, Korea–Democratic People's Republic of (north), Korea–Republic of (south), Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Syria, Tajikistan, Thailand, Turkey, Viet Nam (Vietnam).

Europe (former). Europe. Albania, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czechoslovakia, Czech Republic, France, Germany, Greece, Hungary, Italy, Moldova Republic, Romania, Russian Federation, Serbia-Montenegro, Slovakia, Slovenia, Spain, Switzerland, Ukraine. Note: Serbia-Montenegro appears for the first time. Harvested 112,000 ha (yield = 2,099F kg/ha) in 1999-2001, 87,000 (yield = 2,369F) in 2001, 100,000 (yield = 2442F) in 2002, and 131,000 (yield = 1,720F) in 2003. Produced 224,000 metric tons in 1999-2001, 207,000 MT in 201, 244,000 MT in 2002, and 226,000 MT in 2003.

Oceania. Australia.

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Note: In this 2003 Yearbook the USSR was not listed for the first time in the history of the publication.

1664. Hosoi, Tomohiro; Kiuchi, Kan. 2003. Natto–A food made by fermenting cooked soybeans with *Bacillus subtilis* (*natto*). In: Edward R. Farnworth. 2003. Handbook of Fermented Functional Foods. Boca Raton, Florida: CRC Press. 390 p. See p. 227-50. [111 ref]

• ***Summary:*** Contents: Fermented soybean foods in Asia. Ingredients of natto: *Bacillus subtilis* (*natto*) spores, soybeans (color, size, protein content, sugar content, washing and storage methods). Natto processing: Washing and soaking of soybeans, steaming of soybeans, inoculation with *Bacillus subtilis* (*natto*) spores, packaging, fermentation, packing for shipment, changes in packages. Assessment of quality: Chemical composition, sensory tests (8 criteria), changes in consumers' preferences (growing preference for larger soybeans and natto with markedly weaker odors and strings). Health benefits: *Bacillus subtilis* (*natto*) cells (effects on intestinal microflora and feed efficiency, effects on the immune system, anti-allergy effect of subtilisin, fibrinolytic activity of subtilisin, role of vitamin K-2 (menaquinoe-7) in the prevention of osteoporosis), phytoestrogens–effects on cancer and osteoporosis. Conclusions.

Natto and related foods are all made by fermentation with the bacterium *Bacillus subtilis* (*natto*). These include sweet dou chi (*xian doushi*) in China (where it is used as a seasoning for Beijing duck [Peking duck]), kinema in Nepal and Myanmar, *tua nao* in Thailand, and *chungkuk-jang* in Korea.

In the year 2000 a total of 10.1 million metric tons of soybeans in Japan were converted directly into foods; more than 80% of these soybeans were imported. Between 1991 and 2000 there was a 13% increase in soybean consumption for natto products.

Natto makers prefer to use certain soybean varieties such as Suzuhime and Suzumaru which are grown in Hokkaido, Kosuzu in Iwate, Miyagi, and Akita Prefectures, and Natto-Shoryo in Ibaraki Prefecture.

Natto makers generally desire the following qualities in soybeans: 1. Extra small or small size (for consumers from Tokyo northward). 2. Easily washable. 3. Yellow surfaces and hila. 4. A suitable degree of stickiness when made into natto. 5. Relatively sweet taste. 5. Minimal changes in constituents and appearance during storage.

In Japan, soybeans are classified by diameter into four groups: (1) Extra small is less than 5.5 mm diameter. (2) Small is 5.5 mm to 7.3 mm. (3) Medium is 7.3 mm to 7.9 mm. (4) Large is greater than 7.9 mm in diameter.

Japan's leading natto trade association is called the "Federation of Japan Natto Manufacturers Cooperative Society."

A soybean allergen has been identified as *Gly m* d 28K. This allergen is found in high concentrations in various nonfermented soybean products such as soy protein isolate, tofu, dried frozen tofu, and yuba. However fermented soybean products such as natto, soy sauce and miso do not contain this allergen. "*Bacillus subtilis* (*natto*) produces a serine protease [proteolytic enzyme] of subtilisin NAT during its growth. Subtilisin NAT appears to degrade *Gly m* d 28K."

"Circulating platelets and blood-derived proteins (fibrin) are essential for the formation of blood clots, which prevent bleeding long enough for healing to occur. However, excess coagulation prevents normal physiologic blood flow, which causes thrombotic disorders Thrombolytic therapy is the most direct means of restoring blood flow. *Bacillus* spp. produce serine proteases called subtilisins, which are known to have fibrinolytic activity" [8 references cited]. Address: 1. PhD, Tokyo Metropolitan Food Research Centre; 2. PhD, Dep. of Food Science and Nutrition, Kyoritsu Women's Univ. Both: Tokyo, Japan.

1665. Kwon, Hoonjeong; Kim, Young-Kyung Lee. 2003. Korean fermented foods: Kimchi and doenjang. In: Edward R. Farnworth. 2003. Handbook of Fermented Functional Foods. Boca Raton, Florida: CRC Press. 390 p. See p. 287-304. Chap. 12. [86 ref]

• ***Summary:*** Contents: Introduction. Kimchi: Changes during fermentation, cancer, cardiovascular disease, nitrosamines and ethyl carbonate.

Doenjang: Cancer (epidemiology, anticarcinogenic and antimutagenic activities in vitro and animal models), cardiovascular disease (inhibition of angiotensin converting enzyme, antithrombotic peptides), isoflavones. Conclusions. Conclusions. Acknowledgments.

Note: Angiotensin is an oligopeptide in the blood that causes vasoconstriction (constriction of blood vessels), increased blood pressure, and release of aldosterone from the adrenal cortex. It is a hormone. The inhibition of angiotensin converting enzyme is thought to help relieve medical conditions such as high blood pressure, heart failure, diabetic nephropathy and type 2 diabetes mellitus.

Table 12.1 titled "Fermented food consumption by the Korean population" (gm per person per day) gives statistics for the following soy based foods:

Ganjang (soy sauce): Overall 6.6, highest 8.0 in persons aged 30-49.

Gochujang (hot pepper-soybean paste): Overall 3.7, highest 5.2 in persons aged 30-49 years.

Doenjang (soybean paste): Overall 5.6, highest 8.0 in persons aged 50-64.

Jajang (black [soy] bean paste): Overall 1.1, highest 1.8 in persons aged 7-12.

Chongkukjang (soybean paste, quick fermented [Korean-style natto]): Overall 1.0, highest 2.4 in persons aged 65 or older.

Mixed bean paste: Overall 1.0, highest 1.5 in persons

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aged 30-49.

Total: 19.0, highest 24.4 in persons aged 30-49.

Source: Adapted from Ministry of Health and Welfare, Report on 1998 National Health and Nutrition Survey (Dietary Intake Survey), Korea Health Industry Development Industry.

Conclusion: There is presently no conclusive evidence showing human health benefits from consumption of Korean fermented soyfoods. Address: 1. PhD, Food Toxicology Div., Dep. of Food and Nutrition; 2. Research Inst. of Home Ecology. Both: Seoul National Univ., Seoul, Korea.

1666. Minamiyama, Yukiko; Okada, Shigeru. 2003. Miso: Production, properties and benefits to health. In: Edward R. Farnworth. 2003. Handbook of Fermented Functional Foods. Boca Raton, Florida: CRC Press. 390 p. See p. 277-86. [45 ref]

• ***Summary:*** Contents: Introduction. Miso: The history of miso, manufacturing miso, home production of miso, effects of miso on health (gastrointestinal diseases, cancer prevention, elimination of radioactive materials, effect on cholesterol levels and aging, harmful effects of tobacco). Conclusions. Acknowledgments.

Total commercial production of miso in Japan is presently about 600,00 tonnes (metric tons) per year, produced by over 1,500 miso factories and plants (p. 278).

History: At some time between 200 B.C. and 300 A.D. the soybean was probably introduced to Japan, most likely from northern China, through Korea. The earliest known book about miso is "thought to be the *Taiho-ritsyryo* compiled in A.D. 702, but by that time a type of miso was already known in Japan." The technique for preparing miso was introduced from either Korea or China. One theory is that miso developed from Chinese jan [sic, jiang]. In about 550 to 600 A.D., Japanese came to know about jiang, however at this time jiang was being made in Buddhist temples in China. It is believed that in 753, a Chinese Buddhist named Ganjin [Chinese: Jianzhen] (688-763) came to Japan to promote Buddhism and at the same time brought jiang to Japan.

Elimination of radioactive materials: Miso exports to European countries increased after the April 1986 accident at the Chernobyl nuclear power plant in Northern Ukraine, because it was believed that miso consumption could ameliorate the harmful effects of exposure to atomic radiation. Researchers studying the activities of microorganisms have shown that miso consumption helps to eliminate radioactive substances from the body. Address: 1. PhD, First Dep. of Pathology, Okayama Univ. Medical School; 2. Dep. of Pathological Research, Graduate School of Medicine and Dentistry, Okayama Univ. Both: Okayama, Japan.

1667. Evans, Barry. 2004. Failure of nori crop in Kyushu, Japan. Sea vegetables imported to America today (Interview). *SoyaScan Notes.* Jan. 12. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** About 40% of all the nori produced in Japan comes from the Ariake Sea off the western coast of Kyushu, where it has been cultivated on nets for more than 25 years. This bay was ringed by wetlands, which were gradually filled in by developers. In early 2001 the entire nori crop in that bay failed because of an unseasonal outbreak of red tide–which had several causes, including a land reclamation project which destroyed wetlands that are no longer able to purify the sea water. The Japanese believe that nori will never be grown in that bay again–a huge disaster for thousands of nori farmers! This had led to more of the sea vegetables imported to the USA coming from China and Korea. Barry thinks that 80-90% of all the sea vegetables now consumed in Japan comes from China.

It is generally believed in Japan that, of the various sea vegetables, the kombu crop is the cleanest and most free of heavy metals such as lead, mercury, and arsenic. That is because most of the kombu harvested in Japan comes from the area around Hokkaido, Japan's northernmost large island, where the cold, clear current flows down from the north. Japan has made a big effort, over the past 10-20 years, to clean up its environment and coastal waters.

China, on the other hand, has little pollution control. Its main goal is to be the low-cost producer of any product that consumers desire–worldwide. It produces a growing percentage of the world's sea vegetables–but heavy metal content is an issue.

Eden Foods, which is the leading seller of sea vegetables in the USA, buys all of its sea vegetables from Japan and pays more for them than if it bought them from China or Korea. In recent years, Great Eastern Sun (GES) has built its seaweed business on having less expensive products, imported from China. The only sea vegetable GES imports from Japan (Mitoku) is arame, which is not available from China. Address: Owner, American Miso Co., Inc. and Great Eastern Sun, Asheville, North Carolina 28806. Phone: 704-252-3090.

1668. Wais, Asmat. 2004. Tofu and soybeans in Uzbekistan (Interview). *SoyaScan Notes.* Feb. 11. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Mr. Wais, a native of Afghanistan and an experienced businessman, is thinking about starting a tofu manufacturing plant in Uzbekistan. There is presently only one such plant in Uzbekistan; it is run by a Korean man and it serves a population of about 250,000 Koreans now living in Afghanistan. He thinks that Stalin forcibly removed them from North Korea to do forced labor in Uzbekistan. He would like to buy a tofu shop that makes 1 ton/hour. He would prefer to buy tofu equipment made in the USA since OPAC, a U.S. government agency, finances 80% of U.S.

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made equipment purchased for use overseas.

Mr. Wais speaks good English and is an experienced businessman. He earned a degree in business administration at Michigan State University. Then he returned to Afghanistan, where he eventually owned 3 businesses, including a raisin processing plant.

Soybeans have been grown on a fairly small scale in Uzbekistan since 1991, when the country declared its independence from the Soviet Union. All land is still owned by the government; the people lease it from the government.

He travels frequently to Afghanistan and Central Asia. Most people in Afghanistan–except warlords, a few Taliban supporters, and criminals–are extremely grateful to the USA for liberating them from the Taliban. But life in Afghanistan is still difficult and dangerous. Address: 6309 Barnsdale Path, Centerville, Virginia 20120. Phone: 703-815-1360.

1669. Calvi House, Korean BBQ Restaurant. 2004. Meal (Ad). *Pacific Daily News* (*Agana Heights, Guam*). Feb. 12. p. 33.

• ***Summary:*** Includes:

"Dolsot Bibimpap–$15
"Yuekhoe Bibimpap–$20
"Haemool Bibimpap–$20"
"Doenjang Jige–$12
"Kimchi Jige–$14
"Bulgogi–$14" Address: 2nd Floor, Royal Orchid Hotel.

1670. Ra, Kyung-Soo; Oh, S.H.; Kim, J.M.; Suh, H.J. 2004. [Isolation of fibrinolytic enzyme and β-glucosidase producing strains from doenjang and optimum conditions of enzyme production]. *J. of the Korean Society of Food Science and Nutrition* 33(2):439-42. Feb. [16 ref. Kor; eng]

• ***Summary:*** "Bacterial strains showing the fibrinolytic and beta-glucosidase activity were screened from Doenjang. The strain of KH-15 revealed a high level of fibrinolytic and beta-gluocosidase activity. The isolated bacterium was identified and designated as Bacillus sp. KH-15." Address: 1. Dep. of Food and Nutrition, Daegu Technical College, Daegu 704-721, Korea.

1671. Drosihn, Bernd. 2004. Update on soyfoods in Europe. Part II (Interview). *SoyaScan Notes.* March 15. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Soymilk: A major new soymilk maker in Europe is named Wild (www.wild.de), an old German food company that specializes in fruits and ingredients; their retail soymilk is named Soy and Joy. Their most famous brand is Caprisun, a non-soy drink in a foil pouch, well known in the USA. They and So Good, the Australian soymilk now made with Solae, are both strong competitors of Alpro.

Several weeks ago Hain-Celestial of New York purchased two German soymilk makers, both owned by Bruno Fischer, Jr.: Natumi and Gut Honneroth. He sold both companies at a low price–probably because he had to. Bruno had gotten his soymilk into Aldi, the mother company of Trader Joe's and the No. 1 discounter in Germany–and maybe in all of Europe, and he developed a large soymilk business with Aldi–perhaps so large he could no longer handle it himself. Bruno also made a lot of private label soymilk. With Hain, Bruno found a large German dairy to make soymilk for Aldi under a new Aldi brand. The new European CEO of Hain-Celestial is Philippe Woitrin, who was CEO of Lima Foods when Hain acquired it.

Triballat makes the best soy yogurts (Sojasun brand) in the world–in Bernd's opinion. They have a new brand, Sojadé, which are delicious creamy yogurt drinks–maybe organic. The Japanese Yakult concept of drinking live beneficial probiotic bacteria each morning has now caught on in a big way in Europe. Yakult is one of the best entries into the European food market in years. Bernd just saw White Wave's Silk Alive [the name was soon changed; it was sold commercially only under the name "Silk Live"], a similar product, at the Anaheim Natural Products Expo. But he liked the Wildwood smoothie even better, and the WholeSoy fermented soymilk best of all American products.

In France a small company named Sojami (pronounced so-zha-MEE), which started about 10 years ago, makes very creative, unique, and interesting soy cheeses and cultured soy yogurts. The founder has a university research background and is a very nice guy.

Tofu: Tofu consumption in Europe has expanded steadily over the past 5-7 years, but it is still a very small product. The largest maker of the tofu and tofu products sold in Germany is Life Food GmbH / Taifun Produkte, run by Wolfgang Heck and Guenter Klein. Heuschen-Schrouff B.V. (Landgraaf, Netherlands) and Viana are tied for second place. About 10 years ago, Heuschen-Schrouff started selling their tofu under the organic So Fine brand (www.sofine.nl). An Indian-run company in Kerkrade, Netherlands, run by the brothers Singh (both Sikhs), makes tofu mostly for the Asian (Indonesian) market. In 2001 Viana started selling its tofu to the mainstream market under the Veggie Life brand; this English-language brand name communicates well to people speaking many different languages throughout the EU (European Union)–though distribution is still limited to Germany and Austria. Soto Tofu, formerly run by Rolf Barthof has been sold to a very large dairy company, Algäuland. Viana's main products are tofu and tofu products–such as meat and cheese alternatives. Viana is #1 in Germany in meat alternatives. Germans buy soyfoods for three main reasons: They are good for one's health, they taste good, and good for the environment. Bernd is a vegan, but about 90% of Viana's products are sold to non-vegetarians.

Early tofu companies still active in Europe include Sojafarm (founded and still run by Lothar Stassen), Albert's Tofuhaus (Albert Hess; exports lots of his products to France). A basic problem with the smaller, early tofumakers

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in Germany is that they didn't have the creativity or power to put a brand on the market. So both these companies produce a lot of tofu under private labels. Lothar bought the Svadesha brand (Svadesha was the first German tofu company) and produces tofu under the Svadesha brand. About 2-3 years ago he also purchased the Nagel's Tofu brand from Christian Nagel, who now markets the tofu under his former brand. So Lothar makes tofu under 3 brands. Berief Feinkost (in Beckum [Bochum?], northern Germany), started 10-15 years ago, tries to cover the mainstream tofu market, but not very successfully. Kassel Tofu Kato (started by Gyoergy / Yuri Debrecini, who was at Soyastern). Thomas Karas is no longer involved with soyfoods; he tried to enter the computer business but Bernd does not know what he is doing now. In Spain, the market leader is Natursoy near Barcelona. Nearby is Salvador Sala of Vegetalia. In Spain, there is a lot of interest in and rapid growth of soyfoods and organic foods. In Italy the Ki Group (Schenker) owns a tofu company–fairly old but not very creative.

In the United States, Pulmuone now has three U.S. factories; their first one in Southgate, southern California, a new one at Fullerton, California, and a 3rd one in New York. The Fullerton factory is the most modern Bernd has ever seen. There they make Gourmet Tofu, introduced in about Jan. 2004, which is presliced and marinated, in 4 flavors / styles: Baked, Sliced, and Marinated.

Meat alternatives: Nestle now owns Osem which owns Tivall, the Israeli maker of meat alternatives. Since all of Tivall's products are held together by eggs or egg whites, none of them are vegan–and none are organic. Quorn, which also contains lots of egg protein, is owned by AstraZeneca [Marlow Foods]–which wants to sell the company because growth and profits have been lower than expected. DE-VAU-GE in Germany is a very big company, they make large amounts of meat alternatives (incl. burgers), and they do a lot of business with Aldi in breakfast cereals–not in soyfoods. Bernd thinks they are good, and very economical manufacturers, but they are not very creative and they have no USP (unique sales point); moreover, many of their products contain egg protein, but their quality is lower than that of Tivall. Bernd believes his meat alternatives are as good as Tivall's, but more expensive, in part because of organic ingredients. Tivall makes its raw materials in Israel, then exports these to Europe for cutting and flavoring.

Klaus Gaiser owns Topas which sells Viti brand meat alternatives based on wheat gluten, with no soy; he owns the brand and markets the products, but he has meat companies manufacture them. However, when his typically 3-year contract with the manufacturer expires, he has to find a new manufacturer, but the previous one keeps making his products under their own brand. In the USA: At Turtle Island Foods (Hood River, Oregon), Bernd met Hans Wrobel, a German who does product development. Note: Hans and Rhonda Wrobel of The Higher Taste developed Tofurky in Portland, Oregon. Bernd makes Pizzarella, a tofu-based cheese alternative. Address: Founder and president, Viana Naturkost GmbH, 54578 Wiesbaum / Vulkaneifel, Germany. Phone: +49 06593-99670.

1672. Lee, Sarah. 2004. NAL now has the log and all accompanying photographs from the Dorsett–Morse expedition to East Asia, 1928-1932 (Interview). *SoyaScan Notes.* April 14. Conducted by William Shurtleff of Soyfoods Center. [2 ref]

• ***Summary:*** Special Collections at NAL has two sets of albums. Originally they had 7 photo albums (containing at least 1,000 original photos in albums), which they had labeled the Dorsett collection because they didn't have any records to accompany the albums, but they found that many of the captions mentioned "Dorsett." NAL has since found the text that originally accompanied the photos (the log of the Dorsett–Morse expedition to East Asia)–more than 2,000 pages. Some of these photos are displayed on their webpage, www.nal.usda.gov/ speccoll/ findaids/Dorsett/ index.html. A finding aid has been created for the collection, and it is on the website. The gallery on the web gives sample photos from each of the 7 albums. NAL does not know the source of these photo albums; they have been in the library for a long time [and may well have been a gift of Dorsett and Morse].

Recently the American Soybean Association gave NAL 17 travel books that are the log of the trip. There are many photographs in the log itself.

Copies of the photos, which are made by a vendor, cost about $30 each.

Talk with Prof. Ted Hymowitz. 2008 Nov. 16. Dorsett and Morse may have taken the first color motion pictures ever. The film was given to them by Eastman Kodak. Address: Special Collections, National Agricultural Library (NAL), Beltsville, Maryland.

1673. Kim, Sun-Young; Kim, S.J.; Lee, J.Y.; et al. 2004. Protective effects of dietary soy isoflavones against UV-induced skin-aging in hairless mouse model. *J. of the American College of Nutrition* 23(2):157-62. April. [28 ref]

• ***Summary:*** A soy isoflavone extract was administered to female hairless mice which were then irradiated with ultraviolet light for four weeks.

"Results: In the isoflavone treated group, the skin had a better appearance and less wrinkling than that of the control group" [which received no soy isoflavone extract].

"Conclusions: It appears that isoflavones had an anti-aging effect on the UV-damaged hairless mice model,..." Address: Pharmaceutical & Health Research Inst., AmorePacific Corp. R&D Center, Yongin, Kyounggi, Korea.

1674. Kim, Yoon; Cho, J.Y.; Kuk, J.H.; Moon, J.H.; Cho, J.I.; Kim, Y.C.; et al. 2004. Identification and antimicrobial activity of phenylacetic acid produced by *Bacillus*

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*licheniformis* isolated from fermented soybean, Chungkook-Jang. *Current Microbiology* 48(4):312-17. April. *
• ***Summary:*** "A bacterial strain, B65-1, which showed strong antimicrobial activity, was isolated from Chungkook-Jang, a traditional Korean fermented-soybean food with antimicrobial properties. Based on carbon utilization pattern and partial 16S rRNA sequence analysis, the B65-1 strain was identified as *Bacillus licheniformis*... Our results indicated that the phenylacetic acid produced by *B. licheniformis* during fermentation of soybean is one of the main compounds of antimicrobial activity of Chungkook-Jang."

1675. Lee, Cherl-Ho. 2004. The role of biotechnology in modern food production. *J. of Food Science* 69(3):CRH92-CRH95. April. 12th World Congress of Food Science and Technology. [18 ref]
• ***Summary:*** "Modern food production technology is given great challenges by the emerging fields of biotechnology and molecular biology. Knowledge of conventional fermentation technology is upgraded by the gene level explanations of enzyme actions and physiological functions of biomaterials derived therefrom. The use of genetically modified organisms (GMOs) and their products in food widens the availability of resources while also raising public interest about safety and labeling. As an example of the application of molecular biology in conventional fermentation technology the selection of proteases from a Bacillus species grown in Korean traditional soybean fermentation starter, Meju, and the production of peptides with blood cholesterol lowering effect, obtained from soybean protein hydrolysate, are presented. Recent developments in the Korean bioindustry are reviewed as an example of the role of biotechnology in the food industry. The present status of GMO enzymes in food production is reviewed and safety issues about GMO use in the food system are discussed."

Note: Soy is mentioned 19 times in this document. Address: Graduate School of Biotechnology, Korea Univ., Seoul, 136-701 Korea.

1676. Hymowitz, Theodore. 2004. Speciation and cytogenetics. In: H. Roger Boerma and James E. Specht, eds. 2004. Soybeans: Improvement, Production, and Uses. 3rd ed. Madison, Wisconsin: American Society of Agronomy. xxv + 1144 p. See p. 97-136. Chap. 4. [195 ref]
• ***Summary:*** Contents: 1. Origin of the soybean and its dissemination. 2. *Glycine* species. 3. Generic relationships. 4. Origin of the genus *Glycine*. 5. Genomic relationships among diploid species. 6. Polyploid complexes. 7. Gene pools. 8. Intersubgeneric hybrids. 9. Cytogenetic techniques. 10. Karyotope analysis. 11. Chromosome aberrations–numerical changes. 12. Chromosome aberrations–structural changes. 13. Chromosome aberrations–aneuploidy. 14. Conclusions. Acknowledgments.

Note: The first section of this chapter consists of an excellent, concise history of the soybean.

1500-1100 B.C.–Soybean emerges as a domesticate during the Zhou dynasty in the eastern half of north China.

1st century A.D. soybean probably reaches central and south China and the Korean peninsula. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, 1102 South Goodwin Ave., Urbana, IL 61801.

1677. Koo, Chun-Sur. 2004. Ganjang and Doenjang: Traditional Fermented Seasonings. *Koreana* 18(1):62-67. Spring. Available online.
• ***Summary:*** "As recently as 10 years ago, it was not difficult to see *hangari* (crockery pots) when driving around the countryside of Korea. They were invariably located in an area that received ample sunlight and was also well ventilated. If a house had a big enough yard, the hangari were often placed along the rear wall. In such case, the hangari would sit on an elevated base, made from stones and earth, so that they could receive more direct sunlight. This elevated base was commonly known as *jangdokdae*, or crockery jar terrace.

"Since ganjang is a liquid and doenjang a paste, the two can be easily distinguished. However, they both share a common origin. Tradition calls for Koreans to prepare the *mejubap* needed to make doenjang in the tenth lunar month, by boiling and grinding soybeans. The ground soybeans are formed into a block (20 x 15 cm) or round shape, and left to dry for a week in a cool place. Then, the meju is bound with rice straw and hung to dry from the eaves of their homes for about 40 days. When the meju is thoroughly dried, it is stored in a warm place so that it can ferment. The rice straw is not removed since it serves to facilitate the fermentation process.

"When the fermentation process is complete, the meju is placed in salt water. The water's salt content is proper when the meju will float to the surface. The fermented meju and salt water would gradually mix together over an extended period of time. When the salt water takes on a dark brown color, it is ganjang [soy sauce]. Once the soaking and mixing process is completed, the meju is removed. The removed meju is doenjang, while the dark brown salt water is ganjang. Ganjang is then boiled and stored in a large hangari on the jangdokdae.

"Doenjang, which is also made from the fermented meju, has the consistency of a thick paste. Charcoal and red peppers are placed in a ganjang pot. Charcoal is added because it is effective in absorbing impurities, while peppers are included for their sterilizing capability. These ancient methods of preparing jang have been scientifically proved to produce fermented foods with impressive health benefits.

"Great Taste, Good Health: Mention of Korean jang can be found in the *Book of Wei and Dongyi Tribes, Sanguozhi*, a Chinese document compiled by Chen Shoo in AD. 290.

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This would seem to confirm that jang-making methods were developed a long time ago, indeed: Doenjang, which is neither hard nor soft, was also called tojang in the past. In the days of old, the Chinese used to refer to doenjang as the smell of Korea; thus indicating their acknowledgement of the fact that doenjang originated on the Korean peninsula. The technique of preparing meju was eventually introduced to Japan, such that the mention of *jang, si* and *maljang* is included in the Japanese Daihoritsuryo, or Daiho Code published in 701. Maljang was introduced to Japan as well. However, according to a Shosoin document published in 739, the Japanese referred to maljang as miso. *Touga* by Arai Hakuseki in 1717 stated: 'Maljang, which originated from Goryeo, made its way to Japan, where it was pronounced as miso, in accordance with the local dialect'

"In the olden days, doenjang was said to possess five virtues. The first of these is *dansim,* meaning that doenjang will maintain its own taste and aroma even when combined with other tastes. The second is *hangsim,* that doenjang would never go bad. If stored properly, doenjang actually develops a more intense. taste over time. Third is *bulsim,* that doenjang can eliminate the unpleasant odor of fish and meat. Fourth is *seonsim,* in which doenjang is said to make spicy food more savory, And fifth is hwasim, meaning that doenjang can be used to complement any type of food.

"A recent report revealed that doenjang has the most significant anti-carcinogenic efficacy of all Korean fermented foods, followed by gochujang (red-pepper paste) and ganjang. In the case of doenjang and gochujang, homemade items were found to have greater anti-carcinogenic effectiveness than the commercial products sold in stores. Moreover, traditional doenjang is also known to be effective for restoring liver damage." Address: Director, World Food Culture Research Institute.

1678. Pulmuone Co., Ltd. 2004. Pulmuone 2003 annual report. Chungcheongbukdo, Korea. 43 p. 28 cm.
• ***Summary:*** Contents: Corporate profile. To our shareholders, customers and employees. Pulmuone values and strategy. History: Staying the 20 years progress. How Pulmuone puts its values into action. Pulmuone people: Won Kyung Sun. Overview–Pulmuone packaged-fresh foods businesses. Pulmuone brand–Soy protein business unit. Pulmuone brand–HMR [Home meal replacement, esp. noodles, dumplings, desserts] business unit. Pulmuone brand–Sojae business unit [incl. bean sprouts, mushrooms, kimchi, fresh eggs, nori seaweed]. Pulmuone brand–Green vegetable juice. Pulmuone global brand (Soga)–Pulmuone

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USA, Inc. EMCD–Food service. Foodmerce–General food distribution, Financial section. Board of directors. Pulmuone network. Corporate information.

"Corporate profile: Pulmuone Co. Ltd. is one of the world's leading providers of fresh, close-to-nature products with shelf lives of fewer than 15 days." This unique business model, and the foresight to realize in 1984 what consumers want, stems from: "(1) The special Korean culinary style of cooking, with a heavy dependence on fresh, close-to-nature products. Traditional Korean foods are considered on of the world's healthiest diets, with a heavy dependence on soybean-related ingredients. (2) The Pulmuone founder's vision that emphasizes a 'love for our neighbors' and a 'respect for all living beings.' (3) The mixing of corporate values with strong results..." The heavy emphasis on innovation. "May 2004 marks Pulmuone's 20th anniversary... We'll offer the best Asian-type tofu and related products for Asian consumers, and at the same time provide the best alternative soybean protein-protein based food sources for the rest of the globe." Seung-Woo Nam is chairman of the board and CEO. Last year Pulmuone's revenues increased by 30.2%. Net income (profit) however decreased slightly.

A timeline (p. 8-9) shows 35 important milestones in Pulmuone's history from 12 May 1981 to 2004. Of these, 26 are for Pulmuone companies and 9 are for "affiliates."

Values into action: "Since 1993, our company has donated 0.1% of sales on products bearing the 'Love Earth' seal to needy neighbors and to environmental causes." Examples of projects are shown.

Pages 12-13: "Won Kyung Sun: The founder of Pulmuone Cooperative Farm. A true teacher: Born into an indigent farm family in the southern part of Pyong Yang province in 1914, Won Kyung Sun began raising silkworms at the age of six to support his family after the death of his debt-ridden father. The Korean war [June 1950 to July 1953] had a grave impact on him when his eldest son died at age six. In 1955 [when post-war hunger and starvation were widespread in South Korea], Mr. Won organized Pulmuone on 33,058 square meters [8 acres] of usable land to provide a 'rebirth' for those who had been struggling with Christian values. The land was formed into a cooperative farming community. In 1976, Pulmuone adopted an organic farming approach by using organic fertilizers. In the late 1970s Mr. Won solidified his Pulmuone values to be these: Love for our neighbors, because when our neighbors are not happy, we can never be happy, and Respect for all living beings, because everything is interdependent with each other. When we do not protect nature, which in turns supports all living beings, the well being of our future is jeopardized. The top leaders in Korea regard Mr. Won as one of the most profound teachers in 20th-century Korea."

Five small color photos show Mr. Won. A full-page black-and-white photo shows him walking on a road, carrying a hoe over one shoulder. "In 1995 Mr. Won received the UN's 500 Award for Environmental Achievement."

Soy protein: "A key impetus that drives the domestic market (KRW 490 billion) is the switch by consumers from unpackaged to packaged tofu products. Further, the recent mad cow disease scare... A major concern for Korean consumers is whether soybeans are produced in Korea and if these soybeans are genetically modified (GMO). That our tofu products are free from any GMO–meaning their GMO Level tests less than 1%–has won widespread trust among consumers. As a result, our company gained nearly 75% of the national tofu market with a nationwide, chilled supply-chain system capable of delivering products on a daily basis to maintain freshness. In 2003, we completed the world's largest state-of-the-art automated tofu plant at Eum Sung. It is capable to producing 200,000 pieces of tofu daily.

Soga: In 2003 Pulmuone USA's tofu sales increased by 22% to over $250 million. Color photos show the company's tofu plants at South Gate, California, Fullerton, California, and Tappan, New Jersey. Homepage: www.pulmuone.co.kr. Address: 80-1, Samhori, Daesomyun, Eumsunggun, Chungcheongbukdo, Korea. Phone: 82-043-879-4500.

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1679. Pulmuone USA, Inc. 2004. Pulmuone USA, Inc. proudly announces their new strategic alliance with Wildwood Natural Foods Inc. (News release). Fullerton, California. 1 p. July 20.
• ***Summary:*** "Pulmuone USA, Inc., the largest tofu company in the world, is proud to announce their strategic alliance with Wildwood Natural Foods, Inc. By joining forces, both companies will collaborate on research, production, marketing, and sales to build an even stronger presence in the United States."

T.J. Song, executive vice president of Pulmuone USA is "proud and very excited to have Wildwood join the Pulmuone family... This alliance will make both companies leaders in the natural foods market."

Pulmuone, Inc., founded in 1981, has worldwide annual revenues of more than $400 million. "With an ever-expanding American market base, Pulmuone South Korea established Pulmuone USA in 1991, to distribute natural food products from South Korea to the American market. The company is the leading manufacturer of tofu, fresh noodles, meatless products, and soy milk-based items.

Pulmuone, with manufacturing facilities in California and New York, makes products under the Pulmuone, Kimbo, Nigari, and Soga brands, with Pulmuone, Kimbo and Nigari catering to the ethnic market and the Soga brand focusing on developing and making quality soy products for the mainstream American market. Address: Fullerton, California.

1680. Wildwood Natural Foods, Inc. 2004. Wildwood Natural Foods enters into a strategic alliance with Pulmuone U.S.A., Inc. (News release). Watsonville, California. 1 p. July 20.
• ***Summary:*** "Wildwood Natural Foods, Inc. ('Wildwood'), formerly known as Wildwood Harvest Foods, Inc., is pleased to announce that it has entered into a strategic alliance with Pulmuone U.S.A., Inc. The relationship provides for significant equity investments into Wildwood as well as a broad collaboration on research, production, marketing, and sales."

Billy Bramblett and Jeremiah Ridenour (founders of Wildwood) and Tom Lacina (COO of Wildwood) express enthusiasm for the alliance. Dan Winegarden, President of the Iowa Agricultural Finance Corporation, supports the alliance. "Separately, Wildwood announces the appointment of Paul S-U Kang as President and CEO. Paul's experience includes brand management at Procter & Gamble Co. in Cincinnati, Ohio, and mergers and private equity at Goldman Sachs & Co. in New York. He received his A.B. from Harvard Univ. in Massachusetts and his M.B.A. from Stanford Univ. in California.

Other investors in Wildwood include the tecTerra Food Equity Fund I, the Iowa Farm Bureau, soybean farmers, and over a dozen physicians interested in the health benefits of soy.

"Wildwood was founded some 25 years ago and has been a pioneer in the natural and organic food category. Pulmuone U.S.A., Inc., with three factories in the U.S., is a subsidiary of the publicly-listed Pulmuone Co., Ltd., with revenues of $250 million. Pulmuone Co. Ltd. is the largest player in the global tofu industry and is a part of the Pulmuone Group with businesses in fresh juices, bottled water, fresh noodles, food supplements, and food services." Address: Watsonville, California.

1681. Lim, Sun-Young; Rhee, S.H.; Park, K.Y.; Yun, H.S.; Lee, W.H. 2004. [Inhibitory effect of methanol extracts and solvent fractions from doenjang on mutagenicity using in vitro SOS chromotest and in vivo Drosophila mutagenic system]. *J. of the Korean Society of Food Science and Nutrition* 33(9):1432-38. Nov. [27 ref. Kor; eng]
• ***Summary:*** "This study investigated the inhibitory effect of methanol extracts and several solvent fractions from doenjang on mutagenicity using in vitro SOS chromotest and in vivo Drosophila mutagenic system. In order to determine an antimutagenic effect of doenjang methanol extracts, other soybean fermented foods and original materials were compared." Address: 1. Div. of Ocean and Science, Korea Maritime Univ., Busan 606-791, Korea.

1682. *SoyaScan Notes.* 2004. Chronology of major soy-related events and trends during 2004 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Jan/Feb.–*Biodiesel* magazine starts publication in the USA.

Feb. The excellent European periodical *Soyafoods*, edited by Heather Paine of England, changes its title to Soy & Health, when the American Soybean Association stopped funding. Past and current issues can be downloaded from the Soy Conference website www.soyconference.com.

April–Yamasa Corporation purchases San-J International (Richmond, Virginia).

April–Pulmuone U.S.A. makes a significant financial investment in Wildwood Harvest Foods, Inc. In July the two companies announce their merger. Both tofu companies are based in California.

April–The Food and Drug Administration (FDA) confirms that it is in the process of reviewing a petition for a health claim that suggests the consumption of soy protein-based foods may reduce the risk of certain types of cancer, including breast, prostate, and colon cancer. The Solae Company submitted the petition.

June–"The Whole Soy Story: The Dark Side of America's Favorite Health Food," an article by Kaayla T. Daniel is published in *Mothering* magazine. Her unbalanced approach is to collect, often misinterpret, and publish in one place all the negative information she can find about soy.

July 20–Wildwood Natural Foods, Inc. and Pulmuone

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U.S.A. announce their merger.

July–Soyfoods Center "publishes" on its Internet website (www.soyfoodscenter.com) the entire (previously unpublished) manuscript of its book *History of Soybeans and Soyfoods*, by William Shurtleff & Akiko Aoyagi (2,500 pages). It is now available worldwide for all to use free of charge. Research and writing of this book began in Oct. 1980.

Nov. 10–USDA's Animal and Plant Health Inspection Service [APHIS] confirms the presence of soybean rust on soybean leaf samples taken from two plots associated with a Louisiana State University research farm.

World Wildlife Fund establishes the Roundtable on Responsible Soy to address the impacts of soy production [as on the Amazon rainforest] and identify solutions.

Trends: (1) The low-carb diet continues its popularity and upward trend in the USA. Soy protein is being used to replace carbohydrates is a wide array of products from taco chips to bread, from healthy soft drinks (Snapple-A-Day) to vegetable juice (V8 Splash Smoothies). Consumption of meat, which is also low in carbohydrates, is now coming back into popularity. Few, if any, nutritionists, think that low-carb diets are healthful. (2) The anti-soy faction continues to have an active and one-sided web presence–and a negative effect on the growing interest in soyfoods. Leaders are Sally Fallon, Kaayla T. Daniel, Richard and Valerie James, and a few others. (3) Ten million more people were hungry in 2004 than in 2003, according to Bread for the World Institute's 2004 Hunger Report. At the same time the World Food Program announced that food aid has decreased every year since 1999. Hunger is a growing issue. Hunger and poverty are inextricably linked; if there are no resources, there is no food.

1683. Lee, J.-D.; Park, S.-K.; Hwang, Y.-H. 2004. Evaluation of agronomic characteristics for development of small seed-size soybeans by interspecific crosses. *Korean J. of Breeding* 36(4):207-13. [23 ref. Eng]*

• ***Summary:*** "In general, it is known that smaller soybeans produce a higher sprout yield. The small soybean germplasm with seeds weighing below 100 mg per seed is limited, so wild soybeans (*Glycine soja*) are useful genetic source for the breeding of small seed-size soybean for sprout." Address: 1. Kyungpook National Univ., Daegu, Republic of Korea [South Korea].

1684. Lee, Min June; Kim, M.J.; Min, S.H.; Yoon, S. 2004. [A study on the attitude of soy food and estimated dietary isoflavone intake among Korean adolescents]. *Korean J. of Community Nutrition* 9(5):606-14. [Kor]

• ***Summary:*** "This study was conducted to investigate the attitude to various soy foods and to estimate dietary isoflavone intake among Korean adolescents. The survey was carried out by self-administered questionnaire with 800 middle-school and high-school students residing in urban and rural areas and 714 questionnaires were collected: resulting in 89% response rate. The dietary isoflavone intake was estimated by food frequency questionnaire developed for rapid assessment of isoflavone intake. Soybean paste, soybean curd, soy milk, bean sprouts and dambuk... Stuffed rice in fried soybean curd got the highest score and miso soup got the lowest in preference. More than 50% of the subjects consumed soybean paste stew/soup and soybean curd over twice per week and 12.3% of the subjects consumed soybean over once a day. The estimated daily intake of isoflavones ranged from 0 to 227 mg, and the mean daily isoflavone intake of the subjects was 28.1 mg (16.3 mg genistein and 12.0 mg daidzein) whereas the median value of isoflavone intake was 19.7 mg." Address: Korea.

1685. Shin, D.H. 2004. [Change in preparation methods and bioactive function of fermented soyfoods]. *Korea Soybean Digest* 15:1-12. [Kor]*

1686. Bensky, Dan; Vlavey, Steven; Stöger, Erich; Gamble, Andrew. comp. and trans. 2004. Chinese herbal medicine–Materia medica. 3rd ed. Seattle, Washington: Eastland Press. xxxi + 1311 p. Illustrations adapted by Lilian Lai Bensky. Index. 29 cm. [200+* ref]

• ***Summary:*** Note that this book was compiled and translated. In the chapter on "Herbs that release the exterior" we find: Pharmaceutical name: "Sojae Semen preparatum" (*dan dou chi*). English: prepared soybean. At the start is an illustration of the leaves of a soybean plant with pods and flowers. The text in which it first appeared is: *Treasury of Words on the Materia Medica.* There follow 2 pages about its: (1) Actions and indications. (2) Other combinations. (3) Commentary. (4) Mechanisms of selected combinations. (5) Nomenclature & preparation; Black soybeans are used. (6) Quality criteria; Use loose black soybeans "with a thin membranous skin and a strong aromatic fragrance."

Soy is next mentioned on pages 65-67. Pharmaceutical name: Sojae Semen germinatum (*da dou juan*). English: Young soybean sprout, dried soybean sprout. Text in which first mentioned: *Divine Husbandman's Classic of Materia Medica.* The same categories of information are given.

The third and last mention is on page 977-78 in the chapter on "Substances that extinguish wind and stop tremors." Pharmaceutical name: "Glycinis Testa" (*lu dou yi*). English: soybean skin. "It is made by soaking black soybeans until they sprout, after which the skins are shucked off, collected, and dried in the sun. They should be stored in a dry place as they readily absorb moisture."

Appendix 6 is the "Historical and source text bibliography," sorted by English title. It is a table with the following six columns: English title. Chinese title. Pinyin title. Author (English). Author (Chinese). Date/Dynasty. For example *Treasury of Words on the Materica Medica* (*Ben*

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*cao hui yan*) by Ni Zhu-Mo was first published during the Ming dynasty.

1687. Ebine, Hideo. 2004. Industrialization of Japanese miso fermentation. In: Keith H. Steinkraus, ed. 2004. Industrialization of Indigenous Fermented Foods. 2nd ed. Revised and Expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. See p. 99-147. Chap. 2. [87 ref]

• ***Summary:*** Contents: Introduction. History and earliest known references to miso. Indigenous process: Raw materials used in ancient times. Industrial / Commercial production today. Contrast between indigenous and modern processing. Critical steps in manufacture / fermentation. Major problems in industrialization. Optimal environmental conditions for microorganisms. Essential microorganisms for fermentation. Possible spoilage microorganisms. Chemical / Biochemical changes in miso during fermentation. Changes in physiological functions during fermentation. Forecast of the role of miso in the future.

Foods similar to miso are made in other parts of East- and Southeast Asia. They are referred to as "jiang" in China, "doenjang" in Korea, "taucho" in Indonesia, and "tao-si" in the Philippines.

Note: In the Philippines, the word "tao-si" (also spelled "tausi" or "taosi") refers to fermented black soybeans, not to a kind of miso. Address: Professional Engineer, Shishitsuka, Tsuchiura, Ibaraki-ken, Japan.

1688. Hui, Y.H.; Meunier-Goddik, L.; Hansen, A.S.; Josephsen, J.; Nip, W.-K.; Stanfield, P.S.; Toldra, F. eds. 2004. Handbook of food and beverage fermentation technology. New York, NY & Basel: Marcel Dekker, Inc. xii + 919 p. Illust. 26 cm. Series: Food Science and Technology No. 134.

• ***Summary:*** Koji (and koji starter) is mentioned on pages 4, 482, 485-86, 503, 541-43, 544-51, 554-59, 562-63, 575 and under the subheads: making koji, red koji, salted koji, seed koji, soybean koji, starter koji, washed koji, and wheat koji.

Miso is mentioned on pages 39, 41, 79, 549-52, 555, 557-61, 568, and under the subheads fermentation management, manufacturing miso, mixing, packaging, production, red miso, salty miso, soybean miso, soybean steamer, standardization, sweet miso, water content and texture, white miso.

Natto is mentioned on pages 533-40, and 568, and under the subheads *Bacillus natto*, biochemical changes, Daitokuji natto [not a type of natto; fermented black soybeans], daiyohukuzi natto [sic], enzymes, flavoring compounds, gamma-polyglutamic acid, general description, incubation room, inoculation, management, manufacturing, niowanatto, packing, production, sticky substances.

Soy foods: Asian, Chinese, Japanese, jiang, Korean, miso, natto, soy nuggets, soy paste, soy sauce, soy yogurts sufu, tempeh, types.

Soy nuggets: doushi, history, production, toushih.

Soy protein, p. 393.

Soy sauce: classification, chemical method, common soy sauce, composite soy sauce, In-yu. koikuchi soy sauce, light-colored. processed, raw, Siro [sic, Shiro], soy sauce paste, special, tamari, traditional fermentation.

Soy sauce fermentation.

Soy sauce filter cake.

Soy sauce koji, microflora.

Soy sauce manufacturing processes.

Soy sauce processing.

Soy yogurt, p. 498, and under the subheads composition, microorganisms, production.

Stinky tofu.

Sufu [fermented tofu], pages 571-576, and under the subheads fermentation, fermented tofu, general description, hard tofu, Kwantung sufu, manufacturing, moldy tofu, packaging, product quality and composition, production, red koji, rose sufu, sanitary tofu, seasoning, sesame oil, Tsao sufu.

Tempeh (tempe) pages 4, 39, 41, 82, and under the subheads basic changes, changes in carbohydrates, changes in lipids, changes in proteins and amino acids, changes in vitamins, consumption, cost, general description, history, issues and problems in production, microorganisms related to, presence of antibiotics, presence of antioxidants, production procedures in Indonesia, production procedures in the US, production, reduction of phytate. Address: 1. Science Technology System, West Sacramento, California.

1689. Demick, Barbara. 2005. Americans find a door to N. Korea: a Chinese city is filled with people from the U.S. who want to reach out to the impoverished, forbidden country across the river. *Los Angeles Times* (*California*). Jan. 3. p. 15 (A3).

• ***Summary:*** A huge photo shows a demolished bridge across the Tumen River that once joined China and North Korea. Peter Han, a retired L.A. County social worker, "runs two bakeries in North Korea that produce rolls with raisins–from California, of course–for schoolchildren. He has a factory in the North Korean city of Rajin that makes *doenjang*, a soybean paste, and an experimental farm for soybeans and corn."

Han "was born in the North Korean city of Wonsan but left as a child..." Address: Times staff writer.

1690. Moskin, Julia. 2005. Artisanal, creamy, sweet tofu? Fresh bean curd is still misunderstood in America. *New York Times.* Jan. 5. p. F1, F5.

• ***Summary:*** A song of praise to fresh tofu! A new generation of New York City restaurants are serving fresh, natural tofu (often made locally or in-house the same day it is served). That old, unappealing term "coagulated bean curd"

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"doesn't begin to convey the pleasures of silken tofu–tender mouthfuls of freshly made kinugoshi-dofu (in Japanese), sundubu (Korean), or doufu (Chinese)."

And customers are coming to appreciate "the simple virtues of fresh tofu." Some restaurants known for their tofu (addresses and phone numbers are also given) are: Book Chang Dong, Cho Dang Gol, En Japanese Brasserie, Honmura An, Kasadela, Li Hua, Megu, Seoul Garden, Spicy and Tasty, and Temple.

Tofu is made in much the same way as cheese, except from puréed soybeans instead of cow, sheep, or goat milk as its raw material. "Because of its ability to produce so many different forms of nourishment, the soybean has long been called 'the cow of China,' and tofu was first developed there by Buddhist monks about 2,000 years ago" [doubtful; no citation given].

Chinese names for tofu, that indicate the esteem in which it is held, include "meat without bones" and "meat from the fields."

1691. Pulmuone U.S.A. Inc. 2005. Pulmuone USA Inc. (Website printout–part). www.pulmuone-usa.com Retrieved Feb. 13.

• ***Summary:*** Contents: Home page. 1. Company. 2. Products. 3. Recipes. 4. Food Library. 5. Community. Atop the home page is the Pulmuone logo and the Soga logo. In large letters below the menu bar: "Welcome to Pulmuone. A plate full of nature." Below that in smaller letters: "Pulmuone brings out the nature to your meals: We at Pulmuone believe in bringing the foods as close to nature's way as possible, instead of making foods. To do so, Pulmuone adheres to the following principles; 1. Use only the very best grade raw materials. 2. Never use any artificial ingredients, flavors such as MSG or preservatives. 3. Maintain immaculate, state-of-the-art manufacturing processes." Below that, under the banner "New products," are color photos of the labels of a new line of Soga products in four flavors: Grilled & Marinated Tofu in Tomato Basil, Santa Fe Chili & Lime, Korean Barbecue, and Ginger Miso. Below that: "Pulmuone donates part of its profit to various environment preservation organizations." A window shows four "Pulmuone downloads: Pulmuone Annual Report 2002, Pulmuone IR, Pulmuone Group IR, Daewoo Security Analyst Report.

Under Company is a "Pulmuone History" (actually chronology). 1981 May–Pulmuone Organic Foods opened to sell organic vegetables from its own farm. 1984 May–Pulmuone Foods Co., Ltd. incorporated. 1984 June–Tofu and Bean Sprout Plant: Yangju, east of Seoul. 1986 Nov. Mineral spring water plant: Chungju, South of Seoul. 1987 May–Pulmuone Kimchi Museum, Seoul. 1988 Dec.–Natural House opened (Natural retail chain): Korea. 1989 Jan.–Pulmuone Food Standards Committee (Establish standards for food formula, ingredients and manufacturing process): Korea.

1990 Jan.–Soybean paste plant [jang] opened in Doan, south of Seoul. 1991 Jan.–Pulmuone U.S.A. Inc. founded. 1991 June–Fresh noodle plant: Chuncheon, northeast of Seoul. 1993 Aug.–Ilsongjung Foods Ltd., Korean-Chinese joint venture: China. 1995 June–Tofu Plant #1: South Gate, California, USA. 1995 Sept.–ISO 9002 certificate obtained. 1995 Oct. IPO at KASEC. 2002 March–Tofu Plant #2: Tappan, New York, USA. 2002 Oct.–Soga Soy Foods Center (Research & development of soy foods). 2003 Aug. Tofu Plant #3: Fullerton, California, USA. A photo shows Pulmuone's headquarters in Fullerton, California. Caption: Pulmuone was founded in 1981 with 40 employees. It has grown to become a multinational company of 2,000 employees with annual sales of $450 [sic] million. "The secret to success lies in uncompromising commitment to better foods and better life." Address: 4567 Firestone Blvd., South Gate, California.

1692. Ridenour, Jeremiah. 2005. Pulmuone first invests in Wildwood Natural Foods in April 2004 (Interview). *SoyaScan Notes.* Feb. 13. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Jeremiah met Tom Lacina and his partner / brother-in-law one day when they showed up at the Wildwood plant in Santa Cruz. Jeremiah took them on a tour of the plant, then they went out to lunch. Tom was one of those rare people who was both an attorney and a farmer. He owned a farm and had built a small tofu shop on his land. He was selling about $50,000/year worth of soy products at the most. They said they were struggling in Iowa trying to make their tofu plant work, and they were losing tons of money. Somebody (Shurtleff) told Lacina that if he wanted to be successful, he should model his company after Wildwood. After visiting Wildwood, they visited San Diego Soy Dairy and Luke Lukoskie. He then called Jeremiah and said that if he was ever in the Midwest, he was welcome to stop by for a visit. On a trip to the East, Jeremiah stopped in to see Tom, who introduced him to venture capitalists (VCs) in Des Moines who scouted for companies potentially suited for Iowa state money. The VCs grilled Jeremiah about his business. To get money from the state of Iowa, a company had to have more than $5 million/year in sales. Jeremiah really liked Tom and the Soy Sisters (Tom's wife and sister). Wildwood had run out of capacity, working around the clock 7 days a week, so it was "grow or else." Wildwood and Midwest Harvest Corp. (Tom's company) ended up merging, becoming an Iowa corporation and getting money from the state of Iowa for job creation in Iowa and value-added products made in Iowa from Iowa farm crops. A certain percentage of that money had to be spent in Iowa, but Jeremiah was able to get enough to buy a used meat-packing plant in Watsonville, about 25 miles southeast of Santa Cruz. First the new corporation bought 10 acres of land in Grinnell, Iowa, 1½ miles down the road from Tom Lacina's

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farm and in 2001 built a state-of-the art plant (22,000 square feet) where only soymilk and cultured foods (such as soy yogurt) were made–the only such plant in the USA. Jeremiah has long had a strong commitment to organic farming and the use of organic ingredients wherever possible in his products. On his 320-acre farm, Tom Lacina grows some of the organic soybeans that Wildwood makes into cultured soyfoods in Iowa. This is the type of vertical integration that Jeremiah had long sought. Jeremiah used to contract with various organic farmers, but he gradually found problems keeping the protein levels of his two select varieties high enough and ensuring the cleanliness of the soybeans he wanted. So 5-6 years ago he started to buy his soybeans through a broker, and giving very clear specifications–such as at least 43% protein in the soybeans to be used in making tofu. That system has proven to be much better.

While building his first factory in Iowa, Jeremiah bought an old meat-packing plant in Watsonville, California and began to renovate it for food processing. Building two plants at once turned out to be a big mistake. The usual cost overruns occurred. After building plans had been approved by the inspectors and the meat-packing plant renovation was almost finished, inspectors came back in and said that about $1 million worth of earthquake retrofitting would have to be done. Jeremiah did the work and finished the plant. But now he needed the last million dollars of marketing money that he had been promised by Iowa. But Iowa refused to pay that money, arguing that it would take more than that amount for the company to reach the break-even point. What Wildwood couldn't see, was that politics was at work behind the scenes; Iowa wanted to get out. The money guys told Jeremiah he would have to find a strategic partner. Jeremiah suddenly found himself short of cash and in a financial crisis.

So he made a short list of potential partners who might invest money. House Foods America Corporation (Los Angeles) showed some interest then backed off. Jeremiah had first met Pulmuone in the spring of 2003 at the Natural Products Expo West in Anaheim; their booths happened to be across the aisle from one another. They had a smoothie product and Wildwood had introduced a smoothie the year before; Jeremiah thought that Pulmuone's wasn't very good. Some people from the Pulmuone booth came over to visit. They said that their CEO was coming from Korea and invited Jeremiah to meet him. But for some reason it never happened. So Jeremiah never thought of putting Pulmuone on his short list of potential partners.

Meanwhile, the Iowa cultured products plant was not doing well. "This discipline required to make cultured soyfoods is like that in an operating room." Jeremiah's basic concept was to make these cultured soy products probiotic, which would give them functional value. At his first meeting with the employees he asked how many people had heard of "probiotics," Nobody. Woops. How many had heard of "antibiotic." Everybody. He knew from that moment he would have marketing problems. Jeremiah and a PhD in microbiology had traveled to the plant, established the sanitation protocols, and trained the workers. But soon after he left, the quality control problems returned. Tom Lacina was more interested in having the paperwork done well than in enforcing the sanitation rules. This led to a loss of business and of money.

There was another factor. Jeremiah has come to believe that many, if not most, Midwesterners see anyone from California as a hippie. Hippies don't know how to run businesses and don't understand most Midwesterners. At one point the VCs put their foot down and told Jeremiah, "Too much travel. We don't want you to come here anymore." At that point things got out of control.

Stonyfield Farms was planning to have their soy yogurt made at Wildwood's Iowa plant–a huge potential account. But the people in Iowa could not produce the quality that was required. They missed a huge opportunity to make the Iowa plant successful. Jeremiah's wishes he had waited until the Iowa plant was making good quality products before bringing in Stonyfield.

Today, the Iowa plant is doing very well in every way; sales grew 400% last year. Pulmuone sent their R&D experts there and turned things around in short order. (8) In April 2004 Wildwood sold a controlling interest to Pulmuone. It was a matter of economic survival. So Wildwood has become an international company, with Korean partners. To celebrate the deal, Jeremiah went on a tour of Pulmuone's facilities in Korea. (9) Origins of Pulmuone in 1955 in Korea as a Christian Farming Cooperative. Their mission is "Love Thy Neighbor" and they are deeply committed to pure foods, organic agriculture, and no artificial ingredients. The saintly Mr. Won. Alex Nam went to college with Mr. Won's son. Pulmuone now has 12 organic food products.

In the early days, the Soyfoods Association was unable to attract any Asian soyfoods companies. Today both Asian companies, huge American food processors (Kellogg, ADM, DuPont, Kraft), and even state soybean boards are members. Address: 412 E. Riverside Drive., Watsonville, California 95076.

1693. Wildwood Natural Foods. 2005. Wildwood Natural Foods (Website printout–part). www.wildwoodnaturalfoods.com Retrieved Feb. 13.

• ***Summary:*** Contents: Home page. 1. Our products. 2. Wildly healthy! 3. About Wildwood. Atop the home page is a new Wildwood logo: "Organic since 1978." "Our mission is to nourish health & well being through supporting dietary & agricultural change." "Founded in 1978 on the edge of Marin County's wild watershed, Wildwood Natural Foods' first goal was to provide fresh vegetarian food to local communities. Today, Wildwood is famous for producing the best tasting, freshest organic tofu, vegetarian products, and soy milk you can buy. Ask a tofu eater which tofu is best. We're confident

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that they will say 'Wildwood!' because we've heard that response for over 2 decades.

"In shepherding the products from the farmers' fields to your table, we've discovered a variety of non-GMO higher-protein low-fat soybeans. We contract directly with organic family farmers to grow these beans. Wildwood further ensures the freshness of our products by delivering to your store several times per week. Our commitment is to your health and well-being, while emphasizing great taste, because our reputation is in your next bite."

2. About Wildwood. One page gives 5 Wildwood locations (addresses but no phone numbers or e-mails). Another gives a ½-page company history, starting in 1978. "2001–Focusing on unique products that nourish the body & protect the environment, Wildwood builds two new state-of-the-art certified organic plants–one in Watsonville, California, and one in Grinnell, Iowa. Under Tom Lacina's guidance, the Iowa plant becomes the first dedicated cultured soy plant in the US.

"2004–Wildwood teams up with Pulmuone, a respected leader and innovator in the organic and soy food industry. A fourth team member, Paul Kang, joins Billy, Jeremiah & Tom to continue the wildwood mission born over 25 years earlier; to bring Wildwood's wildly delicious and healthful products to every table in America." Address: 412 E. Riverside Dr., Watsonville, California 95076.

1694. Bernard, Richard L. 2005. New garden-type soybean varieties. Urbana, Illinois. 2 p. Unpublished typescript. Feb. 28 cm.

• ***Summary:*** "Because of their high nutritional value and health benefits there has been considerable recent interest in soyfoods. Most of this attention has focused on soybean products such as tofu, soy milk, soy-protein fortified flour, or meat analogs constructed from extracted soy protein, and it is not generally recognized that soybeans are an excellent vegetable and may be eaten directly much as other beans or peas. The mature dried soybean may be used just as other beans except that to avoid rancidity they should not be pre-soaked but put directly into boiling water for about 40 minutes at which point they are ready to eat. Probably the best way to use vegetable soybeans is to pick the immature pods (after the seeds have reached full size but before any yellowing begins) and boil them for only 4 to 5 minutes (in lightly salted water if your taste prefers) after which the seeds may be easily squeezed out (the shells are inedible) and eaten as a 'finger food' or added to soups, salads, fried rice, or other dishes of your choice. They taste good cold or hot, and the attractive bright green color enhances the appearance of the food. After cooking they may be frozen in or out of the pod for later or out-of-season use. The advantage of eating the immature seeds over the ripe seeds besides the better taste and appearance and much shorter cooking time is that they are more digestible since the complex carbohydrates (oligosaccharides) of the mature seeds have not yet formed.

"While all soybeans are edible, certain soybean varieties with larger seeds and milder taste have been developed for human food usages especially in Japan and Korea. These Asian food varieties have desirable seed traits but are not well adapted to our climate, insects, and diseases. US soybean breeders have crossed some of these large-seeded Asian varieties with adapted US grain varieties and developed some better adapted vegetable types. At the University of Illinois we have made selections from hybrid populations involving these large-seeded soybeans and now have a number of promising vegetable-type lines adapted to Illinois. Thirteen varieties have been released, named with the prefix Gardensoy, ranging from early maturing (maturity group 0) to late (group IV). They have seeds from about 50% larger to twice as large as the common grain types grown in Illinois but yield only about 80 to 60% as well and therefore are not competitive for production for processing.

Any one variety will have an optimum harvest period for green pods of just a few days since all the pods on a soybean plant tend to develop together. The advantage of growing several varieties with different maturity dates is a longer time of harvest. This may also be accomplished by having several planting dates (estimate 3 days delay in planting for one day delay in harvest but this will vary widely). Like all soybeans these varieties are self-pollinating and true-breeding, and therefore you may let a few plants ripen without picking and use these seeds for next year's planting.

"Because of their bigger seed size and better taste the Gardensoy varieties are being offered to home gardeners for small scale production and hand harvest. As harvest machinery and techniques are developed larger scale commercial production may become practical. We will provide 30 to 50-seed packets of these varieties (free of charge) to anyone wishing to try them.

"The table below provides some data based on tests at Urbana in 2000 to 2004 on average yield of ripe seeds, mature seed size (centigrams per seed), date of maturity (plus maturity group), stem type, plant height, and mature seed composition (protein and oil).

"We will be interested in any taste preference, observations, or comments that you wish to send to us after trying them. Please send comments and requests for seeds to the address below.

"Richard L. Barnett, Dep. of Crop Sciences, Univ. of Illinois, 1101 Peabody Dr., Urbana, IL 61801." Tel. 217-333-7279. Address: Dr., Illinois Agric. Exp. Station, Univ. of Illinois, Urbana, IL 61801.

1695. *Suburban Trends* (*West Milford, New Jersey*). 2005. Classified ad: Cook–Korean specialty. March 30. p. E7.

• ***Summary:*** "Leonia–Prepare & cook various side orders as kimchee, doraginamul, haemuljun & main dishes as Denjang

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Jigae, Duk Gook, Kimchee Jigae,... & make various Korean seasonings as chojang, ssamjang, gochujang using pepper, pepper paste, fermented soy bean, water, sugar, vinegar & must be familiar with all traditional Korean eating customs such as Sol and Chusok. 2 years experience. Send letter / resumé to KA YA Rest. 450 Broad Ave., Leonia, NJ 07606. Attn. Mgr."

1696. Gibson, Lance; Benson, Garren. 2005. Origin, history and uses of soybean (*Glycine max*). Revised. Dep. of Agronomy, Iowa State University. 2-3 p. March. https://web.archive.org/web/20120614193010/www.agron.iastate.edu/Courses/agron212/Readings/Soy_history.htm

• ***Summary:*** "History and Origin:

"The first domestication of soybean has been traced to the eastern half of North China in the eleventh century B.C. or perhaps a bit earlier. Soybean has been one of the five main plant foods of China along with rice, soybeans, wheat, barley and millet. According to early authors, soybean production was localized in China until after the Chinese-Japanese war of 1894-95, when the Japanese began to import soybean oil cake for use as fertilizer. Shipments of soybeans were made to Europe about 1908, and the soybean attracted world-wide attention. Europeans had been aware of soybeans as early as 1712 through the writing of a German botanist [Engelbert Kaempfer, lived 1651-1716]. Some soybean seed may have been sent from China by missionaries as early as 1740 and planted in France.

"The first use of the word 'soybean' in U.S. literature was in 1804. However, it is thought that soybean was first introduced into the American Colonies in 1765 as 'Chinese vetches'. Early authors mentioned that soybeans appeared to be well adapted to Pennsylvania soil. An 1879 report from the Rutgers Agricultural College in New Jersey is the first reference that soybeans had been tested in a scientific agricultural school in the United States. For many years, most of the references to this crop were by people working in eastern and southeastern United States where it was first popular. Most of the early U.S. soybeans were used as a forage crop rather than harvested for seed. Most of the early introductions planted in these areas were obtained from China, Japan, India, Manchuria, Korea, and Taiwan.

"For many years, soybean acreage increased very slowly. There were only 1.8 million acres in the United States in 1924 when the first official estimate became available. At that time, most of the crop was used for hay. It was not until the 1920's that soybean acreage expanded to any great quantity in the U.S. Corn Belt.

"Before World War II, the U.S. imported more than 40% of its edible fats and oils. Disruption of trade routes during the war resulted in a rapid expansion of soybean acreage in the U.S. as the country looked for alternatives to these imports. Soybean was one of only two major new crops introduced into the U.S. in the twentieth century. The other major crop, Canola was initially developed in Canada and is now grown on some U.S. acres. Soybean was successful as a new crop because there was an immediate need for soybean oil and meal, its culture was similar to corn, and it benefitted other crops in a rotation.

"Following World War II, soybean production moved from the southern U.S. into the Corn Belt. The major soybean producing states of Iowa, Illinois, Minnesota, Indiana, Ohio, Missouri, and Nebraska produced 67 percent of the U.S. total in 2003; the southern and southeastern states of Arkansas, Mississippi, North Carolina, Kentucky, Tennessee, Louisiana, Alabama, and Georgia produced 14 percent. Other states with significant soybean acreage are South Dakota, Kansas, Michigan, Wisconsin, and North Dakota.

"A record 2.9 million bushel soybean crop was produced in 2001 on 74.1 million acres with an average per acre yield of 39.6 bushels. The leading soybean states are Iowa and Illinois. In 2003, Iowa had 10.6 million acres of soybeans while Illinois had 10.3 million. The highest state yield ever achieved was 50.5 bushels per acre produced by Iowa farmers in 1994.

"The U.S. dominated world soybean production through the 1950's, 60's, and 70's, growing more than 75 percent of the world soybean crop. The U.S. was the major supplier of animal feed protein in the world during this period. A worldwide shortage of feed protein in the early 1970's led to the initiation of large-scale soybean production in several South American countries, most notably Argentina and Brazil. By 2003, the U.S. share of the world's soybean production had shrunk to 34 percent, while Argentina's and Brazil's had increased to 18 and 28 percent, respectively. Most of the land suitable for soybean production in Argentina has been put into production. Brazil has an estimated additional 100 million acres of land that can still be put into soybean production. This land, which comprises an area larger than the U.S. Corn Belt, is remotely located in the interior of the country and faces many obstacles to further soybean production. One of the greatest problems is the lack of an efficient transportation system.

"Uses of Soybean:

"Early Uses. Soybeans were grown for centuries in Asia mainly for their seeds. These were used in preparing a large variety of fresh, fermented and dried food products that were considered indispensable to oriental diets. Soybeans were not used to any great extent for forage in Asia.

"Early use of soybeans in the United States was for forage and to some extent, green manure. It was not until 1941 that the acreage of soybeans grown for grain first exceeded that grown for forage and other purposes in the United States.

"Present Uses. Soybeans are the United States' second largest crop in cash sales and the number one export crop. In 2003, the export value of soybeans was more than

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9.7 billion dollars, or about one-sixth of all agricultural exports. Normally, more than half of the total value of the U.S. soybean crop comes from exports as whole soybeans, soybean meal, and soybean oil. About 40 percent of the world's soybean trade originates from the U.S.

"China has become the largest single country customer for U.S. soybeans with purchases totaling nearly $3 billion. Mexico, the European Union, and Japan are the second, third, and fourth largest international markets, respectively. Major export markets for soybean meal are the Philippines and Canada. Mexico and Korea are large customers of U.S. soybean oil.

"The majority of the soybean crop is processed into oil and meal. Oil extracted from soybeans is made into shortening, margarine, cooking oil, and salad dressings. Soybeans account for 80 percent or more of the edible fats and oils consumed in the United States. Soy oil is also used in industrial paint, varnishes, caulking compounds, linoleum, printing inks, and other products. Development efforts in recent years have resulted in several soy oil-based lubricant and fuel products that replace non-renewable petroleum products.

"Lecithin, a product extracted from soybean oil, is a natural emulsifier and lubricant used in many food, commercial, and industrial applications. As an emulsifier, it can make fats and water compatible with each other. For example, it helps keep the chocolate and cocoa butter in a candy bar from separating. It is also used in pharmaceuticals and protective coatings.

"The high protein meal remaining after extraction can be processed into soybean flour for human food or incorporated into animal feed. Soybean protein helps balance the nutrient deficiencies of such grains as corn and wheat, which are low in the important amino acids, lysine and tryptophan.

"Use of vegetable proteins for human consumption continues to expand in the United States. They can be used as meat and dairy substitutes in various items. Most people are aware of the use of soy proteins in baby formula, weight-loss drinks, sport drinks, and as a low-fat substitute for hamburger.

"Soy flour and grits, made from grinding whole soybeans, are used in the commercial baking industry to aid in dough conditioning and bleaching. They have excellent moisture-holding qualities that help retard staling in bakery products."

Note: This document, unfortunately, contains many errors–and no bibliographic references. Above all it fails to mention that the soybean was introduced to North America [Colony of Georgia] by Samuel Bowen in 1765. Address: Iowa State Univ.

1697. Mine, Yoshinori; Wong, A.H.K.; Jiang, B. 2005. Fibrinolytic enzymes in Asian traditional fermented foods. *Food Research International* 38(3):243-50. April. [39 ref]

• ***Summary:*** "Fibrinolytic enzymes are agents that dissolve fibrin clots. Recently many food derived fibrinolytic enzymes have been found in various traditional Asian foods. Fibrinolytic enzymes can be found in a variety of foods, such as Japanese Natto, Tofuyo [Okinawan fermented tofu], Korean Chungkook-Jang soy sauce [sic, natto],... These novel fibrinolytic enzymes derived from traditional Asian foods are useful for thrombolytic therapy. They will provide an adjunct to the costly fibrinolytic enzymes that are currently used in managing heart disease, since large quantities of enzyme can be conveniently and efficiently produced. In addition, these enzymes have significant potential for food fortification and nutraceutical applications, such that their use could effectively prevent cardiovascular diseases." Address: Dep. of Food Science, Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1.

1698. Crain, Liz. 2005. City's soy wranglers offer a totally tofu experience. *Portland Tribune* (*Oregon*). July 15. p. B3.
• ***Summary:*** About Ota Tofu and Dae Han Tofu, both in Portland. At Ota Tofu in southeast Portland, there are 13 workers on a work floor of just over 900 square feet. "Since 1918, the family business has focused on the local market, never expanding outside Portland." Ota tofu is fresh and unpasteurized, curded with a refined form of nigari.

Ota Tofu doesn't deliver or advertise; it doesn't have to. People and businesses who want Ota Tofu come to the shop to pick it up. Today, the restaurants Sweet Basil, the Farm Café, Old Wives' Tales, Fong Chong, and Curry in a Hurry have all stopped by to pick up buckets or water-filled bags of fresh tofu. All day long, vans and trucks from catering services, Asian markets and other restaurants from as far away as northern Washington drive to the front of Ota to load up on tofu.

A large color photo shows Ota employee Wai Yang as she uses long chopsticks to deep-fry tofu pouches (agé) in a rectangular stainless steel fryer.

Dae Han Tofu, owned by Calvin Chun, started in 1993 and now has four employees. Chun, who moved to Portland from South Korea in 1989, rolls up his sleeves and helps with all parts of the work. Dae Han's work space is a bit larger than Ota's and streamlined for higher volume. In addition to regular types of tofu, the company produces specialty tofus such as teriyaki, hot and spicy, extra firm, and low fat (made from dehulled soybeans).

Contact information: Ota Tofu, 812 S.E. Stark St. Phone: 503-232-8947. Dae Han Tofu, 3340 N.W. Yeon Ave. Phone: 503-223-0044.

1699. Little, Stacey. 2005. Arirang Restaurant review. *Montgomery Advertiser* (*The*) (*Montgomery, Alabama*). Aug. 11. p. 41.
• ***Summary:*** They tried the *doenjang-jjigae* (bean paste stew). Address: Restaurant reviewer.

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1700. House Foods America Corporation. 2005. House Foods America Corporation (Brochure). 7351 Orangewood Ave., Garden Grove, California 92841. 12 p. 28 cm. [Eng; Kor; Jap; Chi]

• ***Summary:*** Brochure (glossy color, written in 4 languages on each 2-page spread: English, Korean, Japanese, Chinese) sent by Patricia Smith from Natural Products Expo (Baltimore, Maryland). 2005. Sept. Contents: Introduction. Tofu & tofu products (In 2004 House Foods American Corporation building its second tofu factory in Franklin Township, Somerset County, New Jersey). House Foods products. Restaurant Curry House. Tofu factory (Garden Grove, four photos). Other photos of the company's products are scattered throughout the brochure. Address: Garden Grove, California. Phone: (714) 901-4350.

1701. Barrett, Walter. 2005. Re: Work with soybeans in Central Asia. Letter (e-mail) to William Shurtleff at Soyfoods Center, Oct. 3. 1 p.

• ***Summary:*** In 1991, at age 44, Walter sold his ownership share of a soil testing laboratory in the Midwest. Since that time has been doing volunteer work with soybeans in Eastern Europe, Central Asia, and Afghanistan, mostly with 3 NGOs (non-governmental organizations): Winrock International, Mercy Corps, and ACDI / VOCA.

"All countries in Central Asia are somewhat familiar with the soybean but few countries, with the exception of Kazakhstan, are growing the soybean for commercial purposes.

"The soybean is most familiar among Korean communities that are scattered throughout parts of Central Asia. While in Turkmenistan, I came across a Korean lady who grew soybeans in her garden for her own use (see photos 77, 78, and 81). Note that she is cooking a native, green-seeded variety. She was one of the very few people growing soybeans in Turkmenistan before my arrival. Even now, progress is very slow because of government mandates to grow cotton.

"I work with both farmers and university researchers on soybeans. Most countries in Central Asia have a few native varieties (see attached photo 63, which shows a Tajikistan researchers with a native Tajik variety). I am guessing that most of these varieties were developed during Soviet times [before 1991]. I would like to know more about the origin of these varieties but that information is not easy to come by. I think, though, that the information would be available if one had the time and means to pursue it.

"I am a retired production agronomist, not a plant breeder. I have a lifetime of experience with growing corn and soybeans but do not consider myself to be a soybean guru by any means. I find my volunteer work in Central Asia very enjoyable and rewarding..." Address: 2804 Trent Drive, Fort Wayne, Indiana 46815. Phone: 260-484-7493.

1702. Barrett, Walter. 2005. Work with soybeans in Central Asia (Interview). *SoyaScan Notes.* Oct. 4 and 6. Conducted by William Shurtleff of Soyfoods Center. Preceded by letter (e-mail) of Oct. 3.

• ***Summary:*** Walter has worked with soybeans in 4 Central Asian nations: Kazakhstan, Uzbekistan, Turkmenistan, and Tajikistan. Kazakhstan and Georgia have the most history with commercial soybean production, because Soviet planners made it happen there. They designated other Central Asian countries for cotton production, in part because cotton needs less water. Latitude is part of the reason. The climate is also very dry, so that all soybeans (and almost all crops) in these countries must be irrigated, but with river water carried by gravity. Of all the Central Asian countries, Kazakhstan has been the most successful at understanding a market economy and making it work.

Walter has many contacts in these countries. He is willing to help Shurtleff try to get a better history of soybeans in each of these countries. First, Shurtleff will send Walter an e-mail containing a table showing the dates he has for the earliest document seen showing soybeans in each in each country, and soybean cultivation in each country. Then the earliest date seen for soybean cultivation in each country. Walter will forward this e-mail to an intermediary (Winrock International or Mercy Corps), who will then mail or phone or hand deliver the message to the network of indigenous researchers Walter has developed over the years. The message will encourage them to contact other researchers who might be interested; then Walter will wait for replies.

Walter believes that Korean communities in at least four of these countries (Turkmenistan, Uzbekistan, southern Kazakhstan, and Tajikistan) were growing soybeans for their own use at an early date–probably since the early 1900s and using them almost entirely for food–such as tofu, soy sprouts, Korean-style miso and soy sauce, green vegetable soybeans, etc. The Koreans raise chickens, for example, but they forage for food and are not fed soybeans. Walter has no idea when, or, why, or how these many Korean communities came to be established in Central Asia. He has no idea where the soybean varieties they grow came from. These Korean communities are all found within a horizontal oval that cuts across national boundaries, and includes the cities of Almaty [Alma-Ata] (in southwest Kazakhstan), Toshkent [Tashkent] (capital of Kyrgyzstan), Dushanbe (capital of Tajikistan), and Ashgabat (capital of Turkmenistan). In this area are numerous Korean restaurants where Walter has eaten; but he has no idea how many Koreans live in this area. Most individual Korean communities grew only one variety, but each Korean community had its own variety. By contrast, there are not many Chinese communities in these areas.

Walter expects his next trip to Central Asia to be in the spring of 2006–probably Uzbekistan and possibly Turkmenistan or Tajikistan. He is given drivers and

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interpreters by the NGO sponsoring his trip. One of the ongoing problems he faces is the limited abilities of interpreters; communication is often difficult, and it is hard to pursue agricultural or academic questions with farmers. It is less difficult with educated researchers or academicians (best is Tajikistan, followed by Turkmenistan–who might help find others). The researchers in these countries don't talk much with each other, either within a country or among countries. They have few opportunities to travel, and little access to the Internet or e-mail. This is because of government restrictions, difficulty of getting visas or money, etc. Researchers are lucky if they have a working computer, but most have a telephone and some have a cell-phone.

Of all Central Asian countries, Kazakhstan is the one in which the soybean is the most important as a commercial crop–by far. They probably have at least several thousand hectares planted to soybeans. The soybeans in Kazakhstan are run through an extruder (extrusion cooker) to make soybean oil and meal. These same extruders are also used to process cottonseed. Soybeans are grown in Central Asia largely because of the demand for meal by the local poultry industry for use in chicken feeds. Poultry is the driving force, and Central Asia is a "protein-poor" region. Walter's main reason for being there is because of poultry and (to a lesser extent) livestock; it is to help educate them about the soybean, its value for producing soybean meal and oil, and about the importance of protein. He helps farmers to grow soybeans and to develop markets for their beans. Actually, there is a ready-made market from poultry growers–who now have to pay a lot of freight to import their soybeans from Kazakhstan, Iran, Turkey, or India. The key is for Walter to serve as the bridge–to help bring the poultry growers and the potential soybean farmers together, to discover that they have a common interest, and then to work out agreements.

NGOs do lots of impact studies; they want their volunteers to work on projects that will have economic impact. They believe that increasing poultry production will have a positive impact on the economy and the people. The oil is also appreciated, and refined using modern technology within each country for use as a high-quality edible oil, sold in bottles at retail stores. Kazakhstan is about one-half the size of the United States, and is quite a progressive country with a market economy, fairly advanced education and technology. Soybeans are grown mostly in the very south. They were a major crop during Soviet times (Russia was a major market for the oil and meal), but after Kazakhstan became independent in 1990, soybean production fell off to near zero. The economies of Central Asian countries plunged at about the same time (1989-91). They are now slowly getting back to where they once were.

The second most important country for soybeans (a very distant second, with maybe 300-500 hectares planted to soybeans) is the Republic of Georgia, where the western half is quite moist and the eastern half is very dry. They have a long history of growing soybeans. Walter knows of one company there that is processing soybeans using an extrusion cooker (similar to that made by Insta-Pro).

In third place might be Uzbekistan, followed by Turkmenistan, and Tajikistan–but all with only about several hundred hectares in soybeans.

Walter believes that soybeans could become a valuable double crop in Central Asia, planted after the wheat harvest in June. That would earn farmers more income, improve the soil, and break various insect and disease cycles. They need a legume in the rotation. The government does not help. They seem interested only in short term profit, keeping the status quo, and staying in power, not in innovation or long-term thinking.

In Tajikistan, he met a village farmer, Mr. Mahmadullo, who had the ability to build machines. He already had a small business making wheat flour using two motor-powered millstones. He worked with Walter to build a revolving soybean drum roaster; the outside was heated by natural-gas flames. After roasting a batch of about 20-25 kg of soybeans, he ground them into roasted soy flour.

In Turkmenistan, Dr. Ashraf spent quite a bit of time working with a Korean community in the town of Dashoguz in making tofu. She also worked a lot with Peace Corps Volunteers (PCVs) in that same town; one of the PCVs was a Korean-American. Walter has not heard of any TVP being made in Central Asia; if its is made, it must be in very small quantity. In Uzbekistan, technologically the most developed, soybeans are being grown–often spread by volunteers. Address: 2804 Trent Drive, Fort Wayne, Indiana 46815. Phone: 260-484-7493.

1703. Ahn, Sun Kyung; Hong, Kwang Won. 2005. [Hyaluronidase inhibitory activity of extracts from doenjang, chungkookjang and miso]. *J. of the Korean Society of Food Science and Nutrition* 34(8):1119-23. Oct. [20 ref. Kor; eng]
• ***Summary:*** "After heat treatment of the water extracts of Doenjang, Chungkookjang and Miso at 100ºC for 10 min, hyaluronidase inhibitory effects of them were reduced approximately to half. However, hyaluronidase inhibitory effects of methanol extracts were maintained well even after heat treatment." Address: Dep. of Food Science and Technology, Univ. of Dongguk, Seoul 100-715, Korea.

1704. Lee, Sang-Il; Shin, Jin-Gi; Kim, Soon-Dong. 2005. [Effect of red ginseng-chungkukjang extracts on lipid profiles of serum in alcohol administered diabetes-induced rats]. *J. of the Korean Society of Food Science and Nutrition* 34(9):1362-66. Nov. [23 ref. Kor; eng]
• ***Summary:*** "The rate of mortality in diabetes rats was significantly inhibited by RC supplementation. These results suggest that inhibited rate of mortality in diabetes rats by supplementation of ethanol with RC was considered to be due to improvement of blood sugar and serum lipids levels

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by components of RC." Address: Dep. of Food Nutrition & Cookery, Keimyung College, Daegu 704-703, Korea.

1705. Shurtleff, William; Aoyagi, Akiko. 2005. Wei ceng zhi shu [The book of miso]. Taipei, Taiwan: Persimmon Cultural Enterprise Co., Ltd. 280 p. Nov. 14. Illust. by Akiko Aoyagi. No index. 26 cm. [Chi]
• ***Summary:*** A very attractive, complex character, Chinese-language edition of *The Book of Miso.* A slightly revised edition (different color cover) was published in mid-2012. Address: 1. Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1706. Cho, H-J. 2005. [Soybeans in prehistoric and ancient remains]. In: Cherl-Ho Lee. 2005. Kong (Soybeans): Seoul, Korea: Korea University Press. 794 p. See p. 45-80. [Kor]*
• ***Summary:*** In *Soybean Storytelling* (2017, p. 24) we read "Wonkwang University Professor An Seung-mo has said, 'From the Early Stone Age wild pulses were used, but pulses that have been positively identified as cultivated come from excavation remains dating from the 1,000s BC. Archeologically speaking, soybeans are assumed to have originated in the area of Manchuria and on the Korean Peninsula. Soybean remains have been excavated at Bronze Age sites on the Korean Peninsula and in the region of Jilin (China) from at least 3,000 years ago, while discoveries in China date mostly from the Han dynasty (220 BC-220 AD), and those in Japan from the Yayoi era after about the 4th century BC.'" Address: Director of Archaeology Div., National Museum of Korea.

1707. Ho, J.S.; Sik, K.M.; Jung, P.M.; Tae, S.J.; Jong, C. 2005. Selection of black soybean line with absence of Kunitz trypsin inhibitor protein. *Korean J. of Breeding* 37:308-10. *

1708. Kim, J.H.; Kim, D.H.; Ahn, H.J.; Park, H.J.; Byun, M.W. 2005. Reduction of the biogenic amine contents in low salt-fermented soybean paste by gamma irradiation. *Food Control* 16:43-49. *

1709. Kim, Sun-Lim; Kim, H.B.; Chi, H.Y.; Park, N.K.; Son, J.R.; Yun, H.T.; Kim, S.J. 2005. Variation of anthocyanins and isoflavones between yellow-cotyledon and green-cotyledon seeds of black soybeans. *Food Science and Biotechnology* 14(6):778-82. [27 ref. Eng]
• ***Summary:*** "Analysis of black soybean seeds [59 Korean varieties] revealed that 100-seed weights of green cotyledon seeds (33.5 gm, n=31) were higher than those of yellow ones (28.9 gm, n=28)... Total isoflavone content of BGC was higher than that of BYC, and negative correlation was found between total anthocyanin and total isoflavone contents."

"Black soybeans are sold at a premium in the market for cooking with rice and for producing black soymilk and traditional medicines among others, because they contain considerable amount of functional ingredients including (in the seed coat) anthocyanins, which have been used widely as natural coloring agents in the food and pharmaceutical industries (4-8)." Address: 1. National Inst. of Crop Science, R.D.A., Suwon, Gyeonggi, Korea.

1710. Yoo, Mi-Young; Jung, Kwon-Hyug; Yang, Ji-Young. 2005. [Quality characteristics of traditional kochujang adding pear juices during fermentation]. *J. of the Korean Society of Food Science and Nutrition* 34(8):1226-31. [21 ref. Kor; eng]
• ***Summary:*** "In order to improve qualities of traditional kochujang, pear juice was added to kochujang, and the physicochemical and microbial characteristics of pear-added kochujang were investigated for 2 months of fermentation at 30ºC... The result of sensory evaluation showed that 6% pear added kochujang were more acceptable than others." Address: 1. Dep. of Food Science and Biotechnology, College of Fishery Science, Pukyong National Univ., Busan 608-737, Korea.

1711. Cho, Hyeon-jong. 2005. Kong [Prehistoric and ancient soybean remains]. In: Cheryl-Ho Lee, comp. 2005. Kong [Soybean]. Seoul, Korea: Korea University Press. 794 p. See p. 45-80. Chap. 2. [53 ref. Kor]
• ***Summary:*** This chapter concerns Neolithic evidence of soybean cultivation in Korea. See especially p. 46-48. Two Neolithic remains are mentioned: (1) Okchoen Daejeonri, and (2) Jinju Sangchonri. The carbonized beans found in Okchoen were not clear, but those in Jinju were more clear as shown in the pictures on page 48. From page 49 to 58, numerous Bronze Age soybean remains are described. Address: National Museum of Korea.

1712. Gulia, Kuldip Singh. 2005. Human ecology of Sikkim: a case study of the Upper Rangit Basin. Delhi, India: Kalpaz Publications. 304 p. See p. 74, 148, 193, 195, 198, 237. Illust. Maps. 23 cm. [60+ ref]
• ***Summary:*** On page 74 is a table titled "Indigenous fermented foods of the Sikkim Himalaya." One of the common fermented foods is kinema, of which soybean is the substrate. "Nature and use: Cooked soybeans showing stickiness with typical flavour, side dish." Kinema is also mentioned on p. 148.

Page 195: "Kinema is an indigenous fermented soybean food which serves as a sustainable," low-cost source of protein in the local diet. Kinema curry is delicious local dish, eaten with boiled rice.

Synonyms of "kinema" in nearby local languages are: *Kinemba* (Limbu). *Hokuma* (Rai). *Bari* (Bhutia). *Satlyangser* (Lepcha).

Note 1. This is the earliest document seen (Jan. 2012) that mentions "Kinemba," the name used by the Limbu ethnic group, or "Hokuma," the name used by the Rai ethnic

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group, for Nepalese kinema, a close relative of Japanese natto.

Products closely resembling kinema include: *Hawaijar* (Manipur in North-East India [NEI]). *Bekang-um* (Mizoram in NEI). *Troombai* (Meghalaya in NEI). *Akhoni* (Nagaland in NEI). *Itohiki-natto* (Japan). *Tooa-nao* [*Thua-nao*] (Northern Thailand). *Chungkook-jang* (Korea).

Page 198: *Vatamas ko achar* is a pickle whose main ingredient is soybean. Address: New Delhi, India.

1713. Ishige, Naomichi; Otsuka, Shigeru; Asakura, Toshio. 2005. Kankoku [Korea]. Tokyo: Nô-san Gyoson Bunka Kyôkai. Series: Sekai no Shokubunka, No. 1. [Jap]*

1714. Kim, Yol-kyu. 2005. Uncovering the codes: Fifteen keywords in Korean culture. Translated by Jung Ha-yun. Fremont, California: Jain Pub. Co. x + 172 p. 23 cm.
• ***Summary:*** A marvelously perceptive book that shows the profound influence of culture on all human actions–even the smallest. Each "keyword" is a little jewel of cultural insights. One of the fifteen keywords is "food."

Page 26: *Chongguk-jang* is a strong-smelling fermented soybean product.

Note 1. This is the earliest English-language document seen (Jan. 2012) that uses the word "chongguk-jang" to refer to Korean-style natto. It can be spelled in various ways, including *cheongguk-jang*.

Page 29: Some people enjoy "ripe blue cheese, but cannot stand the smell of *cheongguk-jang*, a potent Korean" fermented soybean product.

Note 2. This is another way to spell Korean-style natto.

Page 31: "We might say that *doenjang* is the Korean equivalent of cheese."

Note 3. This fermented soybean product could be called Korean jang or Korean miso.

On the dust jacket: This book "is a cultural guide to what is unique about Koreans and their way of life. The questions raised in this book range from the mundane to the spiritual, each touching on the essence of Korea's 5,000-year-old culture: Why is a Korean spoon flat and round, not oval? Why do Korean women pray to a bowl of water? Why do Koreans eat dog meat?"

1715. Koerbitz, Werner. 2005. Status of biodiesel in Asia, the Americas, Australia, and South Africa. In: G. Knothe, J. Van Gerpen and J. Krahl, eds. 2005. *The Biodiesel Handbook.* Champaign, Illinois: AOCS Press. ix + 302 p. See p. 211-18. [7 ref]
• ***Summary:*** Contents: Introduction. The Americas: Argentina, Brazil, Canada, Nicaragua. South Africa. Australia. Asia: China, India, Japan, Malaysia, Philippines, South Korea, Thailand. Address: Austrian Biofuels Inst., Vienna, Austria.

1716. Krishna, Chundakkadu. 2005. Solid-state fermentation systems–an overview. *Critical Reviews in Biotechnology* 25(1-2):1-30. [130* ref]
• ***Summary:*** Solid state fermentation (SSF) started with the ancient Egyptians making bread by 2600 BC.

In the Orient SSF has been widely used to make traditional foods and beverages: tempeh and ontjom in Indonesia, miso, soy sauce and saké in Japan. The koji process (fermentation of steamed rice as solid substrate by a fungal strain of *Aspergillus oryzae*) was taken from China to Japan by Buddhist priests in the 7th century. "Koji is used as a starter in the soy sauce (shoyu) industry, in fermentation of miso (a semisolid cheeselike food), brewing of the Japanese rice wine (saké) and many other Oriental foods (4)."

"*Aspergillus oryzae* and *A. niger* have been employed for the synthesis of alpha-galactosidase, and soy flour and soy beans are considered as the most ideal substrate for enzyme production as a three-fold increase in enzyme production was recorded with these substrates." Address: Center for Marine Biotechnology and Biomedicine, Scripps Institution of Oceanography, Univ. of California San Diego, La Jolla, California.

1717. Lee, Cherl-Ho. comp. 2005. Kong [Soybean]. Seoul, Korea: Korea University Press. 794 p. Illust. No Index. 26 cm. [600+ ref. Kor]
• ***Summary:*** Contents: Foreword, by Kwon Tai-wan.

1. "History of the uses of soybeans," by Lee Cherl-ho and Kwon Tai-wan.
2. "Prehistoric and ancient soybean remains," by Cho Hyeon-jong.
3. "Sauce culture and earthenware," by Shin Suk-jeong.
4. "The history of soybean cultivation," by Hong Eun-hi.
5. "Soybean cultivars and breeding," by Kim Seok-dong and Lee Young-ho.
6. "Characteristics of soybean processing," by Kim Woo-jeong.
7. "History and current state of soymilk and soybean curd," by Son Heon-su.
8. "Fermented soybean foods," by Shin Dong-hwa and Lee Piyo-ji.
9. "The health functionality of fermented soybean products," by Park Kun-young.
10. "Korean foods made with soybeans," by Lee Hyo-ji
11. "Soybean cuisine in other countries," by Cho Jung-soon.
12. "The nutritive value and functionality of soybean foods," by Seung Jeong-Ja;
13. "Industrial uses of soybeans," by Chee Kew-man,
14. "Soybean oil and its by-products," by Lee Gyeong-il.
15. "The current state and future outlook of soybean production and distribution," by Cho Se-yeong.

Each chapter lists 30-60 references and has 10-figures.

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Note: This book was conceived of by the Committee for the establishment of a Korean Soybean Museum. The authors of the various chapters include most of the major soybean specialists in the Korea. It is intended to be a comprehensive work on all major aspects of soybeans and soyfoods.

1718. Lee, Jeyseon; Lee, Kangjin. 2005. Korean dictionary and phrasebook. New York: Hippocrene Books. 311 p. [17 ref]

• ***Summary:*** This is both a Korean-English and an English-Korean dictionary. Korean characters are given for each word in both parts.

Page 21: *gan-jang* means soy sauce.

Note: This is the earliest English-language document seen (May 2021) that uses the term *gan-jang* to refer to Korean soy sauce.

Page 35: *doen-jang* means soybean paste. *doen-jang jji-gae* means soybean paste stew.

Page 80: *kong-na-mul* means [soy] bean sprouts.

English-Korean–Page 93: The Korean word for "bean" is *kong* and for bean sprout is *kong-na-mul.*

Page 135: The Korean word for "pea" is *kong.*

Page 151: The Korean word "soy sauce" is *gan-jang* and for "soybean" is *kong.*

Page 260: The Korean word for "bean sprout soup" is *kong-na mul-kkuk* and for "boiled tofu" is *du-bu jo-rim.*

Page 263: The Korean word for "red-pepper paste" is *go-chu-jang,* for "soybean paste" is *doen-jang,* and for soy sauce (again) is *gan-jang.*

Also (p. 263): The Korean word for "sesame oil" is *cham-gi-reum* and for "sesame seed" is *kkae-so-geum.*
Address: 1. Lecturer in Korean and supervisor of Korean language courses, Univ. of California at San Diego.

1719. Park, Kun-Young; Jung, Keun-Ok. 2005. Fermented soybean products as functional foods: Functional properties of doenjang (fermented soybean paste). In: John Shi, C.-T. Ho, and F. Shahidi. 2005. Asian Functional Foods. Boca Raton, Florida: CRC Press. xxi + 647 p. See p. 555-96. Chap. 20. [121 ref]

• ***Summary:*** Contents: Introduction. History of Korean soybean fermented foods. Manufacturing methods and characteristics of doenjang fermentation. Functional properties of doenjang: Nutritional and functional components in soybean and doenjang, safety of doenjang, antimutagenic activity of doenjang. Anticancer effect of doenjang. Increased chemopreventive effect of doenjang: Antioxidant effects, reduced cardiovascular diseases (fibrinolytic effect {as in chungkookjang and natto which secrete strong fibrinolytic enzymes}, antihypertensive effects, reduced serum cholesterol level), other possible functions of doenjang. Conclusion.

Doenjang is "Korean fermented soy paste" and kanjang is Korean-style fermented soy sauce that is obtained by filtering off the liquid from doenjang. "Historically soybeans and processed soybean foods have been the main protein sources in the Korean diet" (p. 555). "The medicinal functions of doenjang were first described in the *Dongeuibogam* [*Dongui Bogam* (*RR*), *Tongui Pogam* (*MR*)] (1613 A.D.), which was a popular traditional Korean medical text" [no citation given].

The section titled "History of Korean soybean fermented foods" contains what promises to be a number of references to early and possibly very interesting documents that mention soybeans and soyfoods in Korea. Yet the authors fail to cite any of them properly, so for the time being, we must accept their account of what the documents say. The problems are: (1) None of these documents (except one, Ref. #46) is cited in the long list of references at the end of the chapter. (2) The title of all these documents is given only in Korean, even though at least two should have Chinese titles; one of those two (described as "The Chinese agricultural technology book, *Jeminyosul* {A.D. 530 to 550} written by a governor, Maeeunsa,...") is actually the famous *Qimin Yaoshu,* by Jia Sixie. (3) We are never told in what language the original document referred to is written. (4) The page number(s) on which the ancient, important information appears is not given for any of these documents. (5) For some documents no date is given, whereas for others no author is given. (6) It is not clear what names were used to refer to each of the various soyfoods in the original documents. (7) The authors never tell us whether they examined the original document, or read a contemporary version, or simply got the information from a secondary source.

For example (all dates are A.D.): 99–It has been reported [by what document?] that soybeans were cultivated–Where were they cultivated?

530-550–The *Jeminyosul* [*Quimin Yaoshu*] states (in Chinese) that shi [fermented black soybeans], soybeans fermented with bacteria, in Korea were disseminated to China and Japan.

683 Feb.–An article [no title given] by King Sinmoon, that appeared in the 3rd year of his reign (during the Silla dynasty), mentioned the words *jang* (mold-fermented soybeans) and *shi* (bacteria-fermented soybeans).

701–*Daeboyulryong* mentioned the words jang, shi, and maljang, which referred to soybean products.

739–*Jungchang Wonmooseu* also mentioned the word maljang.

*Donga* (no date given), which was written by Shinjungbaesuk (is that the writer's real name?) in Japan, "indicated that maljang was imported from Korye (the old name of Korea);" it was renamed "miso" (Source: Ref. #46–35th Chronicle of Korea Soy Sauce Industrial Cooperative. 1997. Seoul. p. 27-32). Korean jang is said to have developed into traditional Japanese miso using meju made of soybeans and rice instead of maljang, which was made from soybeans only.

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918-1392–During the Korye [Goryeo] dynasty, [in Korea] the name "maljang" changed to "maejyo" and then to "meju" [meaning soybean koji in the shape of balls or cones]; it was soaked in brine in a clay pot and ripened [then filtered]. The liquid was called *kanjang* (soy sauce) and the solid sediment was called *doenjang* (soy paste).

1613–*Donguebogam* [see above], written by Hurjun, described how to make medicinal doenjang using soybeans and how to fix soured doenjang.

1760–*Jungbosan Limkyunge,* written by Yojungim, "introduced 45 different processing methods for soybean foods, describing how many days fermentation for jang, selection of water, salt quality, how to handle the pottery, fixing jang with an off-taste, etc."

1790 ca–*Kyuhap Chongseo,* written by Madam Lee (lived 1759-1824) described the proper methods for making the various types of jang in great detail.

1930 ca.–Commercial production of fermented soybean products ("jang" in Korean) started in Japanese-built jang factories in Korea during the occupation (1909-1945) to supply soybean products for the Japanese in Japan.

1945–After gaining independence from Japan, Koreans took over the factories. Since the Korean war (1950-1953) military personnel and people living in large cities have mostly consumed commercial fermented soybean products, whereas families living in rural areas still prepare their own. Address: Pusan National Univ., Busan, Korea.

1720. Shi, John; Ho, Chi-Tang; Shahidi, Fereidoon. 2005. Asian functional foods. Boca Raton, Florida: CRC Press. xxi + 647 p. Illust. Index. 24 cm. Series: Nutraceutical Science and Technology.

• ***Summary:*** Contents: Preface. About the editors. Series introduction. Contributors. Table of contents. 1. Functional foods and their impact on nutrition and health: Opportunities in the Asia Pacific... Contains two chapters on fermented soyfoods (Chap. 19, Miso, and Chap. 20, Doenjang) which are cited separately.

The Preface begins (p. v): "Health and 'healing' foods have a long history in Asian cultures." Asians such as the Chinese and Indians have long known that food and medicine come from the same source; they can treat illnesses and build a healthy life. Since ancient times, Chinese have compiled a remarkable amount of information about the materia medica, the use of natural substances–plants, animals, and chemical–to treat illness.

Kudzu (*Pueraria lobata, ge geng*), one of the earliest medicinal plants used in traditional Chinese herbal medicine, is discussed on pages 83-86.

In chapter 7 titled "Traditional Functional Foods in Korea," the section on "Fermented soybean foods" (p. 165-66) states that typical daily per capita consumption of these foods are: Soy sauce 20 ml, soy paste 20 gm, and hot soy paste 10 gm. In recent years there has been a decrease in soy intake due to increased use of Western seasonings such as mayonnaise, tomato ketchup, meat sauces, etc.

In Chapter 8, titled "Evolution of Korean dietary culture and health food concepts," the section on "Food as medicine" begins (p. 210): In traditional Korean culture, food was regarded as the basic source of health. It was believed that all diseases could be cured by foods. Korean knowledge of the medicinal effects of foods came, not through the sciences of nutrition, medicine, chemistry, or physiology, but through long human experience. Moreover, a key practice and discipline has long been to eat only when hungry, and not to overeat. The enormous size of the health food market in Korea today reflects the country's long tradition of 'food as medicine.'"

Page 229: "Micronutrients." Asian fish sauces are good sources of vitamin B-12 (cobalamine) because they are made from animal protein. Fish sauce from Thailand contains 1.91 mcg (micrograms) per 100 ml. This amount protects the Thai population from megaloblastic anemia caused by vitamin B-12 deficiency. The estimated average requirement for vitamin B-12 is only 2 mcg per day. However fermented soybean sauce contains very little (0.14 mcg per 100 ml); the small amount present is attributed to microbial synthesis.

Page 230: "The high salt problem." Japanese men rank highest in daily per capita sodium intake at 5.4 gm; the United States, Thailand, and New Zealand each average about 3.9 gm.–72% as much, or 28% less. Some cultures consume as little as 0.69 gm / day.

Pages 248-49: "Future potential for fish sauce." It is unclear whether fish sauce was first developed in Asia or Europe. But while it has vanished in Europe, it has become a thriving industry in Southeast Asia–perhaps because the extensive use of bland-tasting rice requires a salty and tasty protein-rich seasoning. Several species of anchovy are the preferred raw material for fish sauce. Some say that soy sauce was first developed in Japan. Address: 1. Research Scientist, Federal Dep. of Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada; 2. Rutgers Univ., Rutgers, New Jersey; 3. Memorial Univ. of Newfoundland, St. John's, Newfoundland, Canada.

1721. Shipp, Steve. comp. 2005. North Korea in quotation: A worldwide dictionary, 1948-2004. Jefferson, North Carolina: McFarland & Co., Inc. v + 384 p. See p. 149. 25 cm. [1 soy ref]

• ***Summary:*** The chapter on "Kim Il Sung" states (p. 149) that he can be found in every village, town, and city of North Korea. He is everywhere!–even "simply averring (in the National Folk Museum) that 'Koreans can hardly be Korean if they don't eat *toenjang'* (fermented bean paste)."

Quoted from: Cummings, Bruce. 1997. *Korea's Place in the Sun: A Modern History* (Observation in 1997).

1722. Tuttle, Will. 2005. The world peace diet: Eating for

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spiritual health and social harmony. New York: Lantern Books. xvii + 318 p. No index. 23 cm. [170 ref]
• ***Summary:*** One of the best books seen on vegetarianism and animal rights. A very powerful statement. Contents: Food's power. Our culture's roots. The nature of intelligence. Inheriting our food choices. The intelligence of human physiology. Hunting and herding sea life. The domination of the feminine. The metaphysics of food. Reductionist science and religion. The dilemma of work. Profiting from destruction. Some objections answered. Evolve or dissolve. Journey of transformation. Living the revolution.

From the publisher: "Argues that war, terrorism, genocide, disease, environmental degradation, and other problems affecting the world are a direct result of an unwillingness by people to make the connections between what they eat and how it got on their plates."

On pages 260-62 is a section about the author's visit to The Farm in Summertown, Tennessee, and the profound impact it (and its vegan diet and soy dairy) had on him. Page 254 describes how, in 1974 at Colby College, in Maine, he wrote his senior thesis titled "Organizational Behavior on The Farm." He examined "the theory and practice of a community based on cooperation rather than owning, sharing rather than owning, and compassion rather than competition."

About the author: On the back cover is a small portrait photo of the author with these words: "Will Tuttle has a masters degree in humanities from San Francisco State University and a PhD in the philosophy of education from the University of California, Berkeley. A professional pianist, composer, and teacher, he has for the last fifteen years presented at progressive churches, vegetarian and human potential conferences, and intentional communities throughout the country. He trained in Korea as a Zen Buddhist monk..."

Soybean(s) are mentioned on 8 pages of this book, soy on 6 pages, tofu on 4 pages and tempeh on 4 pages.

Note: This book is weakened by lack of an Index.

Note: As of Dec. 2015 Will travels and speaks worldwide. He has a home at Hidden Lake, California [formerly at Healdsburg, Sonoma Co., CA]. Address: PhD, professional pianist, composer and teacher.

1723. Yu, Ki-Yull. 2005. Seed production and distribution in Korea. Seoul, Korea: Sein Pub. Co. 143 p. Illust. 23 cm. [10+ ref]*
• ***Summary:*** Soybean is mentioned on pages 36, 70, 108 and 6 others. Ganjang (soy sauce) is mentioned on page 108.

1724. Park, Eo-Jin; An, S.H.; Park, G.S. 2006. [Quality characteristics of cuttlefish inky tofu prepared with various coagulants]. *J. of the Korean Society of Food Culture* 21(6):653-660. Jan. [24 ref. Kor; eng]
Address: 1. Dep. of Hotel, Food Service and Culinary art, Catholic Sanji College, Korea.

1725. Bramblett, Billy. 2006. The real history of Wildwood Natural Foods after its merger with Midwest Harvest to become Wildwood Harvest in 2001 (Interview). *SoyaScan Notes.* Feb. 17. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** This history in quite different from the one told by Jeremiah Ridenour in Feb. 2005 when everything looked bright. Both Billy and Jeremiah have left Wildwood / Pulmuone and have each started new businesses–although Billy has a contract to serve as a consultant for 3 years. Jeremiah took severance on 30 June 2006. Billy is working with his wife on a rug company that imports Tibetan-style rugs from Kathmandu, Nepal. Jeremiah has started Wise Decisions and does work with soy diesel.

Pulmuone's founder, Mr. Won [full name: Won Kyung Sun], who had started a farmers' cooperative after the Korean war, has been honored by the United Nations for organic agriculture. He founded Pulmuone on Christian principles: "Love your neighbor" and "Respect the environment." Years later, Mr. Won's son tried to develop a company out of this cooperative. He started by opening some stores, but eventually he fell upon hard times and was about to lose it all. But by great good fortune his roommate was a law student named Seung-Woo Alex Nam. Alex said, "I'll bail you out, but I want control." So Mr. Nam took control of what became Pulmuone and built it into a billion dollar company.

Tom Lacina has a brother named Sam Lacina who is a physician in Grand Rapids, Michigan. They have a third generation soybean farm in Iowa and Tom converted to organic. Tom is a musician (concert pianist) and an attorney. Tom and Sam Lacina bought out Paul Rosenmayr and Paul Orbuch of Wildwood.

Wildwood reincorporated in Iowa, then got money from Iowa through tecTerra (which is managing the fund for the state of Iowa). They put in a lot of money, then Wildwood leveraged that to borrow more money and they built two plants, one in Iowa and in one Watsonville, California. The financial status of the Watsonville plant depends on who you ask. Wildwood thought it was doing quite well since it was generating quite a bit of margin–although not as good as it used to when Wildwood was in Fairfax or Santa Cruz. The overhead now costs much more.

In 2002 Wildwood moved all the value-added production, which had been in both Fairfax and Santa Cruz, to Watsonville. We started making these value-added products in October 2002. Tofu production didn't move until Feb. or March 2003 because Jeremiah built a tofu system that didn't work; it never worked properly although it partially works. That was a big problem for the first year or so. Wildwood had to go back to making tofu by hand. It has computer generated and controlled grinding and cooking.

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Then there are four 250 gallon vats on a second level that hold the soymilk at a specific temperature. Theoretically the nigari (magnesium chloride) coagulant is injected into these tanks then mixed into the soymilk mechanically; blades inside spin around. That part of the plant all worked pretty well. But getting the curds down to the forming boxes was the problem; they could never figure it out. But Wildwood had to get out of its Santa Cruz plant. So Rick Loncarich, the plant manager in Santa Cruz, finalized the move.

So at this point the soymilk is just pumped down to the curding vats, the coagulant is stirred in and curding is done by hand. Then the curds are run through a conveyorized process. Billy thinks this is the best way. He has watched the Pulmuone style which is all mechanical, with injection of coagulant (mostly calcium sulfate and GDL) and little fingers stirring the mixture. Wildwood has long believed that nigari is the best coagulant because it makes the firmest tofu and you can handle it and reprocess it without any crumbling. It also makes tofu with the best flavor.

But in the end Wildwood ran out of money; always a big problem–long before Pulmuone came along. Basically, tecTerra in Iowa kept Wildwood afloat, but in exchange, tecTerra wanted control of the company and said that Wildwood had to find a buyer. That was a dark day; tecTerra ran Wildwood for over a year, and they really messed things up. They were using taxpayer money and they had been sharply criticized in the newspapers many times. So they were under a lot of pressure to make a success out of something. Their basic approach was to lay off lots of people to stop the financial bleeding; that is sensible from a strictly financial point of view but sort of stupid in terms longer-term thinking about what's going to happen in the future.

Then tecTerra said. "We're not going to put any more money in, and you have to sell the company." Then a Japanese man was CEO of Wildwood Harvest for about 3 months. Jeremiah's main work was helping to run the plant and doing some sales work too. Jeremiah had been CEO when Wildwood failed, so it was felt that he had had his chance.

The major problem was the plant in Iowa, not the plant in Watsonville, California. In Iowa, it took them a year build a new plant and to get quality that was consistent, and they still have problems. Leading the project were Jeremiah Ridenour, Tom Lacina, and Doctor Gandhi (who comes from India, had been making dairy yogurt for years, then sold that and started working with soy. He has a huge facility up north–perhaps Minnesota). Using Gandhi's technology, the three planned to make a cultured soy product. It took them almost 18 months, after the plant was built, to work through all the quality and microbial problems. Wildwood was burning through money faster than they had it to burn. The plant in Watsonville was late and over budget. The plant in Iowa was on time and on budget, but it took them more than a year to get the product going. Tom Lacina kept making tofu at his original tofu shop; the new facility was only for cultured soy products. The new plant is still running, but they have very low volume and very high overhead. The cost of making a product is more than the sale price. The cultured products plant in Iowa is still losing money hand over fist.

Meanwhile, Wildwood had already met Pulmuone U.S.A. (founded in Jan. 1991, a subsidiary of Pulmuone Co., Ltd. of Korea). at expos. Pulmuone began to take an interest in Wildwood, Wildwood told them everything and showed them everything–complete transparency. The first important thing Pulmuone did, in April 2004, as part of a strategic alliance, was to make an equity investment in Wildwood; they purchased shares of stock, but they ended up owning less than 50% of the shares.

At Yansei University Pulmuone has 85 PhDs doing everything you can think of all the time. So they send their people over and those people make reports and complete a very detailed analysis of the situation. Billy thinks they spend way too much time analyzing everything.

To celebrate the Pulmuone's 25th anniversary, Pulmuone took Jeremiah, Tom Lacina and Billy to Korea for 4-5 days first class. Also on the trip were Rachel Stauffer, of Cybus Capital (that ran the tecTerra fund for the state of Iowa) and Paul Kang, who would soon be CEO of the merged company.

Tom Lacina's records show (e-mail of 21 March and 2 April 2013): "April 19, 2004 is the date of acquisition by Pulmuone U.S.A. of controlling interest in Wildwood Natural Foods (there was a name change at that time from Wildwood Harvest to Wildwood Natural Foods).

"We arrived in Seoul the eve of May 10, 2004 and left Seoul on the morning of May 14, 2004. While there we joined in celebrating Pulmuone's 25th Anniversary and toured its largest plant, distribution center, R&D center, and stores. We visited the founder of Pulmuone and met some of the Board of Pulmuone.

"The first meeting of the Board of Directors of Wildwood Natural Foods, Inc., after the acquisition by Pulmuone occurred on May 12, 2004, at Seoul, South Korea.

"Billy stole all the attention because he looked like a rock and roll star!

"The next step was that Wildwood Natural Foods exchanged stock for the assets of Pulmuone U.S.A. in order to have Wildwood Natural Foods serve as the operating entity and Pulmuone U.S.A. serve as the holding company. This was an Asset Purchase Transaction, not a statutory merger. The documentation became messy during this transition at the end of 2004, but a reasonable date to use is December 16, 2004. I reference December 16, 2004, because that is the date when Wildwood Natural Foods resolved to use a fictitious name–PMO Wildwood–which was later adopted as the corporate name on October 6, 2005, and then changed to Pulmuone Wildwood on December 1, 2005. In fact, the process of collecting all the signatures on the asset

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purchase document took a couple weeks.

"We've re-purposed the tofu facility on my farm into an artist residency–GrinCityCollective.org. I continue to work for Pulmuone, but just as general counsel in the USA."

Returning to Billy's recollections: In Korea (May 2004) Pulmuone showed them everything, treated them with great respect, included them in everything. Billy clearly remembers mandated boilermakers and karaoke performances. Aside from that, Billy, Jeremiah, and Tom thought things looked very promising. "We were very upbeat about it" (Continued). Address: Pulmuone Wildwood.

1726. Bramblett, Billy. 2006. The real history of Wildwood Natural Foods after its merger with Midwest Harvest to become Wildwood Harvest in 2001 (Interview). *SoyaScan Notes.* Feb. 17. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Continued: They had the official first board meeting of the newly merged company at a high-class restaurant owned Pulmuone in Korea; the five board members were Paul Kang, Mr. Seung-Woo Alex Nam, Jeremiah, Tom Lacina, and Billy. Pulmuone also owns a chain of natural food retail stores (like Whole Foods) in Korea, and three tofu factories in Seoul.

It seemed like a good fit. In mid-2004 the decision was made to merge Wildwood Harvest Foods Inc. and Pulmuone U.S.A. On 20 July 2004 each company issued a news release announcing the new merger. The deal was struck by a man named Paul Kang, who was an investment banker, who was a Korean-American, and who speaks English very well and has a good relationship with the Korean company; he had already done some other deals with Pulmuone. Wildwood Harvest Foods, Inc. was renamed Wildwood Natural Foods and Pulmuone U.S.A. was give two seats on Wildwood's board. Pulmuone decided to make Paul Kang the CEO of the new, combined company. He many various changes to the logo.

"Pulmuone's plan was to go public in a few years, and we were all going to be able to cash in our chips." Billy and Jeremiah both owned shares in Wildwood which, over the years through hard work and good management (up to a point) had become a valuable company.

In the USA, Pulmuone was doing very well in the Korean market but they were struggling in the mainstream and natural foods markets. Paul Kang was a very smart person but he had never been a CEO before–especially of a food manufacturing company. Paul Kang went to Korea with Billy, Jeremiah, etc. Then they all went to Natural Products Expo East in the fall of 2004 and to Expo West in the spring of 2005. After about 8 months with him at the helm, Pulmuone realized they had made a mistake, so by June 2005 they sort of demoted him to COO (chief operating officer) of Pulmuone U.S.A. and brought in another person Y.C. Kang; they are not related. Y.C.'s first title was CRO (chief reorganization officer). He tried to reorganize things and put a whole new program into place. It got really crazy. It was a wild year; Mr. Nam would come over every couple of months and have personal meetings with Billy, Jeremiah, and Tom. It is kind of a hit and miss style. After doing all this analysis, they say "OK, let's do this." They try it for some time and if it is not working they say, "OK, let's change everything."

Billy and Wildwood have a deep understanding of their customers and the natural foods market, which has enabled them to stay ahead of the curve all these years.

At the time of the merger: Since Wildwood didn't have any money, they gave Pulmuone stock–so that Pulmuone has almost all the stock. Then they made Jeremiah and Billy into executive sales persons, who would manage different sales in different geographical areas. Jeremiah was in charge of Northern California. Paul Kang took southern California. Tom Lacina took everything out of California. Billy took ingredient, foodservice, and private label. Billy had already been doing this kind of work for a number of years, in part because nobody else was covering that particular channel. The ingredient people would come to Billy and tell him they needed a particular ingredient. He would work with them to develop their products, etc. Trader Joe's had been Billy's account from the beginning; they came onto the scene because Wildwood won the *San Francisco Chronicle* Baba Ganooj tasting contest many years ago. So Wildwood started making soy products (such as baked tofu–teriyaki and Thai–and burgers under the Wildwood label) for them over the years. For a while Wildwood did Soy Sour Cream made in Iowa for Trader Joe's. So in about Feb. 2005 Pulmuone gave all the new salespeople budgets and said, "OK, you make your top line and your contribution margin goals and we're going to promote you and give you money, bonuses, and stuff like that." Paul Kang didn't do very well, so they moved him back to the Korean company to do investment work. Jeremiah didn't do so well so they put him in public relations. Tom Lacina didn't do very well either in the East, although he has a really great guy working for him there named Jim Williams. The company is in a lot of Whole Foods and UNFI warehouses east of the Mississippi. But he wasn't making his goals–so that put him in charge of all sales and marketing. Billy did very well–110% of the goals he was given. But they wouldn't give him credit for it (later they ended up giving him the bonus they had committed to). Billy still does not understand why. Then they took the Trader Joe's account away from him–an account where he had long, positive experience and good contacts. "They said they had a guy in southern California who would call on Trader Joe's. OK, whatever. So things got a little scratchy there." All this happened in the fall of 2005. Right now, Billy's share is not worth much. However if Pulmuone is successful in turning Wildwood around, the value will return and Pulmuone has given Billy and Jeremiah even more options. Billy owns

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shares in the new corporation which is named Pulmuone Wildwood Inc.; that's a U.S. corporation. Originally the corporate name was PMO Wildwood–because so many Americans can't pronounce Pulmuone. That was perceptive. But then Mr. Alex Nam who is really the head honcho of the whole shebang (CEO of Pulmuone Co., Ltd. Korea), as soon as they fired Paul Kang, decided to change the name back to Pulmuone Wildwood. Remember–every time you change a company name you have to change your labels, letterhead, etc. It's a huge job. Bill's told them he thought the best name was "Wild One." Nobody got it. But they did allow Billy to develop a few more products, so that was nice, until he came up with "Sloppy Jofu"–which has been selling very well since 2004. Last year he developed a chili, which they marketing department had trouble launching. Wildwood had been selling tofu to the organic division of Seeds of Change for about 7 years; they have used it in their rice bowls and noodle bowls. They wanted a flavored cube, so he just developed a product for them named "Tofu Barbecubes." He makes the tofu, cuts it into 3/4-inch cubes, marinates the cubes and then bakes them in shallow hotel pans in a conveyorized oven. Wildwood has been baking tofu for 20 years, but never in cubes before this. He just made 8,000 pounds of it for them and sent it to them. They liked it and soon ordered 8,185 pounds more. That was kind of his swan song.

Pulmuone's positive attitude started to decrease about a year ago. Pulmuone offered him a pretty good deal, which he took. But Billy is a consultant for three years; they are paying him about two-thirds of his salary and he doesn't really have to do anything. There is a non-compete clause concerning soyfoods that are the same or similar to those of Pulmuone-Wildwood in form and function; now he has two other clients, one of which is Seth Tibbott of Turtle Island. Billy is going with him to Anaheim in March. Billy is a guitar player. His latest project is with some folks who have a little campaign to get organic foods into school lunch programs in southern California. They call it "The Organic Rebellion." Billy told them he'd write a theme song for them. He just finished it and has recorded the basics. He's now getting kids lined up to do the vocals with him. It starts: "Sign me up for the organic rebellion."

Jeremiah just took a severance pay package; his last day at Pulmuone-Wildwood was Jan. 30, 2006. Jeremiah started a new business, Wise Solutions, developing plant-based industrial products. He has several soy-diesel cars and he has been involved in the promotion of soy diesel for a number of years. Address: Pulmuone Wildwood.

1727. **Product Name:** Re: Ethnic Koreans growing soybeans in Tajikistan or Turkmenistan, and her work introducing soyfoods to these countries.
**Manufacturer's Address:** Letter (e-mail) to William Shurtleff at Soyfoods Center, Feb. 18.
**Date of Introduction:** 2006 February.
**New Product–Documentation:** In Tajikistan she met a couple who lived near Dushanbe. The husband, Victor, was planning to grow soybeans. She gave him some seed grade soybeans to grow, although she had the impression that he hadn't grown soybeans before. She sensed that he wanted to grow them because of increased interest in soybeans–for reasons she does not understand. She gave him the seeds that Walter Barrett had given her, because the soybeans she had found in Tajikistan were not of good quality.

Victor led her to a Korean tofu maker, a woman who didn't speak Korean. She supplied tofu to a Chinese restaurant in Dushanbe. She told Helen that she bought her soybeans from Uzbekistan, and said they were expensive. Helen did not ask the woman when she had started to make tofu commercially or what the name of her small business was. Helen does not recall exactly where it was located.

Vera, Victor's wife, sold Korean salads at a green bazaar in Dushanbe. She and other Korean salad vendors at the green markets sold a type of dish made from Chinese TVP, which is white in color and imported from China.

At an import supermarket called Holland Market in Dushanbe, Helen found several Russian-made TVP products and soymilk powder. She also saw soymilk sold in Tetra Pak cartons.

In Ashgabat, Turkmenistan, two Korean men came to talk with Helen at the Winrock office about a soymilk machine.

In the Dashoguz region of Turkmenistan, Helen met two different groups of Koreans (a least 30 people total) who wanted to see her presentation and demonstration of soymilk and tofu production using a SoyJoy machine, along with a display of soy products such as tofu (in a Tetra Pak carton), TVP, soynuts, soy flour, soy protein isolates, energy bars, soy sauce, etc. In some presentations at farms or for women's groups (including the Korean groups), she also prepared soyfoods or Turkmen foods that included whole soybeans.

In Tajikistan, she gave 3 presentations / demonstrations: One at "Salsa Restaurant" in downtown Dushanbe, and two at a cafeteria and at the meat processing lab of the Khujand branch of the Technical College of Tajikistan. She usually ended her presentations with a meal with the participants. Her menu included Pulov [pilaf] (rice with some meat, soybeans, carrots, and onions), soup, salad, and a crepe (using a mixture of wheat flour, soy flour, and some type of local jam).

At the Agricultural University of Tajikistan in Dushanbe, and at the Khujand branch of the Technical College of Tajikistan, she gave technical presentations using an overhead projector with PowerPoint slides showing the nutritional composition of soybeans, and techniques for the preparation of traditional soyfoods and commercial products such as soy oil, soy protein, lecithin, etc.

In Turkmenistan: She gave food preparation

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presentations: (1) At a farm in the Mary district. (2) At apartment style homes in the cities (Mary district, and Dashoguz). (3) At the Winrock office in Dashoguz for different groups of women. (4) For 2 groups of Peace Corps volunteers in Dashoguz. "Peace Corps was interested in soyfoods because it was suspected that the protein intake of PCVs in that country was not sufficient."

While in Tajikistan and Turkmenistan, Helen did not see any soybeans being cultivated, nor any bundles of soybean plants harvested for green vegetable soybeans.

After her visit: (1) Her soy recipes were translated into the Turkmen language by Winrock staff, but (as far as she knows) they were not printed or reproduced. (2) A 30-page Russian-language brochure on soybeans was created (using desktop publishing) by a group of Peace Corps volunteers in the Dashoguz area. It included planting information and recipes, with colorful pictures and diagrams; about 200 to 300 copies were printed. The produced was funded by the Peace Corps and Helen, however Helen does not have a copy with her in Mexico. (3) Helen prepared a trip report, which is now the property of Winrock International. She did not write much about Koreans in that report.

She includes a Russian-language article on soya from the newspaper *Asia-Plus* (23 Sept. 2004, p. 4).

Note: This document mentions the earliest known commercial soy products in both Tajikistan and Turkmenistan.

1728. Setchell, Kenneth D.R. 2006. Re: The safety of soy infant formulas. Letter to Michael D. Shelby, PhD, NIEHS EC-32, P.O. Box 12233, Research Triangle Park, North Carolina 27709, March 1. 9 p. Typed, without signature on letterhead. [19 ref]

• ***Summary:*** Note: NIEHS stands for the National Institute of Environmental Health Studies; it is part of the National Institutes of Health (NIH), which is under the U.S. Department of Health and Human Services. The mission of the NIEHS is to reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease.

This long letter begins: "Dear Dr. Shelby,

"I have read with interest the NTP-CERHR Expert Panel Report on the Reproductive and Developmental Toxicity of Soy Formula and have the related draft report on Genistein. Both of these reports are lengthy reviews of the literature and provide investigators with a useful reference source of this field. I would like to offer some of my own perspectives on this overall and important issue of the safety of soy formula.

"Neither of the Draft Reports came to my attention until very recently and there has been insufficient time to make a detailed response to the documents. I want to focus my attention on the Draft Report dealing with soy infant formulas and offer some general thoughts and comments based on my 30 year experience of this field and with reference to my work. Regarding the Genistein Draft Report, in the absence of being able to read this document thoroughly, I have just brief comments at this time.

"Genistein is clearly a bioactive molecule, one that appears to display many of the characteristics of selective estrogen receptor modulators (1) and not of estrogens as is so often portrayed by the media. This distinction is important to realize, because it has implications for the potential clinical actions of the molecule. Genistein, with few exceptions is not a major dietary constituent of soy foods unless these have undergone fermentation, as in foods such as tempeh, natto, and to some extent miso, consumed mainly by Asians (2). It accounts for <2% of the isoflavone content of the soybean, soy proteins and most western soy foods, including soy infant formulas (3, 4). The liberal use of genistein in the form of supplements for adults, or food additives should be of some concern, and it is debatable whether it should be regulated as a pharmaceutical, rather than fall under the radar as a dietary supplement. While innumerable studies of genistein in animal models clearly show that adverse reproductive effects can be demonstrated, these findings should be cautiously extrapolated to humans consuming soy foods, and especially to infants feeding on soy formulas.

"It is difficult to understand the agenda driving the negative campaign on soy infant formulas, especially given that this is a feeding regimen that has been in use routinely for over 40 years without any solid evidence of toxicity in healthy full-term infants, or in adults later in life. In 2001, at the invitation of the Korean Academy of Pediatrics I was asked to address the issue of the safety of soy infant formula and isoflavones and learned, to my surprise, that unlike other Asian countries, Korean infants (90%) are predominantly bottle-fed, and of these, almost half are fed soy formula and this practice has been in use for over 30 years. One of the leading brands of soy formula in Korea is made from whole soybeans, and its isoflavone content we found to be 5-fold higher than Western soy formulas that are formulated with isolated soy protein (Setchell unpublished data). The earliest soy formulas used in the USA were formulated with soy flour, which would also have had a higher isoflavone content than current formulas. I would estimate that about 20-30 million infants worldwide have been raised on, or exposed to soy infant formulas and their constituent isoflavones. The magnitude of this 'cohort' is such that adverse effects would surely have been noticed, even by default–certainly had this been a drug / pharmaceutical study spanning 40 years with this statistical power, soy formula would have been considered a completely safe entity. Before alarming the public, it is my view that any perceived negative effects of soy infant formula on reproductive health should be demonstrated by toxicologists and public interest groups leading this 'anti-soy' campaign, and not be assumed based on the biological actions of genistein in animal models, most of which are inappropriate as a model for the human infant.

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"In considering the published literature, I would recommend that much of what has been shown in immature and adult rodents be disregarded as irrelevant to the human newborn and infant."

The last page of the 9-page letter states:

"In my opinion, extrapolating the findings of deleterious effects on reproduction observed in animal studies of genistein, to a human infant fed soy formula, is making a quantum leap of faith and is irresponsible. While many of the findings are interesting, they are not at all surprising, and have absolutely no relevance to this clinical situation. Infants are just not fed or injected with genistein.

"Soy infant formulas, and for that matter soy foods, have a long history of safe use and are nutritionally sound (18, 19). Women throughout Asia are exposed to soy isoflavones through many soy foods throughout pregnancy and isoflavones readily cross the placental barrier and reach the fetus, a critical period for reproductive development. I am unaware of any deleterious effects of feeding soy formula to healthy full-term infants, but rather than suggest that we have not looked for effects, it should be incumbent on toxicologists to present definitive cases of adverse effects of feeding soy formulas to healthy infants before creating the sort of media circus we have seen in recent years. If the hypothesis is that soy formulas are unsafe that should be proven. Save a few exceptions, and these relate to infants with pre-diagnosed disease, there is a paucity of conclusive evidence for negative effects of soy formula on growth and development, pubertal development, reproduction, thyroid function, and cancer of humans. I cannot comment on immune responses since this is outside of my area of expertise, while we are fully aware that allergy to soy, the frequency of which is much lower than allergy to cows milk, is perhaps the only solid concern for soy products.

"Only a long-term prospective study in humans will clarify this issue. We clearly do not need further rodent studies which serve little value, other than wasting tax payers money–money that could and should be spent addressing soy formula and human infant studies if this issue is to be successfully resolved. Indeed, it would be my prediction that if a long-term prospective human study was performed we might be surprised to find that there are significant health benefits from early feeding of soy formula, and for that matter soy foods in children and young adults, that relate to longer term disease prevention. Anecdotally, there is evidence showing that as the Japanese are changing the traditional diet and eating less soy foods, there has been a notable increase in the incidence of the chronic diseases of Westerners who generally are not exposed to soy foods. This of course is not proof but interesting association of the potential of including soy foods in the diet for disease prevention. To condemn soy formula based on scant clinical data and animal data that has questionable validity to the human infant would border on irresponsibility and would do a disservice to the pediatric population. In the absence of solid proof to the contrary, common sense should prevail and this panel should look at the bigger picture of soy food consumption worldwide when making a decision on safety.

"Sincerely,

"Kenneth Setchell. Ph.D.

"Professor of Pediatrics..."

No industry funding or conflict of interests. Address: Dep. of Pediatrics, Children's Hospital Medical Center, Cincinnati, Ohio.

1729. **Product Name:** Soga All Natural Twin-Pack Tofu [Extra Firm, Firm, Soft].
**Manufacturer's Name:** Soga Soyfoods [Pulmuone U.S.A.].
**Manufacturer's Address:** 4585 Firestone Blvd., South Gate, CA 90280. Phone: 866-356-2800.
**Date of Introduction:** 2006 March.
**Ingredients:** Feb. 2007: Water, organic soybeans, calcium sulfate, glucono delta lactone, magnesium chloride. Certified by Quality Assurance International.
**Wt/Vol., Packaging, Price:** 15.5 oz (439 gm) packed in molded plastic tray with heat-sealed, peel-off plastic film lid. Retails for $0.99 (2007/02 Lafayette, California).
**How Stored:** Refrigerated.
**Nutrition:** Per 3 oz (85 gm): Calories 80, calories from fat 45, total fat 5 gm (8% daily value; saturated fat 1 gm), cholesterol 0 mg, sodium 5 mg (<1%), total carbohydrate 2 gm (dietary fiber <1 gm [3%], sugars 0 gm), protein 9 gm. Vitamin A 0%, vitamin C 0%, calcium 15%, iron 6%.. Percent daily values are based on a 2,000 calorie diet.
**New Product–Documentation:** Letter (e-mail) from John Sim, head of sales at Pulmuone. 2007. April 5. These three products were introduced in about March 2006 at the Natural Products Expo West, at Anaheim, California. Their innovative package was first introduced in Oct. 2002 with their Organic Twin Pack.

1730. Kim, Jae-Hun; Kim, Sun-Im; Kim, Jong-Gun; et al. 2006. [Effect of green tea powder on the improvement of sensorial quality of Chungkookjang]. *J. of the Korean Society of Food Science and Nutrition* 35(4):482-86. April. [34 ref. Kor; eng]
• ***Summary:*** "The results of sensory evaluation approved that the addition of Choi-cha or Powder-cha green tea powder reduced the off-odor of Chungkookjang. Therefore, Choi-cha and Powder-cha could be used as the effective natural additives for the improvement of the sensorial quality of Chung-kookjang." Address: Dep. of Radiation Food Science & Biotechnology, Advanced Radiation Technology Inst., Korea Atomic Energy Research Inst., Jeonbuk 580-185, Korea.

1731. Koh, Jin-Bog. 2006. [Effects of cheonggukjang added *Phellinus linteus* on lipid metabolism in hyperlipidemic

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rats]. *J. of the Korean Society of Food Science and Nutrition* 35(4):410-15. April. [36 ref. Kor; eng]
• ***Summary:*** "The effects of cheonggukjang (traditional fermented soybean food, CK) and cheonggukjang added *Phellinus linteus* (CKP) on lipid metabolism were investigated in adult male rats. Twenty weeks old Sprague-Dawley rats were fed a purified hyperlipidemic diet (control diet: 0.5% cholesterol, 10% fat, 18% casein) for 4 weeks... These results showed that both the feeding of cheonggukjang and cheonggukjang added Phellinus linteus decreased the triglyceride, total cholesterol and LDL-cholesterol in serum as well as the triglyceride and cholesterol in liver, and increased the HDL-cholesterol to total-cholesterol ratio in serum of the rats." Address: Dep. of Life Science, Silla Univ., Busan 617-736, Korea.

1732. Banks, Ashley. 2006. Worth the wait: Sam Hawk Korean Restaurant offers dining adventure. *Daily Herald* (*The*) (*Provo, Utah*). May 4. p. 47.
• ***Summary:*** "We ordered two kinds of soup: Dwenjang Jegae, a soybean soup with potatoes, zucchini, onions, mushrooms and tofu,..."

They also enjoyed the "Pork Kalbi, pork spare ribs grilled in a spicy sauce with onions and green onions, with rice and a soybean and red pepper paste inside a lettuce leaf,..."

"The Beef Bulgogi was another favorite meat dish. Small beef strips were grilled in a Korean barbecue sauce... This beef dish was much milder and also delicious when wrapped in lettuce with rice and the soybean and red pepper paste."

1733. Kim, Kyung-Mi; Kim, H.R.; Yoo, S.M.; Kim, J.S.; Choe, J.S. 2006. [Quality characteristics of Chunggugjang prepared by *Bacillus subtilis* NRLSI IV with different inoculum levels and fermentation temperatures]. *Korean J. of Food and Cookery Science* 22(3):291-98. June. [35 ref. Kor; eng]
• ***Summary:*** "Chunggugjang prepared at 40ºC showed high sensory evaluation result in microorganism growth, appearance, taste and viscosity and particularly had low off-flavor." Address: Rural Resource Development Inst., National Inst. of Agricultural Sciences and Technology (NIAST), RDA, Sowan, Korea.

1734. Ma, Yan-Song; Wang, W.-H.; Wang, L.-X.; Ma, F.-M.; Wang, P.-W.; Chang, R.Z.; Qiu, L.-J. 2006. Genetic diversity of soybean and the establishment of a core collection focused on resistance to soybean cyst nematode. *J. of Integrative Plant Biology* 48(6):722-731. June. [26 ref]
• ***Summary:*** "The best method of control of SCN is through the development of resistant cultivars. However, limited progress has been made in soybean breeding in China because most modern cultivars have no resistance to SCN. The distribution and phenotype of 432 immune or highly resistant Chinese accessions were surveyed and a primary core collection was selected as a representative sample for further analyses. Using evenly distributed simple sequence repeat markers, five selection methods were applied to the primary core collection and the optimal method was chosen to establish a core collection, which consisted of 28 accessions. These encompassed 70.8% of the allelic variation present in the overall resistant collection. The 28 accessions differed from the reference resistant accessions at the genomic level, indicating that Chinese resistant accessions are distinct from known resistant accessions."

"Soybean cyst nematode (SCN) was first found in Northeast China in 1899 (Dai et al. 1958) and later spread to Korea, the US, Columbia, Brazil, Argentina, and other countries." Address: 1-2. Inst. of Crop Science, Chinese Academy of Agricultural Sciences, National Key Facility of Crop Gene Resources and Genetic Improvement, Crop Germplasm and Biotechnology, Ministry of Agriculture, Beijing 100081, China.

1735. Hymowitz, Ted. 2006. Early archaeological evidence of the soybean (wild or domesticated) in Korea (Interview). *SoyaScan Notes.* Sept. 1. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** An Israeli (who may be a member of a team) has recently reported this archaeological discovery in Korea dating from about the beginning of the Christian era, or maybe a little earlier. It is not yet clear whether they have found the wild soybean (*Glycine soja*) or the cultivated soybean (*Glycine max*). If it is the cultivated soybean, this would be the earliest archaeological discovery of soy in Korea. It would indicate that, in the Chinese expansion and conquest, they took their plants, indeed the soybean, south into today's Korea. This is much earlier than we expected. But this is about the only archaeological information on the soybean that Ted has ever found.

Ted's friends in China continue to hypothesize all sorts of crazy ideas and theories (maybe the soybean came from southern China, around Shanghai), but they have no evidence. Ted knows it bothers the Chinese that they have been unable to find archaeological evidence. It is partly a matter of national pride / nationalism. It bothers them so much that, for example, in the international meetings dealing with exchange of germplasm, the Chinese have said they have removed the soybean from free exchange. They are allowed to withhold it, since it is clear that the soybean is of indigenous Chinese origin. Rice and soy are dear to the hearts of the Chinese; they don't exchange much germplasm of either of these two crops. Address: Prof. of Plant Genetics (retired), Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

1736. Wilson, Audrey. 2006. Soy sauces are not all the same:

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Let's talk food. *Hawaii Tribune-Herald* (*Hilo, Island of Hawaii*). Oct. 3. p. 17.
• ***Summary:*** "When we think of shoyu or soy sauce, we think of Kikkoman, Aloha Shoyu, or if you read my column, saltless shoyu."

"Korean soy sauce is Joseon Ganjang" and is a by-product of 'doenjang,' or Korean bean paste, is thin and dark brown in texture and very salty. In Korea, the fermented soybean liquid is called soybean liquid and the solids are called soybean paste. The traditional soy bean fermented liquid is rich in protein and amino acids. It became a substitute for Buddhists who were not allowed to eat meat.

"In Singapore and Malaysia, dark soy sauce is called 'douyou' and light soy sauce is called 'juangqing.'"

"In Thailand, black soy sauce is called 'Siu dahm' and is the most widely used soy sauce for Thai dishes." It contains "only 55 mg. of sodium per tablespoon."

1737. Fruin, W. Mark. 2006. Thoughts on the early history of soy sauce and kecap / ketjap (Interview). *SoyaScan Notes.* Oct. 6. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Mark knows a woman professor Tashiro in Japan who is doing research on the early history of soy sauce (e-mail shiro@flet.kweio.ac.jp). She and others she knows are interested in the "leaky sieve" theory which basically says "Yes, we had this very controlled system during the Tokugawa / Edo period, but lots of things were going on that were not official–such as exporting outside of Deshima. You could call them pirates or extra-legal exports. Many of these exports went to places like Korea, or the Korean islands between the Korean mainland and Japan, all of which were near Japan. Mark suggests I write her and mention his name.

Remember that there is a difference between Kansai shoyu (lighter in color and saltier, *usukuchi*) and Kanto shoyu (darker in color, *koikuchi*). Whatever they shipped out of Deshima and Nagasaki was more likely to be Kansai shoyu than Kanto shoyu.

Also remember that soy sauce was widely made locally by small makers. One of the bigger castle towns (*jôka-machi;* "castle + under") or commercial towns (*shukuba-machi*) of Kyushu or southern Japan probably provided the early shoyu exported by the Dutch East India Co. (VOC). These were the two types of cities in Tokugawa Japan; there had to be one castle per fiefdom (*han*). Address: Palo Alto, California.

1738. Cwiertka, Katarzyna J. 2006. The soy sauce industry in Korea: Scrutinising the legacy of Japanese colonialism. *Asian Studies Review* 30(4):389-410. Dec. [81 + 27 endnotes. Eng]
• ***Summary:*** Excellent; very original, carefully researched, well documented, and well written! Contents: Introduction. Fermented soyfoods in Korea. The soy sauce industry in Japan. The Japanese soy industry in colonial Korea. The soy sauce industry in South Korea. The hidden legacy of Japanese colonialism.

In about the 9th century, two major fermented soyfoods–kanjang (soy sauce) and toenjang (soybean paste) began to be made in Korean homes. The third fermented soybean product, *koch'ujang* (red chili pepper paste), started to be made much later, after red peppers were introduced to Korea at the end of the 16th century. However the earliest known references to this new fermented soybean product are found in the 2nd half of the 17th century.

Since that time, these three types of *jang* have held a central place in Korean cookery. They were traditionally made in individual homes by women, and helped to mark the cycle of the seasons. Meju started to be made in early winter. Whole soybeans were soaked in water, boiled, mashed, shaped into lumps of various shapes, dried in the sun for several days then hung in a dry place for up to about 4 weeks until the surface was covered with a bloom of *Aspergillus* oryzae mold and various species of *Bacillus* bacteria multiplied inside each lump.

In the early spring, the meju was mashed or crushed into small pieces; 2 parts by weight of meju were mixed in distinctive earthenware crocks with 4 parts of water and 1.2 parts of salt. Each crock was covered and the mixture was then allowed to ferment outdoors for several months. A strainer was pressed down into the mash and the liquid soy sauce (*kanjang*) that collected in it was siphoned off, boiled, and left to mature for 40-60 days. The solids that remained in the crock were mixed with more salt, packed tightly, then left to ferment in the sun for another month. The result was Korean soybean paste (*jang*). The taste of each family's *jang* was unique.

The first commercial soy sauce brewery in Korea was the Yamamoto Soy Sauce Brewery, established in 1886 in the port city of Pusan. Many more such breweries were established in Korea during the following decades; commercial soy sauce began to replace its traditional homemade counterpart.

A significant growth in commercial breweries took place after Korea became Japan's protectorate in 1905. By the 1920s more than 100 commercial soy sauce breweries were operating throughout Korea; they made soy sauce according to the traditional Japanese method–not the Korean method. They were clustered around urban areas having a large concentration of Japanese residents: Pusan, Ulsan, Taegu, Miryang, Masan, Kwangju, Mokp'o, Kunsôn, Taejôn, Ch'ônan, Inch'ôn, Seoul, Haeju, Chinnam'po, P'yongyang, Sinûiju, Wônsan, Hamhûng and Kyôngsông.

Tsushima (1943, p. 12) listed 276 soy sauce factories in operation throughout Korea during 1942; this figure is higher than that given by other sources.

The first soy sauce brewery in P'yongyang, Miyagawa Shoyu Miso Brewery, was established in 1905 and remained the only commercial brewery in the city until Feb. 1936,

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when Kunishi Shoyu Co. set up a modern factory employing more than 100 workers.

The article concludes: "The overwhelming presence of factory-made *jang* in South Korea today is a mundane reminder of the impact of Japanese colonialism" on Korean cuisine. Address: Centre for Japanese and Korean Studies, Leiden Univ., P.O. Box 9515, 2300 RA Leiden, The Netherlands. Phone: +31 71 527 2599.

1739. Ahn, Y.S.; Kim, Y.S.; Shin. D.H. 2006. Isolation, identification, and fermentation characteristics of *Bacillus* sp. with high protease activity from traditional Cheonggukjang. *Korean J. Food of Science and Technology* 38:82-87. [Kor; eng]*

1740. Cho, Tae-Yong; Han, G.H.; Bahn, K.N.; Son, Y.W.; Jang, M.R.; Lee, C.H.; Kim, S.H.; Kim, D.B.; Kim, S.B. 2006. [Evaluation of biogenic amines in Korean commercial fermented foods]. *Korean J. of Food Science and Technology* 38(6):730-37. [24 ref. Kor; eng]
• ***Summary:*** These Korean fermented foods include commercial fermented soyfoods such as doenjang, soy sauce, and chungkukjang.

"Putrescine (PUT), cadaverine (CAD), tryptamine (TRY), histamine (HIS), tyramine (TYR), and 2-phenylethylamine (PHE) were mainly formed in fermented foods by the action of microorganism, so their levels were high with a range. On the other hand, spermidine (SPD), spermine (SPM), serotonin (SER), noradrenaline (NOR), and dopamine (DOP) were formed originally via biosynthesis with consequent low level." Address: 1. Test and Analysis Center, Busan Regional Korea Food and Drug Administration (KFDA), 123-7, Yongdang-dong, Nam-gu, Busan 608-829, Korea.

1741. Jung, Hee-Jung; Nam, E.S.; Park, Shin-In. 2006. [The study on the consumption and the preference of Chungkukjang products among middle school students in Seoul]. *Korean J. of Food and Nutrition* 19(4):427-34. [24 ref. Kor; eng]
• ***Summary:*** "The subject were 538 middle school students (male 283, female 255) in 3rd grade, and were asked to fill out the questionnaire... The result showed that most students knew about traditional chungkukjang (88.5%) and chungkukjang powder (68.2%), but only 43.5% and 29.4% of the respondents knew about raw chungkukjang and chungkukjang pill, respectively." Address: Dep. of Nutrition, Graduate School of Education.

1742. Jung, Hee-Jung; Nam, E.S.; Park, Shin-In. 2006. [Perception and preference of Chungkukjang in middle school students in Seoul]. *Korean J. of Food and Nutrition* 19(4):416-26. [30 ref. Kor; eng]
• ***Summary:*** "Therefore, in order to make middle school students take the chungkukjang foods with pride by increasing their perception and knowledge of them, the family should give them many opportunities to eat chungkukjang foods. The school also should try to use more chungkukjang foods in the school meal service, and try to improve in cooking process to make more tasty chungkukjang foods fur teenagers." Address: Dep. of Nutrition, Graduate School of Education.

1743. Jung, K.O.; Park, S.Y.; Park, K.Y. 2006. Longer aging time increases the anticancer and antimetastatic properties of doenjang. *Nutrition* 22(5):539-45. June. *

1744. Kim, H.J.; Tsoy, I.; Park, J.M.; Chung, J.I.; Shin, S.C.; Chang, K.C. 2006. Anthocyanins from soybean seed coat inhibit the expression of TNF-α-induced genes associated with ischemia/reperfusion in endothelial cell by NF-KB-dependent pathway and reduce rat myocardial damages incurred by ischemia and reperfusion in vivo. *FEBS Letters* 580(5):1391-97. *

1745. Kim, Y.J. 2006. Study on the safety for traditional foods: Korea Food and Drug Administration research report. *

1746. Kwon, D.Y.; Jang, J.S.; Lee, J.E.; Kim, Y.S.; Shin, D.H.; Park, S. 2006. The isoflavonoid aglycone-rich fractions of Chungkookjang, fermented unsalted soybeans, enhance insulin signaling and peroxisome proliferator-activated receptor-gamma activity in vitro. *BioFactors* 26(4):245-58. *
• ***Summary:*** Note that these soybeans are unsalted. Address: Food Functional Research Div., Korean Food Research Institutes, Korea.

1747. Lee, Chang-Hyun; Oh, S.H.; Yang, E.J.; Kim, Y.S. 2006. Effects of raw, cooked, and germinated small black soybean powders on dietary fiber content and gastrointestinal functions: research note. *Food Science and Biotechnology* 15(4):635-38. [27 ref. Eng]
• ***Summary:*** Results in rats. "These results suggest that the processes of cooking and germinating the small black soybean might contribute to acceleration of fecal excretion in both experimental normal and constipation model rats." Address: Dep. of Anatomy, College of Oriental Medicine, Woosuk University, Samrye, Jeonbuk 565-701, Korea.

1748. Lee, Yeong-Ho; Park, Tae-shik. 2006. [Origin of legumes cultivation in Korean Peninsula by view point of excavated grain remains and genetic diversity of legumes]. *Nongupsayeongu* (*Agricultural History Studies*) 5(1):1-31. [Kor]*
• ***Summary:*** In *Soybean Storytelling* (2017, p. 25) we read: "Neolithic Age (before 1500 BC): Remains of soybeans and other related foodstuffs of the Neolithic Age can be found

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at the Daecheon Village, Okcheon site and the Sangchon Village, Jinju site. However, the charred rice, barley, wheat, foxtail millet, and other grains reported found with the soybeans are not mentioned in the official report of the Daecheon Village site, whereas the Sangchon Village report references the wheat, barley, foxtail millet, broomcorn millet, and other grain materials along with the remains of the pulse family. These remains have become known as the earliest soybean materials found in Korea" (Lee 2006).

1749. Hwang, Tae-Young; Moon, J.K.; Yu, S.; Yang, K.; Mohankumar, S.; Yu, Y-H.; Lee, Y-H.; Kim, H.S.; Kim, H-M.; Maroof, M.A.S.; et al. 2006. Application of comparative genomics in developing molecular markers tightly linked to the virus resistance gene *Rsv4* in soybean. *Genome* 49(4):380-88. [40 ref. Eng; fre]
• ***Summary:*** "Abstract: The *Rsv4* gene confers resistance to all the known strain groups of soybean mosaic virus in soybean... To construct a fine genetic map near *Rsv4* in soybean, we employed a comparative genomics approach that used genome sequence information of the model legume *Lotus japonicus."* Address: 1,3-4. BioEvaluation Center, Korea Research Inst. of Bioscience and Biotechnology, Daejeon 305-806, Republic of Korea [South Korea].

1750. Jang, Chan-Ho; Lim, J.K.; Kim, J.H.; Park, C.S.; Kwon, D.Y.; Kim, Y.S.; Shin, D.H.; Kim, J.S. 2006. Change of isoflavone content during manufacturing of cheonggukjang, a traditional Korean fermented soyfood. *Food Science and Biotechnology* (*Seoul, Korea*) 15(4):643-46. [23 ref. Eng]
• ***Summary:*** "Cheonggukjang [Korean-style natto], a popular Korean traditional fermented soyfood, was manufactured by fermenting steamed soybeans in a temperature-controlled room by traditional methods in which steamed soy was exposed to rice straw naturally rich in *Bacillus* species. *B. subtilis* and *B. licheniformis* were found to be the major microorganisms present in cheonggukjang made by the traditional method."

"Cheonggukjang has been a Korean traditional food since the Chosun dynasty (1600 AD) or earlier (16)."

"At the end of 2004, an area of 97,312 square meters in Sunchang, Jeonbuk Province, Korea was designated as 'Sunchang fermented soy products valley' by the Korean government. This area has been producing various kinds of fermented soy products such as soy paste, *kochujang* (fermented hot pepper-soybean paste), and *cheonggukjang* by traditional methods." Address: 1-2. Dep. of Animal Science and Biotechnology, Kyungpook National Univ., Daegu 702-701, Korea.

1751. Kim, Jong Ho; Yoo, J.S.; Kim, S.Y.; Lee, S.K. 2006. [Quality properties of soybean pastes made from meju with mold producing protease isolated from traditional meju]. *J. of the Korean Society for Applied Biological Chemistry 49: 7-14* 49(1):7-14. [35 ref. Kor; eng]
• ***Summary:*** "The changes in moisture content, enzyme activity (amylase, protease, lipase), reducing sugar, amino-type nitrogen contents and anti-oxidant activity were investigated during the aging period. The moisture contents decreased gradually with time." Address: 1. Dep. of Applied Biology and Chemistry, Konkuk Univ., Korea.

1752. Oishiku tabete kirei ni naru reshipi: daizu no chikara o shinjinasai. Nattô, tenpe, chongutchan [Delicious recipes that make you beautiful: Believe in the power of soybeans: Natto, tempeh, Korean-style natto]. 2006. Tokyo: Gakushû Kenkyûsha. 81 p. Illust. (Color). 26 cm. Series: Gakken mook. [Jap]*
Address: Japan.

1753. Yi, Hyoji. 2006. Han'guk ui umsik munhwa [The food culture of Korea]. Seoul, Korea. [Kor]*

1754. Pulmuone USA Inc. 2007. Soga foods (Website printout–part). www.sogafoods.com Retrieved Jan. 26.
• ***Summary:*** Contents (across the top): Home: The new tofu family. What's new. Tofu tips. Coupons. Site map. Contact us. (Left nav bar): Our products. Recipe collection. Meet chef Joseph. Soga wellness. Club So Good!! Where to buy. About us (Our history). Press pass.

"Founded in 1991 [sic], Soga Foods, a division of Pulmuone U.S.A. Inc., was established to manufacture superior tofu products for the Asian American market along with developing products for the mainstream American market.

Soga Foods has been built upon the philosophy of Won Kyung Sun, who founded Pulmuone 48 years ago as a quasi-Christian cooperative farm. His ideas held two key principles we still use today: "love thy neighbor" and have "respect for all living beings."

Note: As of 16 Feb. 2013 this URL and website no longer exist. The URL www.pmo.com (which used to lead to Pulmuone Wildwood, Inc.) now takes you to www.wildwoodfoods.com–which has no history of wildwood natural foods. Address: 4567 Firestone Blvd., South Gate, California.

1755. Kim, Sun-Lim; Lee, H.Y.; Chi, H.Y.; Lee, S.J.; Kim, S.J. 2007. [Diversity in lipid contents and fatty acid composition of soybean seeds cultivated in Korea]. *Korean J. of Crop Science* 52(3):348-57. Jan. [26 ref. Kor; eng]
• ***Summary:*** "The 117 soybeans seeds were collected from the nine provinces of Korea... The 100-seed weights of the black soybeans varied from 27.7 to 33.1 gm, while the 100-seed weights of the yellow soybeans varied from 24.6 to 36.6 gm. The protein contents of the 59 black soybean seeds (38.6%) were significantly higher than those of the 58 yellow

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soybean seeds (37.9%). However, lipid contents of the black soybean seeds (17.6%) were lower than those of the yellow soybean seeds (18.1%)." Address: 1. National Inst. of Crop Science, R.D.A., Suwon 441-857, Korea.

1756. Su, Chun-Li; Wu, Chao-Jung; Chen, Fang-Nan; et al. 2007. Supernatant of bacterial fermented soybean induces apoptosis of human hepatocellular carcinoma Hep 3B cells via activation of caspase 8 and mitochondria. *Food and Chemical Toxicology* 45(2):303-14. Feb.
• ***Summary:*** This article is about Chongkukjang, Korean salted natto paste. "SC-1, the aqueous phase of soybean fermentation products by bacteria (Bacillus subtilis and Bacillus brevis), significantly inhibited the growth and clonogenesity of human hepatocellular (Hep 3B), mouse hepatocellular (ML-1), and human colorectal (HCT 116 and HT-29) carcinoma cells." Address: 1. Dep. of Nursing, Chang Jung Christian Univ., Tainan 711, Taiwan, ROC.

1757. Chun, Jiyeon; Kim, G.M.; Lee, K.W.; Choi, I.D.; Kwon, G.H.; Park, J.Y.; Jeong, S.J.; Kim, J.S.; Kim, J.H. 2007. Conversion of isoflavone glucosides to aglycones in soymilk by fermentation with lactic acid bacteria. *J. of Food Science* 72(2):M39-M44. March. [34 ref]
• ***Summary:*** "Abstract: Four lactic acid bacteria (LAB), *Lactobacillus paraplantarum* KM, *Enterococcus durans* KH, *Streptococcus salivarius* HM and *Weissella confusa* JY, were isolated from humans and tested for their capabilities of converting isoflavone glucosides to aglycones in soymilk... Especially, *L. paraplantarum* KM seems to be a promising starter for bioactive-fermented soymilk based on its growth, acid production, and isoflavone conversion within a short time." Address: Div. of Applied Life Science, Graduate School, Inst. of Agriculture and Life Science, Gyeongsang National Univ., Jinju 660-701, Korea.

1758. Barrionuevo, Alexei. 2007. To fortify China, soybean harvest grows in Brazil. *New York Times.* April 6. p. A1, C7.
• ***Summary:*** An excellent article on the major changes taking place in world soybean production and trade. For about 3,000 years, China has produced enough soybeans for its own needs. But since about 1995, China has emerged into the world's largest net soybean importer–by far. Three main forces have driven this change: (1) As Chinese workers become more affluent, their appetite for meat increases; therefore more soybeans are needed as animal feed. (2) Fresh water in China has become increasingly scarce. In northern China, where soybeans have traditionally been produced, water tables are dropping at a rate of 3-10 feet/year. "It takes a thousand tons of water to produce one ton of grain," says Lester Brown, president of the Earth Policy Institute, a U.S. environmental research and advocacy group. "So the most efficient way to import water is in the form of grain." (3) China's population, the largest in the world at 1.3 billion people, continues to grow.

Since 2001/02, the USA has been the largest soybean exporter to China. But last year (2005/06), Brazil became China's largest supplier of soybeans; the trade grew 50% over the year before and nearly doubled since 2004. China seeks a long-term, low cost supplier. Brazil still has large amounts of land that could be planted to soybeans, and China hopes to export soybeans directly from Brazil, in its own ships, thereby bypassing the international grain traders such as Cargill, Bunge, and ADM.

But Brazil has drawbacks as a soybean supplier: (1) It has a transportation bottleneck; its infrastructure for transporting the soybeans from field to port in trucks over long (up to 1,000 miles), bumpy, dirt roads, and its congested ports where some ships must wait for up to a month before loading soybeans. (2) Brazil would strongly prefer to export value-added soybean products such as oil and meal rather than raw, unprocessed soybeans. (3) Soybean farmers in Mato Grosso, though producing huge amounts of soybeans, are deeply in debt and losing money, as they become slaves to the big trading companies. (4) The strong Brazilian currency keeps prices high.

Graphs show: (1) The world's net soybean importers (in descending order): China (by far), European Union, rest of the world, Japan, Taiwan, South Korea. (2) World's net soybean exporters (incl. projections to 2007/08): Brazil, USA, Argentina, rest of world. A map shows world soybean trade. China is the leading destination for both U.S. and Brazilian soybeans. A large color photo shows a truck loaded with soybeans near Rondonopolis, Mato Grosso, Brazil.

1759. Bang, Myung Hee; Chio, O.S.; Kim, W.K. 2007. Soyoligosaccharide increases fecal bifidobacteria counts, short-chain fatty acids, and fecal lipid concentrations in young Korean women. *J. of Medicinal Food* 10(2):366-70. June. [23 ref]
• ***Summary:*** "These results demonstrate that a soyoligosaccharide intake of 3 g/day increases fecal bifidobacteria counts, SCFA [short-chain fatty acid] concentrations, and fecal lipid output in Korean young women." Address: Dep. of Food Science and Nutrition, Dankook Univ., Seoul, Republic of Korea.

1760. Han, Gyu-Hong; Cho, T.Y.; Yoo, M.S.; Kim, C.S.; Kim, J.M.; Kim, H.A.; Kim, M.O.; Kim, S.C.; Lee, S.A.; Ko, Y.S.; Kim, S.H.; Kim, D.B. 2007. [Biogenic amines formation and content in fermented soybean paste (Cheonggukjang)]. *Korean J. of Food Science and Technology* 39(5):541-45. Oct. [28 ref. Kor; eng]
• ***Summary:*** "The potential to produce biogenic amines was investigated in microbial strains isolated from fermented soybean paste, cheonggukjang [often spelled "chongkukjang]." The typical levels of 11 biogenic amines, including putrescine, histamine, and tryptamine, were

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analyzed in commercial cheonggukjang." Address: Test and Analysis Center, Busan Regional KFDA.

1761. *Iowa Soybean Review* (*Iowa Soybean Association, Urbandale, Iowa*). 2007. Another record year–1.11 billion bushels of U.S. soybeans exported in 2007 marketing year. Investing checkoff dollars. 19(2):20-21. Nov.
• ***Summary:*** A sidebar shows: "Top 10 U.S. Export Destinations of 2007 were:

"1. China–420 million bushels
"2. Mexico–141 million bushels
"3. Japan–116 million bushels
"4. Taiwan–71 million bushels
"5. Indonesia–53 million bushels
"6. Netherlands–52 million bushels
"7. Germany–38 million bushels
"8. Egypt–28 million bushels
"9. Korea–21 million bushels
"10. Turkey–19 million bushels

"The United States set another record for exports of soybeans during the 2007 marketing year, which was completed Aug. 31, 2007. The U.S. exported 1.11 billion bushels of soybeans with an approximate value of $10 billion. This is 18 percent higher than last year's exports, and it is the second record in three years.

"Soymeal and oil sales are ahead of last year's pace, but that marketing year ended Sept. 30 and year-end figures are not yet completed. Soymeal exports are 5 percent ahead of last year, and soy oil exports are up 77 percent even with the increased soy oil use in biodiesel.

"'Soybeans are the highest-valued U.S. agricultural commodity export and contribute a great deal to the balance of trade,' says Brent Babb, director of internal operations and program development for the U.S. Soybean Export Council (USSEC). 'On average, 43 percent of U.S. soybean production is exported each year.'"

"'Promotion and market development efforts in overseas markets are vital for the competitiveness of the soybean farmers in Iowa,' says Ray Gaesser, past president of the Iowa Soybean Association. 'With every other row of soybeans exported, Iowa farmers depend on overseas markets to utilize part of the 500 million bushels of soybeans we harvest.'

"In addition to record exports for 2007, the United States is starting the 2008 marketing year with a record amount of export sales commitments of 297 million bushels. The chart above shows 2008 export commitments as of Aug. 16, 2007.

"Chinese Imports Crucial: Chinese soybean buyers, visiting the Midwest last May, exceeded expectations by signing 17 contracts worth $2.07 billion with eight U.S. soybean export companies at the Chicago Board of Trade [Illinois]. The same trade delegation signed another round of contracts at the Iowa Statehouse that same week.

"The contracts signed by Chinese companies apply to the 2007-2008 market year, and the volume totals 5.76 million metric tons, or about 210 million bushels, about one-half of the 420 million bushels of soybeans that U.S. farmers sold during the 2006-2007 market year.

"The 14-company buying delegation was organized by the American Soybean Association–International Marketing, the international arm of the U.S. Soybean Export Council, with the China Chamber of Commerce for Imports/Exports of Foodstuffs, Native Produce and Animal By-Products.

"The Chinese delegation visit builds on an increasing trade relationship between the U.S. and China, which went from practically zero U.S. soybean imports in 1998 to 435 million bushels in the 2004-2005 market year.

"'The U.S. soy export program to China is a great example of how U.S. agriculture is deeply involved in the economic development of our trading partners,' Babb says. 'Our ASA- International Marketing activities in China provide training And expertise in animal production and aquaculture that provide improved nutritional and economic benefits. Through USSEC's network of eight overseas offices and with support from the soybean checkoff and several state soybean organizations, we promote soy product usage in animal feed, soyfood and industrial uses in more than 80 countries.'" Address: ISA Communications Manager.

1762. Kwak, Chung Shil; Lee, M.S.; Park, S.C. 2007. Higher antioxidant properties of Chungkookjang, a fermented soybean paste, may be due to increased aglycone and malonylglycoside isoflavone during fermentation. *Nutrition Research* 27(11):719-27. Nov. [54 ref]
• ***Summary:*** Chungkookjang (CKG), a popular Korean fermented soybean paste, has long been considered to be more healthful than soybeans. CKG was much richer in antioxidants than unfermented steamed soybeans, probably due to its increased aglycone isoflavone and malonylglycoside isoflavone, which resulted from fermentation, as well as total content of polyphenols. Address: 1. Institute on Aging, Seoul National Univ., Seoul 110-810, South Korea.

1763. Meerak, Jomkhwan; Iida, H.; Watanabe, Y.; Miyashita, M.; Sato, H.; Nakagawa, Y.; Tahara, Y. 2007. Phylogeny of gamma-polyglutamic acid producing *Bacillus* strains isolated from fermented soybean foods manufactured in Asian countries. *J. of General and Applied Microbiology* (*Tokyo*) 53(6):315-23. Dec. [23 ref]
• ***Summary:*** Natto and closely related fermented soyfoods are made and consumed in many Asian countries. In this study, 34 *Bacillus* strains capable of producing gamma-polyglutamic acid (PGA) were isolated from natto and its relatives in mountainous areas of South Asia and Southeast Asia and from soils in Japan. This phylogenetic analysis shows the similarity among strains of *Bacillus subtilis* isolated from various sticky fermented soyfoods of Asia.

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This suggests that *B. subtilis* strains responsible for the fermentation of sticky Asian soyfoods might have originated from the same stock.

The foods examined include: Kinema from Darjeeling (West Bengal, India) and Dhankuta (Nepal). Thua-nao from Maehongsorn and Chiangmai, Thailand. Tan-douchi from Ruili, Yunnan province (near the border with Myanmar). Chungkuk jang from Taegu, Korea. Also, soil was examined from Hokkaido, Iwate, Nagano, and Yamagata, Japan. Address: 1-3, 7. Dep. of Applied Biological Chemistry, Faculty of Agriculture, Shizuoka Univ., Shizuoka 422-8529, Japan.

1764. Cho, K.M.; Seo, W.T. 2007. Bacterial diversity in a Korean traditional POI soybean fermented foods (Doenjang and Ganjang) by 16S rRNA gene sequence analysis. *Food Science and Biotechnology* 16:320-24. *

1765. Kim, Kyung Seon; Park, Jae Bok; Kim, Suna. 2007. [Quality characteristics of kochujang prepared with Korean single-harvested pepper (*Capsicum annuum* L.)]. *J. of the Korean Society of Food Science and Nutrition* 36(6):759-65. [38 ref. Kor; eng]
• ***Summary:*** "This study was conducted to analyze the chemical properties of single-harvested pepper (YW211, YW213), and to investigate the change of kochujang quality by the addition of single-harvested peppers. Capsaicinoids content of YW211 was 271.65±25.10 mg/100 g and ASTA color value of YW213 was 212.71±2.38, which were comparatively higher values than commercial red peppers."

Note: The meaning of "single-harvested pepper" is unclear. A Google search does not help. Address: 1. Korea Food Research Inst., Gyeonggi 463-746, Korea.

1766. Mitsuboshi, Saori; Kiuchi, K. 2007. [Development of new itohiki-natto and odor of natto type foods]. *Journal of Japan Association on Odor Environment* 38(3):151-62. [28 ref. Jap; eng]
• ***Summary:*** "Domestic availability of industrial-grade *Bacillus subtilis* (natto) is limited to only three varieties of those suited for automated Itohiki-natto production, and scarcity of varieties of strains is causing difficulties in development of new varieties of Itohiki-natto. For that reason, we have been involved in research in distribution of *Bacillus subtilis* (*natto*) in the regions of Southeast Asian where the bacteria are in wide distribution. Available natto preparations include Chinese Douchi and Korean Chungkuk-Jang. In this connection, we have collected Douchi, isolated a new variety of the bacteria, and manufactured new Itohiki-natto. As the result, we have discovered *Bacillus subtilis* (*natto*) KFP843, which is expected to be capable of producing a new, soft variety of Itohiki-natto. We expect that this product may win a place in the diet of the aged who are experiencing difficulties in mastication or mastication and deglutition..." Address: Faculty of Home Economics, Kyoritsu Women's Univ., 2-2-1, Hitotsubashi, Chiyoda-ku, Tokyo, 101-8437, Japan.

1767. Park, Min Kyung; Song, Y.; Joung, H.; Li, S-J.; Paik, H.Y. 2007. Establishment of an isoflavone database for usual Korean foods and evaluation of isoflavone intake among Korean children. *Asia Pacific J. of Clinical Nutrition* 16(1):129-39. [37 ref. Eng; [kor]]
• ***Summary:*** "Asian populations including Koreans are assumed to have a higher isoflavone intake due to the higher consumption of soybean. However, it is difficult to estimate isoflavone intake because there is no isoflavone database in Korea. In this study, an isoflavone database was established with systematic review. Literature with analytical values of Korean soybeans and its products were collected and evaluated to establish an isoflavone database. A total of 142 food items containing isoflavones were selected among 2,932 food items in the Korean Nutrient Database. Among these, only 25 food items were evaluated with analytical values and the remaining 98 items were replaced with adaptations or calculations from similar items. Dietary intake of isoflavones was assessed for 426 boys and 365 girls aged 8 to 11 years with 3-day food records. The daily mean isoflavone intake was 8.3 mg among boys and 7.2 mg among girls. More than 70% of subjects had a daily isoflavone intake below 10 mg. The most contributory food item to the isoflavone intake among adolescents was tofu in quantity and soybean sauce in frequency. This database could be used to estimate isoflavone intakes from dietary data among various populations and to evaluate the relationships between isoflavone intake and chronic disease." Address: 1. Dep. of Food and Nutrition, Seoul National Univ., San 56-1, Shillim-dong, Kwanak-ku, Seoul 151-742 Korea.

1768. Do, Min Hee; Lee, Sang Sun; Jung, P.J.; Lee, M.H. 2007. Intake of fruits, vegetables, and soy foods in relation to breast cancer risk in Korean women: a case-control study. *Nutrition and Cancer* 57(1):20-27. [50 ref]
• ***Summary:*** High consumption of cooked soybeans, including yellow and black soybeans, had an association with reduced breast cancer. Address: 1. Dep. of Food and Nutrition, College of Human Ecology, Hanyang Univ., Seoul, Korea.

1769. Hui, Yiu H.; Chandan, Ramesh C.; Clark, Stephanie; et al. ed. 2007. Handbook of food products manufacturing: health, meat, milk, poultry, seafood, and vegetables. 2 vols. Hoboken, New Jersey: John Wiley & Sons, Inc. Illust. (color). 22 cm.
• ***Summary:*** In Chapter 46, "Bioactive peptides from food proteins," we read (p. 15): "... ACE-inhibitory activity has been isolated from soybeans fermented with *Bacillus subtilis* and *chunggugjang* [Korean natto] fermented with

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*Bacillus subtilis."* In both studies, the optimal conditions for production were 60 hours fermentation at 40ºC (Cho et al. 2000). Address: Senior Scientist, Science Technology System, West Sacramento, California.

1770. Kurihara, Harumi. 2007. Harumi's Japanese home cooking. 1st American ed. New York, NY: Home Books. A division of the Penguin Group (USA) Inc. 160 p. Illust. (color). No index. 26 cm.
• ***Summary:*** A translation of *Kurihara Harumi no japaniizu hoomu kukkingu.* One chapter is titled "Soup, eggs & tofu." The book (which is crippled by the lack of an index) contains 7 recipes for miso, 5 for tofu, 2 for teriyaki sauce, and 1 for edamame. Soy sauce is used as an ingredient in many recipes such as Chicken with soy and balsamic dressing. The short glossary mentions Kochujan (Korean miso [actually red-pepper paste]).

Harumi Kurihara, a housewife, is Japan's most popular cooking expert. Her first book in English, *Harumi's Japanese Cooking* won the Gourmand World Cookbook award in 2004. Address: Japan.

1771. Losso, Jack N.; Shahidi, Fereidoon; Bagchi, Debasis. 2007. Anti-angiogenic functional and medicinal foods. Boca Raton, Florida: CRC Press. 715 p. See p. 131. Illust. 24 cm. [30+ ref]*
• ***Summary:*** Section 6.2.2 "Fermented soy foods (Doenjang, chonggukjang, and ganjang)" has the following contents: 1. General characteristics of doenjang, chonggukjang, and ganjang. 2. Health promoting effects of doenjang, chonggukjang, and ganjang.

Doenjang is Korean soy paste [somewhat like Korean miso]; it is made from meju (a fermented mass of cooked soybeans [soybean koji]) and takes several months to ferment. In traditional meju the main microorganisms are *Aspergillus oryzae, Aspergillus sojae* and *Bacillus subtilis.* "In the past, doenjang was obtained by separating the soy sauce (ganjang) after fermentation of meju in brine for several months. However, commercial doenjang is now produced as a sole product without separation of ganjang, and other cereals are often added to soybeans as a substrate [as is also the case for Japanese miso]. Modern meju is prepared on an industrial scale by inoculating" the substrate with *Aspergillus oryzae* "and *Bacillus* rather than depending on natural contaminant flora."

Chonggukjang is another type of fermented soybean paste; in Korea it is typically consumed as the basis of a soup and takes only a few days to ferment. The fermented soybeans are typically mixed with salt, garlic, ginger, and red chili pepper before being used as a soup base. Chonggukjang was first mentioned in the *Sanlim Gyongje,* by Hong Man-Sun, an agricultural encyclopedia published in 1715. Note: It could be called Korean natto.

Ganjang is Korean soy sauce. Traditionally it was made by separation of the liquid from doenjang [From Google Books Preview].

1772. Robinson, Martin; Bartlett, Ray; Whyte, Rob. 2007. Korea. 7th ed. Footscray, Victoria, Australia; London: Lonely Planet. 440 p. Illust. (some color). Maps (some color). Index. 20 cm. [30+ ref]
• ***Summary:*** This is a travel guidebook to Korea, including North Korea (p. 344+). Many maps. Page 23: The Korean word *doenjang* means "soybean paste;" it is used as a base for soups.

Page 62: In Korea, chili pepper usually takes the form of *gochujang* (red pepper paste). It is a popular topping for Bibampap

Page 71-72: Soups and stews–haejangguk = bean sprout soup. doenjang jjigae = soybean paste stew. dubu jjigae = tofu stew. sundubu jjigae = spicy uncurdled tofu stew [sic, tofu / soymilk curds in spicy stew]. sundubu = uncurdled tofu [sic, soymilk curds]

Page 177: "Tofu lovers and vegetarians will want to head for 'Tofu Village,' a cluster of restaurants that feature tofu."

Page 180: The Korean word for soymilk curds (or unset tofu) is *sundubu.*

Page 181: In Gang-Won-Do a restaurant named Yujeong Cheonggukjang serves a superb spicy soup that resembles miso soup but is actually made with Korean natto (*cheonggukjang*).

Note: This is the earliest English-language document seen (Jan. 2012) that uses the word "cheonggukjang" to refer to Korean-style natto.

Page 222. The Korean word for tofu is *dubu.*

The interesting section on North Korea starts on page 344.

Page 389: In the box titled "Unusual festivals" [in North Korea]–Chodang's Uncurdled Tofu Festival; exciting only for vegetarians.

Also: Tofu (dubu) is mentioned on pages 63-66, 71-72, 90, 125, 151, 170, 174, 175, 177, 180, 185, 192, 222, 283, 288, 321, 326, 389.

1773. Brown, Lester R. 2008. Plan B 3.0: Mobilizing to save civilization. New York and London: W.W. Norton & Co. xiv + 400 p. Jan. 16. Illust. Index. 21 cm. [1023 endnotes]
• ***Summary:*** A remarkable, very important book. A must-read for all who care about the fate of their planet and civilization.

Contents: Preface. 1. Entering a new world. I. A civilization in trouble: 2. Deteriorating oil and food security. 3. Rising temperatures and rising seas. 4. Emerging water shortages. 5. Natural systems under stress. 6. Early signs of decline.

II. The response–Plan B: 7. Eradicating poverty, stabilizing population. 8. Restoring the earth. 9. Feeding eight billion well. 10. Designing cities for people. 11.

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Raising energy efficiency. 12. Turning to renewable energy.

III. An exciting new option. 13. The great mobilization (as during World War II). Notes. Acknowledgments. About the author.

The section titled "The changing food prospect" (p. 36-38) notes that even though there has been a drop in grain production per capita, this has been partially offset by the enormous growth in world soybean production, from 68 million tons in 1984 to 222 million tons in 2007. In Brazil and Argentina, the growth of soybean production since about 1980 has been spectacular; by 2005 soybean production in both countries was rivaling or exceeding grain production. Increasingly, high-protein soybean meal is used to feed livestock, poultry, and fish. Feed rations containing about 80% grain and 20% soybean meal are now standard fare worldwide. "This allowed the global diet to improve even as the grain supply per person was declining." The world's farmers are now struggling to expand production fast enough "to feed 70 million more people each year and to allow billions of low-income consumers to move up the food chain. But they are being further challenged by the explosive "demand for grain to produce fuel ethanol for cars."

Tables: 1-1 (p. 16). Top 20 failing states, 2006. From worst to better: Sudan, Iraq, Somalia, Zimbabwe, Chad, Ivory Coast, Democratic Republic of the Congo, Afghanistan, Guinea, Central African Republic, Haiti, Pakistan, North Korea, Burma, Uganda, Bangladesh, Nigeria, Ethiopia, Burundi, Timor-Leste [East Timor]. Some 17 of these countries have rapid rates of population growth; they are caught in the demographic transition trap. 7-1 (p. 150). Plan B budget: Additional annual funding needed to reach basic social goals. Total: 77 billion dollars. 8-1 (p. 170). Plan B budget: Additional annual funding needed to restore the earth. Total: 113 billion. 12-1 (p. 261). World energy from renewables in 2006 and Plan B goals for 2020. 13-1 (p. 274). Plan B carbon dioxide emissions reductions and sequestrations in 2020. Reduction of 81.5% from 2006 baseline. 13-2 (p. 282). Plan B budget: Additional annual expenditures needed to meet social goals and restore the earth. Total: 77 + 113 = 190 billion. 13-3 (p. 284). Military budgets by country and for the world in 2006 and Plan B budget. Total: 1,235 vs. 190. / Can we save the earth? "It depends on you and me, on what you and I do to reverse these trends. It means becoming politically active. Saving our civilization is not a spectator sport.

"We have moved into this new world so fast that we have not fully grasped the meaning of what is happening... The two overriding policy challenges are to restructure taxes and reorder fiscal priorities." Taxes must be restructured "to get the market to tell the ecological truth." Fiscal priorities must be reordered "to get the resources needed for Plan B." (p. 285-86). Address: President, Earth Policy Inst., 1350 Connecticut Ave., N.W., Suite 403, Washington, DC 20036. Phone: 202-496-9290.

1774. Ness, Carol. 2008. House organic crowned top tofu: Taster's choice. *San Francisco Chronicle.* Jan. 23. p. F2.
• ***Summary:*** For tasting they chose 15 brands of firm tofu, served plain. The ranking was: House organic 79 ($2.49 for 14 oz at Andronico's). House 74 (non-organic, $1.69 for 14 oz). Soy Deli organic 73 ($1.99 for 12 oz). Whole Foods 385 67 ($0.99 for 14 oz), Azumaya 66 ($1.79 for 14 oz). Trader Joe's organic 64. Wo Chong 57. White Wave 55. Soy Fresh 40. Golden Gate 38. Soga (extra firm [made by Pulmuone]) 38. Mori Nu (box, silken) 36. Nasoya 21. Wildwood 20. Small Planet 2. Address: Chronicle staff writer.

1775. Chung, Jeff. 2008. Think you're a true Korean-food fan? Try this stew. *Honolulu Advertiser* (*The*) (*Hawaii*). Jan. 27. p. 60.
• ***Summary:*** The stew is called "cheongukjang stew. It's nothing exotic but simply a stew made from fermented soybean paste with a smell so pungent it could get you kicked out of your condo.

"Many local Korean restaurants will give you a complimentary order of stew if you order at least two meat dishes, such as kal bi. This can be either kim-chee stew or another common dish, a bean-paste stew called *doenjang.* Its very similar but can't even compare with cheongukjang."

1776. Kim, Seong-Ho; Jung, S.H.; Kim, I.H.; et al. 2008. [The effects of Chungkookjang biopolymer on blood glucose and serum lipid lowering in Streptozotocin-induced diabetic rats]. *J. of the Korean Society of Food Science and Nutrition* 37(1):35-41. Jan. [31 ref. Kor; eng]
• ***Summary:*** "The rats were divided into three experimental groups; a normal group (N), diabetic control group (D), and a diabetic group with the supplementation of Chungkookjang viscous biopolymer (DCB). The groups were given experimental diets for four weeks... These results indicate that dietary supplementation of Chungkookjang viscous biopolymer improved glucose lowering and lipid metabolism in diabetic rats." Address: Dep. of Bio-Food Science, Kyongbuk College of Science, Chilgok 718-851, Korea.

1777. **Product Name:** Wildwood Tofu-Veggie Burgers (Organic) [Original].
**Manufacturer's Name:** Pulmuone Wildwood, Inc.
**Manufacturer's Address:** Fullerton, CA 92833.
**Date of Introduction:** 2008 January.
**Ingredients:** Jan. 2008: Tofu* (filtered water, soybeans*, nigari {magnesium chloride, a natural firming agent}), vegetable oil* (sunflower or canola), yellow onion*, carrot*, kale*, tapioca starch*, sea salt, garlic powder*. * = Organic.
**Wt/Vol., Packaging, Price:** 6.5 oz (184 gm) vacuum packed. Package of two retails for $2.69 (2008/01 Lafayette, California).
**How Stored:** Refrigerated.

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**New Product–Documentation:** Product with Label purchased at Trader Joe's, Lafayette, California. 2008. Jan. 16. Green, tan, red, orange, and blue. Front panel: "2 ready-to-enjoy burgers. 25% organic vegetables." "100% U.S. grown organic soybeans." USDA Organic logo. Certified organic by Oregon Tilth. www.wildwoodfoods.com. "Dairy free, gluten-free & soy-isolate free, organic, vegan."

1778. Lee, Hyun-Joo; Kim, S.I.; Park, J.G.; Park, J.N.; Han, I.J.; Song, B.S.; Kim, J.H.; Byun, M.W.; Lee, J.W. 2008. Effect of Choi-cha on fermentation characteristics and sensory quality of Chungkookjang (Korean fermented soybean). *Korean J. of Food Preservation* 15(1):144-49. Feb. [27 ref. Kor; eng]

• ***Summary:*** "Physiological, sensory and microbiological evaluations were conducted during fermentation of Chungkookjang with Choi-cha (non-fermented green tea) powder in efforts to improve the sensory quality of Chungkookjang. Growth of fermentative microorganisms in Chungkookjang was inhibited by Choi-cha; the pH and VBN value decreased as the concentration of Choi-cha increased... This result indicated that the sensory quality of Chungkookjang was improved by fermentation with 3% (w/v) of Choi-cha powder." Address: Dep. of Nutrition and Culinary Science, Hankyong National Univ., Anseong 456-749, Korea.

1779. Shurtleff, William; Aoyagi, Akiko. 2008. Le livre du tofu: La source de protéines de l'avenir–dès maintenant! [The book of tofu: Protein source of the future–now! Translated from the English by Nathalie Tremblay]. Varennes, Quebec, Canada: Éditions AdA Inc. 430 p. Illust. by Akiko Aoyagi. Index. Feb. 28 cm. [53 ref. Fre]

• ***Summary:*** Contents: Preface. Acknowledgments. Part I. Tofu: Food for mankind. 1. Protein East and West. 2. Tofu as a food. 3. Getting started. Our favorite tofu recipes (lists about 80 recipe names for each of the different types of tofu, plus soymilk, yuba, whole soybeans, gô, okara, and curds; very favorites that are also quick and easy to prepare are preceded by an asterisk).

Part II. Cooking with tofu: Recipes from East and West (500 recipes). 4. Soybeans: History, cooking with whole dry soybeans, roasted soybeans (*iri-mame*), fresh green soybeans (*edamame*), kinako (roasted full-fat soy flour), soybean sprouts (*daizu no moyashi*), natto (sticky fermented whole soybeans, with "gossamer threads"), tempeh (fermented soybean cakes), Hamanatto and Daitokuji natto (raisin-like natto), modern western soybean foods (natural soy flour [full-fat], soy granules, defatted soy flour and grits, soy protein concentrates, soy protein isolates, spun protein fibers, textured vegetable protein (TVP), soy oil products). 5. Gô (*purée de fèves de soya fraîches;* a thick white puree of well-soaked uncooked soybeans). 6. Okara or Unohana. 7. Curds and whey (*Caillé et petit-lait*). 8. Tofu (includes history, and preparatory techniques: Parboiling, draining, pressing {towel and fridge method, slanting press method, sliced tofu method}, squeezing, scrambling, reshaping, crumbling, grinding).

9. Deep-fried tofu (*Tofu frit*)*:* Thick agé or nama agé (*Agé épais* {*côtelettes de tofu frit*}), ganmo or ganmodoki (*burgers de tofu frit;* incl. *hiryozu / hirosu*), agé or aburagé (*pochettes de tofu frit;* incl. "Smoked tofu," p. 197). 10. Soymilk (*Lait de soya*). 11. Silken tofu (Kinugoshi ou tofu soyeux) ("*Kinu* means 'silk'; *kosu* means 'to strain'; well named, kinugoshi tofu has a texture so smooth that it seems to have been strained through silk"). 12. Grilled tofu (*Tofu grillé*). 13. Frozen and dried-frozen tofu (*Tofu surgelé et tofu surgelé séche*). 14. Yuba (incl. many meat alternatives such as Yuba mock broiled eels, Buddha's chicken, Buddha's ham, sausage). 15. Tofu and yuba in China, Taiwan, and Korea (incl. Savory tofu {*wu-hsiang kan*}*;* see p. 258 for illustrations of many meat alternatives, incl. Buddha's fish, chicken, drumsticks, and duck, plus vegetarian liver and tripe, molded pig's head, and molded ham). 16. Special tofu (*Tofu particuliers*).

Part III–Japanese farmhouse tofu: Making tofu for more and more people. 17. The quest. 18. Making community tofu. 19. The traditional craftsman. 20. Making tofu in the traditional way. Appendices: A. Tofu restaurants in Japan (many are vegetarian). B. Tofu shops in the West (Directory of 43 shops in the USA, in Europe {Germany 11, Austria 1, Belgium 2, Denmark 1, Finland 1, France 6, Ireland 1, Italy 3, Netherlands 4, Portugal 1, Spain 6, Switzerland 4, UK 9, Wales 1}, and 3 in Latin America {Brazil, Colombia, El Salvador, Guatemala, Mexico}). C. People and institutions connected with tofu. D. Table of equivalents. Bibliography. Glossary. Index. About the authors (autobiographical

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sketches; a photo shows Shurtleff and Aoyagi, and gives their address as New-Age Foods Study Center, 278-28 Higashi Oizumi, Nerima-ku, Tokyo, Japan 177). Sending tofu in the four directions.

Pudding recipes include: Rice pudding with gô and apple (p. 76, incl. 2 cups soymilk). Tofu chawan-mushi (p. 147; Steamed egg-vegetable custard with tofu). Tofu fruit whips (p. 148). Tofu rice pudding (p. 150, incl. 1 cup soymilk). Tofu custard pudding (p. 152). Soymilk custard pudding (p. 208). Brown rice pudding (p. 208, with 2 cups soymilk). Soymilk chawan-mushi (p. 209). Chawan-mushi with yuba (p. 249).

Dessert recipes include: Tofu whipped cream or yogurt (p. 148; resembles a pudding or parfait). Tofu ice cream (p. 149, with chilled tofu, honey, vanilla extract and salt). Banana-tofu milkshake (p. 149). Tofu cream cheese dessert balls (p. 149). Tofu icing (for cake, p. 149). Tofu cheesecake (p. 150). Tofu-pineapple sherbet (p. 151). Also: Soymilk yogurt (cultured, p. 205). Healthy banana milkshake (p. 206). On p. 160 is a recipe for "Mock tuna salad with deep fried tofu."

Note. This is the earliest French-language document seen (Sept. 2013) that mentions soy cream cheese (p. 125), which it calls *Fromage à la crème au tofu.* Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549 USA. Phone: 925-283-2991.

1780. *Morning Star* (*The*) (*Bernon, British Columbia, Canada*). 2008. Traditional cuisine on the menu. March 23. p. 44.
• ***Summary:*** Korea–A wide variety of foods and dishes can be found throughout Korea. In Korea "various fermented and preserved foods, such as kimchi (fermented spicy cabbage), jeotgal (seafood fermented in salt), and doenjang (fermented soy bean paste) are notable for their specific flavor and high nutritional value."

1781. Nichols, Rick. 2008. Korean evolution: food. *Philadelphia Inquirer* (*The*) (*Pennsylvania*). March 30. p. M01, M03.
• ***Summary:*** Much of this article is about Everyday Good House, a Korean restaurant.

"There was a splendid bulgogi, thinly sliced rib eye tenderized by a marinade of Asia pear juice, sesame oil, garlic and soy [sauce] that had the perfect balance of tart and sweet."

There was "soodubu casserole filled with a pudding of silken tofu turned sunburst red by kochukaru spice powder; doenjang chigae, a Koreanized variation on miso soup, spiked with the tang of fermented soybean paste;..."

A large, elegant color photo shows "Soodubu, a spicy tofu soup."

1782. Kim, Nam Yee; Song, E.J.; Kwon, D.Y.; Kim, H.P.; Heo, M.Y. 2008. Antioxidant and antigenotoxic activities of Korean fermented soybean. *Food and Chemical Toxicology* 46(3):1184-89. March. *
• ***Summary:*** The Korean fermented soy product, Chungkookjang, will be evaluated in vitro and in vivo. It was found "to be a promising functional food which can prevent oxidative stress." Address: College of Pharmacy, Kangwon National Univ., Chunchon, Republic of Korea.

1783. *Daily Herald* (*The*) (*Provo, Utah*). 2008. Recently reviewed: Fusion Asian Grill. April 17, p. 47.
• ***Summary:*** "This Korean restaurant is full of smells–ones you'll like but not necessarily ones you'll recognize.

"Korean food includes some ingredients and dishes that might not be familiar to the casual diner, such as kimchee (made from cabbage) and doenjang (fermented soybean paste)..."

"We liked the BiBimBop and BolGoGi, both traditional Korean meat dishes. Main entrees are around $9..."

1784. Lauterbach, Christiane. 2008. The joy of soy: The city's first Korean tofu house still sizzles. *Atlanta Magazine.* June. p. 54. *
• ***Summary:*** A rediscovery of 88 Tofu House, which opened in 2000 and has now achieved cult classic status. It is located at 5490 Buford Highway. Phone: 770-457-8811.

"... spicy bowls of kimchi, pickled tofu, daikon, salted fish, sprouts and more–helps focus one's attention."

1785. Xiao, Chao Wu. 2008. Health effects of soy protein and isoflavones in humans. *J. of Nutrition* 138(6):1244S-1249S. June. [77 ref]
• ***Summary:*** "Epidemiological investigations suggest that soy consumption may be associated with a lower incidence of certain chronic diseases. Clinical studies also show that ingestion of soy proteins reduces the risk factors for cardiovascular disease. This led to the approval of the food-labeling health claim for soy proteins in the prevention of coronary heart disease by the U.S. FDA in 1999. Similar health petitions for soy proteins have also been approved thereafter in the United Kingdom, Brazil, South Africa, the Philippines, Indonesia, Korea, and Malaysia. However, the purported health benefits are quite variable in different studies. The Nutrition Committee of the American Heart Association has assessed 22 randomized trials conducted since 1999 and found that isolated soy protein with isoflavones (ISF) slightly decreased LDL cholesterol but had no effect on HDL cholesterol, triglycerides, lipoprotein(a), or blood pressure. The other effects of soy consumption were not evident. Although the contributing factors to these discrepancies are not fully understood, the source of soybeans and processing procedures of the protein or ISF are believed to be important because of their effects on the content and intactness of certain bioactive protein subunits.

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Some studies have documented potential safety concerns on increased consumption of soy products. Impacts of soy products on thyroid and reproductive functions as well as on certain types of carcinogenesis require further study in this context. Overall, existing data are inconsistent or inadequate in supporting most of the suggested health benefits of consuming soy protein or ISF." Address: Nutrition Research Div., Food Directorate, Health Products and Food Branch, Health Canada, 2203E Banting Research Centre, Ottawa, Canada.

1786. Min, Hyun-Kyeng; Kim, Hyo-Ju; Chang; Hae Choon. 2008. [Growth-inhibitory effect of the extract of porphyran-chungkookjang on cancer cell]. *J. of the Korean Society of Food Science and Nutrition* 37(7):826-33. July. [40 ref. Kor; eng]

• ***Summary:*** "Porphyran, which was prepared from laver (*Porphyra yezoensis*), decreased the viability of the cancer cells, however, it did not affect the viability of normal cells... However, the methanol and the water extracts of porphyran-chungkookjang did not inhibit the growth of normal cell. Moreover, the methanol extract of porphyran-chungkookjang at 1.0 mg/mL showed 1.2 to 1.5 fold higher anticancer effects than that of the chungkookjang." Address: All: Dep. of Food and Nutrition, Chosun Univ., Gwangju 501-759, Korea.

1787. Baek, Lag Min; Park, L.Y.; Park, K.S.; Lee, S.H. 2008. [Effect of starter cultures on the fermentative characteristics of *Cheonggukjang*]. *Korean J. of Food Science and Technology* 40(4):400-05. Aug. [33 ref. Kor; eng]

• ***Summary:*** The effects were examined by using three *Bacillus subtilis* strains. Strain B-59 was isolated from rice straw. The total amino acid contents of the *cheonggukjangs* were highest in the B-59 strain. "Glutamic acid and lysine contents were higher in the B-59 sample than in the control. Finally, the *cheonggukjang* fermented using the B-59 strain had improved sensory qualities such as color, taste, texture and overall acceptability compared to the control and Kn-10 samples." Address: Faculty of Food Technology and Service, Catholic Univ. of Daegu [Korea].

1788. Wilson, S.; Martinez-Villaluenga, C.; de Mejia, E.G. 2008. Purification, thermal stability, and antigenicity of the immunodominant soybean allergen P34 in soy cultivars, ingredients, and products. *J. of Food Science* 73(6):T106-T114. Aug. [51 ref]

• ***Summary:*** "Protein P34 (Gly m Bd 30K) is the immunodominant allergen in soybean (Glycine max L.)"

"Among soy consumer products, soymilk presented the highest P34 antigenicity, ranging from 7 to 23 mg/g extracted protein, followed by tempeh (8 mg/g extracted protein), soy infant formula (3.4 mg/g extracted protein), soy powder [soy flour] (2 mg/g extracted protein), and soy cheese products (0.50 mg/g extracted protein). Korean miso, soy sauce, soy chili mix, soy nuts, soy cream cheese, soy meat patty, texturized soy protein, and soy cereal exhibited undetectable P34 antigenicity (detection limit = 0.45 ng). Selecting soybean varieties with low levels of this allergen, or via processing, could potentially make soybean products less antigenic."

Note: "Less antigenic" means less likely to cause allergic reactions. Address: Dep. of Food Science and Human Nutrition, Univ. of Illinois at Urbana-Champaign, 228 ERML, MC-051, 1201 W. Gregory Drive, Urbana, IL 61801.

1789. Cwiertka, Katarzyna J.; Moriya, Akiko. 2008. Fermented soyfoods in South Korea: The industrialization of tradition. In: Christine M. Du Bois, C.-B. Tan, and S.W. Mintz, eds. 2008. The World of Soy. Urbana, Illinois: University of Illinois Press. viii + 337 p. See p. 161-181. [47 ref]

• ***Summary:*** Contents: Introduction. The soul of Korean cuisine. The industrialization of *Chang* manufacture. Conclusion–*Chang* and Korean identity. Notes.

Photos show: (1) One of the Starbucks outlets in Korea's capital. (2) Industrially produced soybean paste and hot red pepper paste on shelves in a modern retail store. (3) A traditional home in the Hahoe Folk Village near Andong. Meju [soybean koji] is hanging under the eaves and sauce pots stand in the courtyard. Liquid soy sauce is *kanjang.* Korean miso is *toenjang* or *doen jang.* Hot red pepper miso is *koch'ujang*, which was first mentioned in the 2nd half of the 17th century.

Although foreign foods are widely consumed in Korea today, soybeans and soyfoods remain a fundamental part of the Korean diet, and appear in a wide range for forms. Whole soybeans are boiled with other beans, rice, and other cereals to make *k'ongbap* [*kongbap*]. Whole soybeans are also mashed or ground into a creamy soup called *k'ongguksu* [*kongguksu*] which is served in the summer with noodles, soymilk, and julienned cucumber. Soybean sprouts (*k'ongnamul*), long a favorite in Korea, are used as an ingredient in a variety of soups, stews, and stir-fried. Seasoned soy sprouts (*k'ongnamul much'im* [*kongnamul muchim*]), a popular dish at many Korean meals, is made with blanched soybean sprouts seasoned with green onions, garlic, salt (or sometimes soy sauce), sesame oil, and crushed sesame seeds. Several kinds of tofu (*tubu*) are used in Korean cooking; they can be fried, braised, or simmered. To make Tofu kimchi (*tubu kimch'i*), cut fresh tofu into squares and arrange with pieces of kimchi; it serves as a popular snack with alcoholic beverages. Minced or mashed tofu mixed with minced meat can be used as a filling for dumplings called *mandu* [like Japanese manju], which are then fried or steamed. Roasted soybeans (*pokkun k'ong*) and roasted soybean flour (*k'ongaru*) are indispensable ingredients in many traditional desserts such as *kwaja* and *ttok.* During the

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last two decades, soymilk has become a popular product in Korea.

Footnote 16 describes the four basic types of Korean soy sauce: *ch'ong kanjan, chung kanjan, chin kanjang,* and *chin kanjang* (written with a different ideogram than no. 3). There is also *honhap kanjang* (a mixture of Japanese soy sauce and its chemical counterpart) and *choson kanjang* (a product manufactured on the basis of traditional Korean methods) (p. 172-73). Address: 1. Leiden Univ., Netherlands, lecturer at the Centre for Japanese and Korean Studies.

1790. Kaplan, Lawrence. 2008. Legumes in the history of human nutrition. In: Christine M. Du Bois, C.-B. Tan, and S.W. Mintz, eds. 2008. The World of Soy. Urbana, Illinois: University of Illinois Press. viii + 337 p. See p. 27-44. [40 ref]

• ***Summary:*** Contents: Introduction. Legumes in early prehistoric nutrition. Food grain legumes native to the Americas: Radiocarbon dating, beans in American archaeology, history and protein structure. The Near Eastern pulses: The classical texts, the broad bean (*Vicia faba*), lentil, pea, chickpea. The Asiatic and African pulses: Cowpea (*Vigna unguiculata* subspecies *unguiculata*), yard-long or asparagus bean (*Vigna unguiculata* subspecies *sesquipedalis*), mung bean or green gram (*Vigna radiata*), black gram (*Vigna mungo*), adzuki bean black gram (*Vigna angularis*). Note.

Throughout the world and throughout history legumes accompany cereal grains as primary components of human diets. "So pervasive is the combination of the combination of these complimentary food resources that they are often assumed to have been combined since the very beginnings of agriculture." In developing countries, "the proportion of protein derived from pulses appears to be in steady decline."

"Soy consumption is highest in industrialized, technologically developed Japan and the Republic of Korea [South Korea] (supply per capita per year of 7.53 kg and 8.10 kg, respectively) because of its central role in the traditional diet of these countries." Address: Emeritus Prof. of Biology, Univ. of Massachusetts, and former editor of the journal *Economic Botany*.

1791. Park, Jun-Seong; Park, H.Y.; Kim, D.H.; Kim, D.H.; Kim, H.K. 2008. ortho-Dihydroxyisoflavone derivatives from aged Doenjang (Korean fermented soypaste) and its radical scavenging activity. *Bioorganic & Medicinal Chemistry Letters* 18(18):5006-09. Sept. [20 ref]

• ***Summary:*** "One new ortho-dihydroxyisoflavone, 7,30,40-trihydroxyisoflavone (2), and two known ortho-dihydroxyisoflavone derivatives were isolated from 5-year-old *Doenjang* (Korean fermented soypaste), and evaluated as potent antioxidant by comparing with other known isoflavones... This study shows that the position of hydroxyl substituent at the aromatic ring of isoflavone plays an important role in radical scavenging effect." Address: 1. R&D Center, AmorePacific Corporation, 314-1, Bora-dong, Giheung-gu, Yongin-si, Gyeonggi-do 446-729, Republic of Korea.

1792. Samuels, Debra. 2008. A colorful assortment and the best kimchi around. *Boston Globe* (*The*) (*Massachusetts*). Oct. 8. p. 15.

• ***Summary:*** Dae Han Oriental Market is at 34 Elm St., Waltham. While you're at the market, check out all the offerings such as "miso (*doenjang*), red pepper paste (*gochujang*),... soybeans (*banchan*), a nice variety of tofu (*dubu*)..."

1793. Xu, Baojun; Chang, Sam K.C. 2008. Characterization of phenolic substances and antioxidant properties of food soybeans grown in the North Dakota–Minnesota region. *J. of Agricultural and Food Chemistry* 56(19):9102-9113. Oct. 8. [31 ref]

• ***Summary:*** "The isoflavone profiles of North Dakota soybean cultivars were similar to those of South Dakota, but average values of total isoflavone (TI) contents were higher than soybeans grown in the other states and Korea and Japan according to the U.S. Department of Agriculture-Iowa State University Database on the isoflavone contents of foods."

"These data suggest that some selected soybean cultivars may be used as high-quality food-grade soybeans for providing high phenolic phytochemicals and antioxidant activities." Address: 1. The Pharmaceutical Inst., Dalian Univ., Dalian 116622, China; 2. Dep. of Cereal and Food Sciences, North Dakota State Univ., Fargo, ND 58105.

1794. Millman, China. 2008. Korean secrets: Oakland storefront opens up a world of tasty cuisine. *Pittsburgh Post-Gazette* (*Pennsylvania*). Oct. 16. p. 69.

• ***Summary:*** A restaurant review of Korea Garden. Choices include "seaweed and lightly pickled cucumber in a sweet, soy-based brown sauce; [soy] bean sprouts in red pepper sauce, marinated chewy fried tofu,..."

The pancake is served on a hot stone platter so it stays warm and crispy as you eat each piece. Make a dipping sauce by mixing together the vinegar and soy sauce on the table."

"You "can order bulgogi, thin strips of beef marinated in a light sweet soy sauce with a hint of fruit used to tenderize the meat (probably kiwi or Asian pear)." "... all three dishes came with the same sweet-salty-spicy sauce, which tasted of both doenjang (fermented soybean paste) and gochujang (red chile paste), two of the most important flavoring components of Korean cuisine."

"The spicy seafood hot pot has a savory, misolike broth and was almost brimming over with chunks of monkfish,..."

"Karaoke is available on the second floor for a minimum of five people."

A photo shows "Tofu stew, a traditional Korean

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dish, surrounded by a variety of banchan, side dishes that accompany meals at Korea Garden." Address: Pittsburgh Post-Gazette.

1795. Jeong, P.H.; Shin, D.H.; Kim, Y.S. 2008. Effects of germination and osmopriming treatment on enhancement of isoflavone contents in various soybean cultivars and cheonggukjang (fermented unsalted soybean paste). *J. of Food Science* 73(8):H187-94. Oct.
• ***Summary:*** "To develop soybean products containing high isoflavone contents, the effects of germination and osmopriming on the isoflavone contents of 3 soybean cultivars (Ilmi, Daehwang, and Taekwang) were investigated."

"We concluded that cheonggukjang would contain higher isoflavone contents after the treatment of germination and osmopriming." Address: General Affairs Team, Ourhome Ltd., 5444-1 Sangdaewon-dong, Jungwon-gu, Seongnam-city, Kyunggi-do 462-120, Korea.

1796. NEI–Nutrition & Education International (Website printout–part). 2008. www.nei-intl.org Retrieved Nov. 19.
• ***Summary:*** A very inspiring and interesting website about an organization created by Dr. Steven Kwon that is introducing soybeans and soyfoods to Afghanistan as a way of combating that country's serious malnutrition problems. Dr. Kwon has taken early retirement after 22 years working for Nestlé. Please watch the 10-minute video at the bottom of the homepage first. Then read several of the most recent newsletters. The January/March 2008 newsletter notes that farmers working cooperatively with NEI expect to harvest 2,000 tons of edible soybeans in Oct. 2008. NEI is working closely with the Ministry of Women's Affairs (MoWA). A map shows that NEI has four soymilk feeding facilities in various parts of Afghanistan, a soy flour factory in Kabul, and soybean fields in most of the provinces (*weleyats*) in the northern half of the country.

"Afghanistan has one of the world's highest maternal mortality rates. One out of fifty women die during childbirth. Because expectant mothers are malnourished, they are unable to pass on vital nutrients to their babies during pregnancy or breast-feeding. Not surprisingly, one in four Afghan babies die before the age of five, and 54% of these under-five children are chronically malnourished. (UNICEF Humanitarian Action Report Update for Afghanistan. 17, Jan. 2008)."

Headings: Home (Introduction, Why Afghanistan, why soy, what will it take). About us. Programs. News. Career / internship. Contact. Team.

1797. Lyddon, Chris. 2008. Global grain trade review: Volatility the dominant factor in the 'wildest 12 month history of the grain market.' *World Grain* 26(11):26-33. Nov.
• ***Summary:*** A table titled "Global grain trade activity (in 1,000 tonnes)" gives the following statistics for soybeans: 2007-08 Top exporters: 1. United States 31,434. 2. Brazil 25,500. 3. Argentina 13,500. 4. Paraguay 5,080. 5. Canada 1,825. World total 78,968 (+15% over last year).

Top soybean importers: China 36,500. E.U.-27 15,400. 3. Japan 4,050. 4. Mexico 3,750. 5. Argentina 2,950.

Also gives the top 5 importers and exporters of soybean meal for 2007-08. Exporters include: 4. India 4,850. 5. Paraguay 1,112. World total 56,2062 (+6%). Top importers: 1. E.U.-27 23,900. 2. Indonesia 2,400. 3. Vietnam 2,400. 4. Thailand 1,950. 5. Korea 1,835.

Various factors have been cited as the cause of this volatility: (1) Energy policy–using maize, rapeseed, and soybeans to make biofuels. (2) Commodity speculators–who can make prices rise faster than they would otherwise. (3) Hedge fund position limits. (4) Government intervention by embargoes and export taxes. (5) The low value of the U.S. dollar. (6) The long term trend (spanning about 15 years) of declining wheat acres. (7) Fundamentally tight stocks. (8) Disruption of supply by things like floods. Address: European editor; chris.lyddon@ntlworld.com.

1798. Kyung, Mi Hwang; Jung, K.O.; Song, C.H.; Park, K.Y. 2008. Increasing antimutagenic and anticlastogenic effects of doenjang (Korean fermented soybean paste) prepared with bamboo salt. *J. of Medicinal Food* 11(4):717-22. Dec. [31 ref]*
• ***Summary:*** The kind of salt used in making doenjang is one of the most important factors affecting the chemopreventive activities of doenjang. "Bamboo salt (BS) is known to exert various therapeutic effects on several diseases." The more typical salts are sun-dried salt (SDS-D) and purified salt (PS-D). Address: Hazard Analysis Team, Gyeongin Regional Food & Drug Administration, Incheon, Republic of Korea (South Korea).

1799. Chae, I.S.; Kim, H.S.; Ko, Y.S.; Kang, M.H.; Hong, S.P.; Shin, D.B. 2008. Effect of citrus concentrate on the physicochemical properties of Kochujang. *Korean J. of Food Science and Technology* 40:626-32. *

1800. Committee for the Establishment of a Korean Soybean Museum. 2008. Soyworld Museum (Website printout part). www.soyworld.org Retrieved 4 Aug. 2017. [Kor]
• ***Summary:*** Contents: Introduction: greetings, history, Research Society, Board of Directors, Rules of study meeting.

Soy information Center: cyber museum.

Yeongju Bean Museum: establishment history, people who participated.

Community: newsletters, company / company introduction.

Member: Membership Registration, Membership Application Form, Edit your membership information,

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Online Membership, Privacy Policy. Address: Yeongju, Korea.

1801. Ham, Seung-Shi; Choi, Hyun-Jin; Kim, Soo-Hyun; Oh, Hyun-Taek; Chung, Mi-Ja. 2008. [Antimutagenic and cytotoxic effects of kochujang extracts added deep sea water salt and sea tangle]. *J. of the Korean Society of Food Science and Nutrition* 37(4):410-15. [24 ref. Kor; eng]
• ***Summary:*** "This study was performed to observe the antimutagenic and cytotoxic activities of methanol extract of kochujang added with sea tangle and deep sea water salts (SDK) and kochujang added with sea tangle (SK) using the Ames test and SRB assay, respectively." Address: Dep. of Biotechnology and Engineering, Kangwon National Univ., Chuncheon 200-701, Korea.

1802. Kim, J.S.; Choi, S.Y. 2008. [Quality characteristics of soybean curd with Omija extract]. *Korean J. of Food and Nutrition* 21:43-50. [Kor; eng]

1803. Oh, Hon-Il; Eom, S.M. 2008. [Changes in microflora and enzyme activities of *Cheonggukjang* prepared with germinated soybeans during fermentation]. *Korean J. of Food Science and Technology* 40(1):56-62. [25 ref. Kor; eng]
• ***Summary:*** "This study was carried out to investigate the changes in microflora, enzyme activity and sensory quality of four kinds of cheonggukjang during fermentation. Three different kinds of cheonggukjang were prepared with germinated soybeans using rice straw, *Bacillus natto, B. natto* plus *Aspergillus oryzae,* and the last one was prepared with non-germinated soybeans using rice straw... The results of the sensory evaluation revealed that for overall acceptability, the cheonggukjang prepared with germinated soybeans using *B. natto* plus *A. oryzae* was similar to the cheonggukjang prepared with non-germinated soybeans using rice straw." Address: All: Dep. of Food Science and Technology, Sejong Univ.

1804. Shim, Sung-Lye; Ryo, K.Y.; Kim, W.; Jun, S.N.; Seo, H.Y.; Han, K.J.; et al. 2008. [Physicochemical characteristics of medicinal herbs *Ganjang*]. *Korean J. of Food Preservation* 15(2):243-52. [57 ref. Kor; eng]
• ***Summary:*** "We investigated the physicochemical properties of *Ganjang* added to a medicinal herb extract (functional Ganjang). The proximate compositions of conventional Ganjang (control) and functional Ganjang (supplemented with 3% or 5% of an herb extract) were not significantly different." Address: 1. Dep. of Food and Nutrition, Chosun University, Gwangju 501-759, Korea.

1805. Chung, Taekyung; Samuels, Debra. 2008. The Korean table: from barbecue to bibimbap. 100 easy-to-prepare recipes. North Clarendon, Vermont: Tuttle Publishing. 159 p. Illust. (color photos by Heath Robbins). Index. 27 x 24 cm. [4 ref]
• ***Summary:*** This stylish book is printed in Singapore entirely on glossy paper with many large color photos. The section titled "The ingredients: Stocking your Korean pantry." includes information about: Miso (Korean miso is doenjang). Seaweed (*Miyeok*). Sesame paste (*Chamkkae anggeum*). Sesame seeds (*Chamkkae anggeum*). Soy sauce (*Ganjang*). Soybean sprouts and mung bean sprouts (*Kongnamul and Sookjoo namul*). Tofu (*Dubu or tubu*).

In Chapter 1, "Starters and snacks," we find Sweet and salty glazed soybeans (with edamame) (*Kong jorim*) (p. 45).

Chapter 6 (p. 121-29) titled "Vegetables & tofu," includes: Braised tofu (*Dubu jorim*). Pan-fried tofu with mushrooms (*Dubu jeon*). Vegetable and miso porridge (*Kongnamul sigeumchi doenjang jook*). Another tofu recipe is a dessert: Crusty tofu sherbet (with soymilk) (*Yooja dubu sherbet*).

Many recipes call for soy-based sauces such as: Soy dipping sauce (*Cho ganjang*) (p. 30). Sweet soy sauce base (*Jomi Ganjang*) (p. 31) The main ingredient is soy sauce, to which is added water, garlic, sliced fresh gingerroot, crushed black peppercorns, light brown sugar, and wine. Soy scallion dipping sauce (*Yangnyum ganjang*) (p. 32). Spicy miso dip (*Ssam jang*) (p. 33).

1806. Farnworth, Edward R. ed. 2008. Handbook of fermented functional foods. 2nd ed. Boca Raton, Florida: CRC Press. xviii + 581 p. See p. 333, 341-45. *
• ***Summary:*** Partial contents related to soy: Chapter 6. "Natto: A soybean food made by fermenting cooked soybeans with *Bacillus subtilis.* Chapter 11. "Miso: Production, properties, benefits to health."

Chapter 12. "Korean fermented foods: Kimchi and doenjang," by Jeonghee Surh, Young-Kyung Lee Kim, and Hoonjeong Kwon, has a long section on doenjang, including: Cancer: Epidemiology, anticarcinogenic and antimutagenic activities *in vitro* and animal models. Cardiovascular disease: Inhibition of angiotensin converting enzymes, antithrombotic peptides, isoflavones.

Chapter 17. "Tempeh: A mold-modified indigenous fermented food."

Two references to sufu (fermented tofu) appear on page 464.

1807. Kim, Emily. 2008. Cooking Korean food with Maangchi. Scotts Valley, California: CreateSpace. 50 p. See p. 83. Illust. (color). 20 cm. *
• ***Summary:*** Page 25: A recipe for "Doenjangjjigae (bean paste vegetable stew)" calls for "100–150 grams of tofu. Soybean paste ("doen jang")..."

1808. Kim, Mi Kyung; Kim, J.H.; Nam, S.J.; Ryu, S.; Kong, G. 2008. Dietary intake of soy protein and tofu in association with breast cancer risk based on a case-control study.

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*Nutrition and Cancer* 60(5):568-76. *

• ***Summary:*** "Soy food and its constituents may protect against breast cancer, but the association between soy intake and decreased breast cancer risk is inconsistent. We evaluated the relationship between breast cancer risk and the dietary intake of soy protein as measured by total soy food and tofu intake. Histologically confirmed cases (n = 362) were matched to controls by age (within 2 yr) and menopausal status. High soy protein intake was associated with reduced breast cancer risk in analyses adjusted for potential confounders including dietary factors among premenopausal women (odds ratio [OR] = 0.39 in the highest quintile, 95% confidence interval [CI] = 0.22-0.93, P for trend = 0.03) and postmenopausal women (OR = 0.22, 95% CI = 0.06-0.88, P for trend = 0.16). We also found an inverse association between total tofu intake and breast cancer risk among premenopausal women (for total tofu intake, OR = 0.23 in the highest quintile, 95% CI = 0.11-0.48, P for trend < 0.01; for at least 1 serving of tofu as the main ingredient per day, OR = 0.26, 95% CI = 0.13-0.55, P for trend < 0.01). We concluded that increased regular soy food intake at a level equivalent to traditional Korean consumption levels may be associated with a reduced risk of breast cancer, and this effect is more pronounced in premenopausal women." Address: 1. Dep. of Preventive Medicine, College of Medicine, Hanyang Univ., Seoul, Korea.

1809. Lee, Cherl-Ho. 2008. Chongkukjang [Korean-style salted natto]. In: Kan Kiuchi, Toshirô Nagai, and Keitarô Kimura, eds. 2008. Natto no Kagaku: Saishin Jôhô ni yoru Sôgôteki Kôsatsu [The Science of Natto: A Comprehensive Examination of the Latest Information]. Tokyo: Kenpakusha. viii + 285 p. See p. 224-26. 22 cm. [Jap]

• ***Summary:*** Cherl-Ho Lee (PhD of Korea Univ., Seoul) kindly sent us his English-Language copy of this chapter. Cc = Chinese characters "1. The origin of Chongkukjang

"Chongkukjang (3 Cc) is a branch of Korean soybean fermented products (Cc). It is a bacterial fermented soybean food, similar to Natto of Japan, but different in the usage. Chongkukjang is made by rapid fermentation of cooked soybean to produce soybean paste (*Doenjang*) by mixing salt after the bacterial fermentation. Therefore, it is one of the fermented soybean condiments stemmed from the long history of soybean fermentation in Korea as classified in Figure 1.

Shi (Cc) is prepared by fermenting individual cooked soybean whole grain with bacteria, *Bacillus subtilis*, while Maljang is made by Meju, cooked and pounded soybean ball grown with mold, *Aspergillus oryzae*, outside and bacteria, mainly *Bacillus* species, inside. The term "Shi (Cc), the Chinese letter indicating fermented soybean, first appears in Jijiupian (3 Cc) written in Han period (Cc 206 B.C.-208 A.D.) of China. Bowuzhi (3 Cc) of Jin (Cc 265-420 A.D.) of China describes that Shi was originated from foreign country, and the letter is a dialect. Xintangshu (3 Cc) of Tang (618–807 A.D.) in China names Shi as a special product of Balhai or Bohai (2 Cc 688–826 A.D.), a nation founded by the refugees from defeated Kokuryo (3 Cc 37 B.C.–668 A.D.). Chi-Min-Yao-Shu (4 Cc) written by Jia-Si-Xie (3 Cc 550) of Late-Wei (2 Cc) in the 6th century, describes several methods of Shi preparation (Lee, C.H., 2001)

"It is generally recognized that Koreans were the first people to experiment with soybean fermentation, sparking the beginning of the soy sauce culture of the Orient. The history book of Wei (2 Cc) praises the fermentation skill of the Korean people (8 Cc). The techniques were transferred to Japan around 2-3 Century A.D. from Kokuryo. The Japanese term for soybean paste, Miso was originated in Korean language Maljang, an old term indicating fermented soybean products as shown in Figure 1.

"Masakurainbunsyo (5 Cc) written in Japan in 752, describes Miso as a dialect from Koryo (2 Cc), and called as Koryojang (3 Cc) (Lee, S.W., 1990). Although the term `jang (1 Cc)' is used for the fermented condiments in general in the Orient, in this classification it is the soybean products fermented with other cereals using Koji, mostly developed in Japan.

"Chongkukjang is termed as Yumshi (2 Cc) in the earlier Korean literatures like Samkuksaki (4 Cc) written by Kim Bu-Shik (3 Cc, 1075 -1151). The 18th century literatures like Sanlimkyungje (4 Cc, 1715) describe it as Jeonkukjang (3 Cc), reflecting the need for rapid processing of soybean paste during the war time of Byungjahoran (4 Cc). Food historians believe that the phonetic change from 'Jeonkuk (2 Cc)' to 'Chongkuk (2 Cc)' took place at that time. Another story is that the Qing (Cc) army used to carry the instant fermented soybean as military ration, so people called it Chonkukjang (3 Cc). What all these names imply is that this product was made for extraordinary situation, for example war time or famine conditions, for the urgent supply of nutritious savory food ingredient.

"2. Methods of preparation

"The first written record on the preparation of Jeonkukjang appeared in *Jeungbosan limkyungje* (3 Cc) written by Yoo Jung-Im (3 Cc) in 1765. Newly harvested soybean is cooked and covered with straw mat, and placed on the warm *ondol*, typical Korean stone floor heated by fire underneath, for 3 days until the mucous string is formed with strong fermented smell. It is mixed with decoupled and roasted soybean powder, and pounded in a stone mortar with the addition of salt, and sun dried. The mixing ratio of fermented soybean and roasted soybean powder is 2 to 1, and the amount of salt addition is determined by taste. The product appears to be in dried form, easy for storage and transport, and suitable for the military use. This process is slightly different from the method practiced today. Today, the process is very simple as shown in Figure 2. Soybean is cooked and covered with straw mat or cloth, and placed on

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the warm *ondol* for 3-4 days until mucous strings are formed. It is mixed with chopped ginger, chopped garlic and salt, and pounded slightly until the bean kernels are separated into halves, and stored in an earthen jar. Industrially, inoculation is made by adding pure culture of *Bacillus subtilis* or placing pieces of rice straw to cooked soybean. Rice straw is the source of Bacillus subtilis, which grow fast at 40ºC and becomes naturally dominating flora in the system (Lee H.C., 1995) The strong smell of the bacterial fermented soybean is partially masked by ginger and garlic, and turned to the characteristic Chongkukjang flavor. The spicy seasoning is thus prepared in 3-4 days, while ordinary soybean paste, Doenjang, which uses Meju as fermentation starter, takes over 6 months to complete ripening.

"3. Usage and function *Bacillus subtilis* produces strong proteolytic enzymes, and soybean proteins undergo rapidly partial hydrolysis into peptides and even to amino acids and ammonia in the short fermentation period of Chongkukjang. This process produces the typical Chongkukjang flavor, strong meaty and sharp smell. It is used for making Chigae, a stew of vegetables, meats, fish and shell-fish, same as Doenjang. Chongkukjang-chigae is one of the most favorite menu in Korea, especially for the aged group. The amount of Chongkukjang added to the stew is large enough to supplement protein to the diet significantly. The fermented bean halves floating and mixing in the vegetable stew gives healthy sign of the dish. The strong desire on Chongkukjang of old Koreans may be not only the sensory nostalgia, but the physiological demands for their better health.

"Recently scientists discover the health beneficial physiological functions of some components produced in Chongkukjang. The soybean peptides are inhibiting angiotensin converting enzyme (ACE), and thus expected to suppress the incidence of high blood pressure. The mucous substance in Chongkukjang is peptido-polysaccharides produced by *Bacillus subtilis*, and contains enzyme kinase which has fibrinolytic and immune-modulating activity. The isoflavonoides in soybean support estrogen hormone function and relieve the malfunction of human menopause (Lee C.H., 2004).

"It is not surprising to find that fermented soybean products have been used as medicine in many Oriental medicine subscription, such as those in Dongeuibogam (4 Cc), a Classic of Eastern Medicine written by Hur Jun (2 Cc) in 1611. Recently, the dried form of the bacterial fermented soybean, either in granules, pills or powder form, are sold as health food in Korea.

"References:

"Cherl-Ho Lee, Fermentation Technology in Korea, Korea University Press, 2001, 44-81.

"Cherl-Ho Lee, The role of biotechnology in modern food production, Journal of Food Science, 2004, 69(3), R92-95.

"Han-Chang Lee, The mystery of Chongkukjang, Shinkwang Publishing Co., 1995.

"Sung-Woo Lee, Study on the origin and interchange of Dujang (also known as soybean sauce) in ancient Asia, Korean J. Dietary Culture, 1990, 5(3), 313-318." Address: PhD Korea Univ., Seoul, 136-701, Korea.

1810. Murakami, Ryu. 2008. Miso sup'u–In za miso supu [In the miso soup]. Kyonggi-do P`aju-si: T`aedong Ch`ulp`ansa. 284 p. 20 cm. [Jap]*

• ***Summary:*** This is a murder mystery, a work of fiction. The author was born in 1952. Address: Japan.

1811. Pettid, Michael J. 2008. Korean cuisine: An illustrated history. London: Reaktion Books. 223 p. Illust. (color). Maps. Index. 23 cm. [118 + 110 endnotes]

• ***Summary:*** This is the best book seen to date on this subject. "Korean words are transliterated into English using the McCune-Reischauer system and Chinese words by the Pinyin system." The book uses Korean words liberally, which we find very helpful. The many color photos on glossy paper also help to clarify the text. Contents: Daily foods. Ritual and seasonal foods. Regional specialties. Drinks. Foods of the royal palace. The kitchen space and utensils. Food in contemporary Korea.

Page 36: Rice mixed with beans (*k'ong pap*) was another way to stretch the rice supply; today it is common in many homes and restaurants. Black [soy] beans were generally used to make this dish. They were soaked overnight before being cooked with the rice. However, on the Harvest Festival (*Ch'usok*), the 15th day of the 8th lunar month, beans that are not quite fully ripened are added to the rice and cooked as is–to make the special holiday dish named *ch'ongdae k'ong pap.*

Pages 38-39, 101: The popular rice dish, Pipim pap [Bibim pap], probably developed from foods eaten by farmers when cooked rice (or other grains) was mixed with whatever vegetables were at hand. Nowadays, soybean sprouts (*k'ong namul*) are an essential ingredient.

Page 107, 109: In Pyongyang Province of today's North Korea, one of the most famous foods is *mandu* dumplings; in this area they are stuffed with beef, pork, kimch'i, [soy] bean sprouts, and the like.

Page 109: In Hamgyong Province, which occupies the northernmost reaches of the Korean Peninsula, the climate is harsh and the winter are long and cold. Rice is rarely grown here, but dry-field crops such as soybeans, millet and potatoes are grown in abundance.

The foods of northern Korea tend to be less spicy than those grown in the south. "Perhaps most important to the flavour of Korean foods are the seasonings made from soybeans: toenjang (soybean paste) and kanjang (soy sauce). Sprouts from soybeans (*k'ong namul*) are eaten as a side-dish or added to soups and stews..." (p. 40).

Note: We find it interesting that in this detailed book

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on Korean cuisine, no mention is made of *chungkukjang / chongkukjang* (Korean natto). This may be an indication that this food is no longer of much importance in Korean culture. Address: Asst. Prof. of Korean, Dep. of German, Russian, and East Asian Languages, Binghampton Univ., England.

1812. Pettid, Michael J. 2008. Korean cuisine: An illustrated history. Tofu (Document part). London: Reaktion Books. 223 p. [118 + 110 endnotes]

• ***Summary:*** This is the best book seen to date on this subject. Tofu is mentioned as follows:

Pages 41-42: Tofu (Korean: *tubu*) arrived relatively late in Korea, first becoming widely used during the early part of the Choson dynasty (1392-1897, i.e. late 1300s or early 1400s). The earliest Korean document seen that mentions tofu is the literary collection of Yi Saek, who lived 1328-1396.

Endnote 16 (p. 202): This collection is titled *Mogun-jip* [*Collected Writings of Mogun*] after his pen name, Mogun. "Yi was one of the leading Confucian literati of the late Koryo period and is appraised as one of the exemplary literary talents of the Koryo dynasty."

In Korea's dynastic records, an entry from 1434 states that an emperor from China's Ming dynasty (1368-1644) sent some serving women to the Choson court to prepare various foods; one of these was tofu. "The account states that all the dishes were harmonious and served beautifully and the means of preparing the tofu was even more exquisite."

Endnote 17 (p. 202): *Sejong Sillok* (*Veritable Records of King Sejong*), p. 66, 27b-28a (1434-12-24).

Note: This document contains the earliest date seen (1434) for tofu in Korea.

Of the many foods that the women brought to the Choson court from the Ming court, only tofu was singled out for praise in this particular entry. After this time, it is thought that dishes featuring tofu became common at the palace and then were disseminated throughout Korean society.

Pages 57-58: Korean soups can be classified into four broad categories. Stews, known as *tchigae* are thicker than regular soups, and are a common part of Korean meals. They are generally served as a shared side dish, rather than in individual bowls as soups typically are. "In general, *tchigae* are cooked and served in the same vessel, a glazed earthenware pot (*ttukpaegi*)." This earthenware pot, compared to a regular metal cooking pot, retains heat much better and enables the stew to continue cooking after it has been removed from the heat source.

One of the most popular Korean stews, *Toenjang tchigae*, is made with Korean miso (*toenjang*). Historically, there have been many different ways of preparing this stew throughout Korea and it remains a staple in Korean homes today. Basically, *toenjang* is added to water and boiled with one's choice of seasonal vegetables, seafoods, and often tofu, resulting in a thick, hearty stew that nicely complements rice and side dishes.

Page 107: In the chapter on "Regional specialties," under Pyongyang province (in North Korea) we read that special foods include a type of sausage named *sundae,* which "is made with pork entrails, clotted cattle blood, tofu, glutinous rice, and various seasonings." The contents are put into a casing, which is "tied at both ends before it is boiled. The sausage is then sliced and eaten with a seasoning of salt, chilli pepper, and black pepper."

Pages 113-14, 122, 124: The chapter on "Drinks" describes unfiltered rice wine (*makkolli* [like Japanese *doboroku*]) which was milky white, simple to make, and hence the drink of farmers and the common people. It was by far the most representative alcoholic drink of Korea, and was enjoyed by all classes at various times. Moreover, it goes well with warmed tofu topped with kimch'i [kimchi] and sesame seeds (*tubu kimch'i*)–a color photo of which is shown on p. 124.

Pages 130-31: The chapter on "Foods of the royal palace" states that great attention was given to foods and their preparation at the royal places of Choson (1392-1897) and Koryo (918-1392). There were many official boards and related positions. "For example, attached to the Board of Personnel (*Ijo*) were positions charged with the procurement of rice and the preparation of meals for the royal family." In addition, beyond the official posts, there were hundreds of palace women and slaves who actually prepared and served food to the royals. Indeed there were positions responsible for very specific tasks such as the preparation of tofu, liquor, tea and *ttok* (rice cakes [like mochi]; see photo of pounding rice, p. 36).

Page 171: The section on "Food in Korea today" discusses *pudae tchigae,* or military camp stew, which originated during the period after the Korean War. A color photo shows this hodge-podge of ingredients, which may include Spam, hot dogs, ramen noodles, tofu, rice cakes (*ttok*), vegetables and noodles in a spicy broth.

The "Recipes" section includes recipes for *Tubu chorim* (Spicy braised tofu, with "210 gm firm tofu {extra firm is even better}, sliced into pieces about 1 cm thick") and *Tubu kimch'i* (Tofu with kimchi, with 420 gm firm {or extra firm} tofu {1 block}, sliced into pieces about 1 cm thick, p. 196-97). Address: Asst. Prof. of Korean, Dep. of German, Russian, and East Asian Languages, Binghampton Univ., England.

1813. Pettid, Michael J. 2008. Korean cuisine: An illustrated history. Korean-style soy sauce, miso, and red pepper sauce (Document part). London: Reaktion Books. 223 p. [118 + 110 endnotes]

• ***Summary:*** This is the best book seen to date on this subject. There are many records of the early Korean kingdoms using soy products; for example a record of 683 CE states Korean-style jang (*toenjang*) and soy sauce

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(*kanjang*) were among the presents exchanged in a royal wedding (p. 40, endnote 15. See: Kim Pusik, *Samguk sagi* {"History of the Three Kingdoms"} translated into modern Korean, Yi Pyongdo {Seoul, 1996}, Vol. 1, p. 201).

The section on "Condiments and seasonings" (p. 42) begins: An old Korean proverb states, "Food is only as good as the *jang"* (sauces based on soybeans).

Korean cookery has a wide range of flavors which include the stronger flavors of soybean paste stew (*toenjang tchigae*) and *kimch'i.* Moreover, even among the soy sauces (*kanjang*) and Korean-style misos (*toenchang*) there is a tremendous range of varieties and regional specialties, with many distinctive flavors.

A work titled *Chungbo sallim kyonje* (Farm management, supplemented and enlarged), written in the early 1800s points out the importance of *jang.*

*"Jang* is the source of all flavors. If the taste of a house's *jang* is not good, even if there are good vegetables or flavorful meats, one cannot prepare good food. The household head must always keep in mind the fermentation of *jang,* and through this will be able to have well-aged and good *jang."*

Likewise, Yi Pinghogak (1759-1824) in her *Kyuhap ch'ongso* ("Encyclopedia for Women's Daily Life") discusses the best days to make *jang* and also the importance of having the *changdoktae,* the terrace upon which earthenware jars of soy sauce and other *jang* are kept, face in an auspicious direction, as determined by the yearly calendar.

The three main types of *jang* are *toenjang, kanjang* and *koch'ujang.* The suffix *-jang* refers to a fermented sauce based on soybeans; *toenjang* means 'thick' soybean sauce and *kanjang* means 'salty' liquid soybean sauce.

The basic ingredient used to make both these sauces is soybean koji (*meju*) which was traditionally made in the late autumn and allowed to ferment until past the lunar New Year, about 3 months in all. The blocks of *meju* were then soaked in large earthenware pots of brine to make *jang* and *toenjang.*

In Korea, there are three basic types of soy sauce (*kanjang*)*:* (1) a strong-flavored sauce with a dark color (*chin kanjang*), (2) a medium-flavored sauce with a light-brown color (*chung kanjang*), and (3) a weak-flavored sauce with a light, clear color (*mulgun kanjang*). Type (1) requires at least five years of fermentation, and because of its sweet flavor and dark color it is used for boiling, fermenting, or as a seasoning in medicinal rice (*yak pap*). Type (2) was traditionally used as a seasoning for vegetables or stews, whereas type (3) which was fermented for 1-2 years used mainly as a seasoning for soups.

Given the importance of soy sauce in Korea, it us no surprise that recipe books of the Choson

Joseon period (1392-1910) offer dozens of variations on the basic recipe. For example, *Sallim kyongje* ("Farm management") alone offers some 25 variations.

In each household, soy sauce was prepared with great care, and each step in the process was carefully followed according to the family tradition. If a daughter-in-law failed to match the preferred taste of the soy sauce in her husband's household, it was seen as a bad omen for the family. Many families even made small ritual offerings to the household gods when making soy sauce in order to ensure success. Other customs such as hanging gold-colored thread, red chili peppers, or traditional socks–all believed to repel malevolent spirits–around the earthenware pots of soy sauce were done to keep away malicious spirits.

During the period 1910-1945, when Korea was a colony of Japan, Japanese-style shoyu was introduced to Korea and mass-produced in factories. However the flavor of this new soy sauce did not match the tastes of the Korean people, so despite the rationing of crops for the military, Koreans continued to make their traditional soy sauce, thereby preserving this important element of Korean food culture.

A detailed discussion of Korean-style miso (*toenjang*) is given next, followed by a shorter discussion of *koch'ujang* which is made by mixing *meju* powder, glutinous rice or regular boiled rice, and red chilli pepper powder–and then fermenting the entire mixture. Address: Asst. Prof. of Korean, Dep. of German, Russian, and East Asian Languages, Binghampton Univ., England.

1814. Rennie, Frank; Mason, Robin. eds. 2008. Bhutan: Ways of knowing. Charlotte, North Carolina: Information Age Publishing, Inc. xii + 304 p. See p. 221, 229, 230. Illust. 24 cm. [30+ ref]

• ***Summary:*** Each chapter is on a different basic subject by a different author or person interviewed. In Section III, Chapter 26, titled "Food Crops in Bhutan," by Karma Lhendup begins with a definition of *Dru na gu,* the nine traditional food crops cultivated in Bhutan. The last of these is: "Pulses or legume crops such as *lebe* (soybean), *gakpu* (mung bean / green gram), *orey* (red kidney bean / *rajma*), and *baesrem* (peas)..." in the national language (Dzongkha) (p. 221). A table (p. 223) shows that each of the nine crops has a different name in the country's three other major languages.

"The immature peas and soybean pods are boiled and the inner part [the green beans] is eaten" (p. 229).

"The most important use of red kidney beans (*orey*) and soybeans (*lebe*) is processing them into *Lebe Yhitpa* by fermenting the half-boiled beans naturally in bamboo containers." The resulting fermented food "typically has a pungent smell and can be used to prepare varieties of curry and *aezay* [red chili paste, a mixture of chilli powder, cheese, tomato, onion, and salt (p. 228)]. *Lebe Yhitpa* is considered to be similar to natto of Japan and Chungkok-jang of Korea" (p. 229-30). Address: British Open Univ. [UK].

1815. Schneider, Michael. 2008. Major sources, composition and processing. In: Frank D. Gunstone, ed. 2008.

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Phospholipid Technology and Applications. Bridgwater, England: The Oily Press. xii + 201 p. See p. 21-40, Chap. 2. Illust. 24 cm. Series: Volume 22 in The Oily Press Lipid Library. [38 ref]

• ***Summary:*** Contents: Introduction. Occurrence: Glycerophospholipids, sphingophospholipids. Phospholipid processing: Vegetable phospholipids (fluid {crude} lecithins, solvent technologies {membrane degumming, membrane de-oiling, acetone de-oiling, carbon dioxide de-oiling, alcohol fractionation, chromatographic purification}), animal phospholipids (egg phospholipids, milk phospholipids, marine phospholipids, brain phospholipids). Modification of phospholipids: Chemical modification (chemical hydrolysis, acetylation, hydroxylation, hydrogenation). Commercial uses (summarized in tables 2.10 and 2.11).

Figures: 2.1. Model of a biological membrane (from *Scientific American*).

2.2 Structure of diacylglycerophospholipids; X is residue from choline (PC), ethanolamine (PE), inositol (PI), glycerol (PG), water (PA).

2.3 Structure of sphingomyelin.

2.4 Vegetable lecithin processing (including crude soya lecithin, standard lecithin, modification (hydroxylation), acetylation, hydrolysis), fractionation (with acetone, or ethanol), and compounding (using emulsifiers, carriers, or fats and oils).

2.5 Egg yolk phospholipid processing principles (in order to get various products, such as egg yolk powder or yolk lipids).

2.6 Milk fat globule membrane (remarkable complex).

Tables: 2.1 Phospholipid content of biological materials (% of dry matter; soybeans 0.5, sunflower seeds 0.2, rice bran 1, egg yolk 17, salmon roe 8, milk 0.1).

2.2 Main phospholipid classes of commercial interest and their abbreviations: The two main classes are (a) glycerophospholipids and (b) sphingophospholipids. In class (a) are: phosphatidylcholine (PC), phosphatidylethanolamine (PE), phosphatidylserine (PS), phosphatidylinositol (PI), phosphatidylglycerol (PG), diphosphatidylglycerol (DPG). phosphatidic acid (PA), N-Acyl-phosphatidylethanolamine (NAPE). In class (b) are: ceramide phosphocholine (sphingomyelin).

2.3 Phospholipid composition in oil-free polar lipid extracts for commercial raw materials (%). Gives values for soya [soybeans], rapeseed, sunflowerseed, corn, egg, milk, salmon roe. For example, egg is the richest source of PC (74%) whereas soya has the lowest content of PC (22%).

2.4 Main fatty acid composition of phospholipid mixtures (%). Gives values for soya, rapeseed, sunflowerseed, corn, egg, milk, and salmon roe. For example, egg is the richest source of 16:0 (30%) compares with only 20% for soya.

2.5 Composition of commercial fluid soya lecithin (%). It contains 52% of 6 phospholipids, 6% glycolipids, 4% carbohydrates, 38% neutral lipids, and five fatty acids (palmitic acid 18%, stearic acid 5%, oleic acid 11%, linoleic acid 59%, and linolenic acid 7%).

2.6 Typical composition of a commercial de-oiled soybean lecithin (%). It contains 81% phospholipids, 10 glycolipids, etc.

2.7 Alcohol fractionation of soybean lecithin.

2.8 Chromatic systems for phospholipid fractionation / purification.

2.9 Lipid composition of commercial marine phospholipid products (%). Gives values for krill, fish processing by-products, and salmon eggs.

2.10 Commercial phospholipid products and their predominant use. 18 commercial products are listed. The uses are: Food, animal feed, industrial, cosmetics, pharma [pharmaceutical], and dietetics. For example: The main uses / applications of fluid soybean lecithin (oil containing) are animal feed, food, industrial, cosmetics, pharma. and dietetics. By contrast, de-oiled soybean lecithin fractions (PC 50-80%) are food, cosmetics, pharma, and dietetics.

2.11 Major companies employing a range of phospholipid preparations. The companies are: ADM (US), Solae (US), Cargill (Germany), Lipoid (Germany), Phospholipoid (Germany), Chemi (Italy), Lecico (Germany), Tsuji Oil Mill (Japan), Fresenius-Kabi (Sweden), Doosan (Korea), Nippon Oils and Fats (Japan), Biofer (Italy), Avanti Polar (USA), Belvo (Italy), Enzymotec (Israel), Lipogen (Israel), and Neptune (Canada). For each company is given: Website, country, and which of 13 commercial phospholipid products it sells. Address: Lecithos–Functional Lipid Innovation and Consulting, Freinsheim, Germany.

1816. Young, Jin Song. 2008. The food and cooking of Korea: Discover the great tastes of one of the world's great cuisines... Leicestershire, England: Hermes House, and imprint of Anness Publishing. 256 p. Illust. (color photos by Martin Brigdale). Index. 30 x 23 cm.

• ***Summary:*** An elegant book, with more than 800 color photos on glossy paper–plus 150 authentic recipes.

Doenjang (soya bean paste, p. 21, 38-41, 97, 174, 181, 213). Soy sauce (includes both dark and light, p. 21, 38, 41). Wheat noodles in soya bean soup (with "1 cup [whole] soya beans," p. 100). Soyabean sprouts (p. 53, 99, 126, 142, 194, 225). Soya bean paste (see *doenjang*).

One chapter is titled "Vegetables, salads & tofu" (p. 201+). Tofu (p. 53, 201). Tofu recipes: Tofu and stir-fried kimchi (p. 75). Pan-fried kimchi fritters (with "2 oz. firm tofu," p. 79). Steamed tofu and chive dumplings (p. 80). Braised tofu (with "1 block firm tofu, diced," p. 211). Spicy soft tofu stew (with "1 block soft tofu," p. 212). Soya bean paste stew (with ½ block firm tofu, p. 213). Vegetable and tofu cake with mustard dip (p. 214-15). Blanched tofu with soy dressing (p. 216). Stuffed pan-fried tofu (p. 217). Address: Owner of several Korean restaurants in Asia.

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1817. Conlon, Michael. 2009. The history of U.S. soybean exports to Japan. *GAIN Report* (*Global Agriculture Information Network*) No. JA9502. 14 p. Jan. 20. [42 ref]
• ***Summary:*** An excellent, very readable historical summary. Contents: Introduction: The amazing soybean. The Auckland. Perry and the black ships. William Morse: USDA's plant explorer in Japan and the father of soybeans in America. U.S. Market development efforts in Japan. Recent activities in market development. End notes.

Page 7: "In the late 1940s, ASA began to look at international markets because of the sharp increase in domestic production and Japan offered terrific opportunities for U.S. producers. Japan began importing small quantities of U.S. soybeans in 1946, when it bought 3,441 metric tons. By 1955, that quantity had soared to 572,050 metric tons, making Japan the largest overseas market for U.S. soybeans. Nonetheless, there were issues such as high foreign matter content and the lack of understanding on the part of American growers about Japan's soybean needs (endnote 25). William Termohlen, the agricultural attaché in Japan at the time, believing that there were tremendous opportunities in Japan for U.S. soybeans requested that an ASA representative be sent to Japan to study the market. In late 1955, George Strayer, ASA's first executive officer, with funding from FAS, spent almost two months in Japan talking to soybean product producers and government officials. From his time in the country, Strayer became a major proponent for U.S. soybeans in Japan. In a 1955 edition of *Soybean Digest*, he announced to the American farmer that "Soybeans are the life blood of Japan. They are an absolute necessity, for they are the food of the people" (26).

"On February 7, 1956, ASA and FAS signed a cooperator agreement, allocating $100,000 in P.L. 480 proceeds to cover activities in Japan and Germany for one year (27). The first activities in Japan included funding a survey on quality of soybeans exported from the United States under the new grain grading standards for soybeans, sending a Japanese team to the United States, and establishing an office in Japan to carry out the program.

"Japanese manufacturers and associations were quick to realize the benefit of increasing domestic soybean consumption. In April, 1956, ASA entered into an agreement with several Japanese industry organizations to create the Japanese American Soybean Institute (JASI). JASI was composed of the leading Japanese soybean user organizations: soy oil/meal processors, producers of tofu, miso, and soy sauce, and the oil and fat importers and exporters. Expenses of the new office were borne jointly by ASA and the Japanese industry. Before JASI, there had been no such thing as a soy food association in Japan where producers of the various soy foods met to discuss common problems and areas of cooperation. Thus, JASI opened new channels of communication among Japanese involved with soybeans as well as among Americans and Japanese."

Page 9: "In 1957, ASA and FAS sponsored Dr. A.K. Smith of the USDA's Agricultural Research Service (ARS) to visit Japan to study soybean utilization. He found that only a limited amount of U.S. soybeans were used to produce soy foods (36). The following year, under a cooperative agreement between FAS, ARS and ASA, two Japanese scientists went to work with Dr. Smith at USDA's Peoria [Illinois] Labs for ten months to determine which U.S. soybean varieties were good for tofu and miso. The scientists identified two varieties, Hawkeye and Harosoy, and the Japanese industries started using these varieties of soybeans for food products (37). By the late 1950s, the image of soy food changed to 'wholesome and nutritious.'"

Page 10: "In 1965, ASA sponsored six technicians of the Japanese Margarine Makers Association to visit the Miami Margarine Company in Cincinnati, Ohio to study how to make margarine using soy oil (40). Upon their return, they made "Uni-Soya" margarine from soy oil, which was cosponsored by ASA, JOPA, and the Margarine Association. Uni-Soya margarine was distributed to consumers in Tokyo and Osaka and became the first margarine in Japan made from soy oil. Because of this project, soy oil use for margarine production significantly increased."

Page 11: "The 1973 U.S. soybean embargo, unfortunately, caused some anxiety in the strong relationship between the United States and Japan. Soybeans were in short supply in the middle of 1973, and as an inflation-fighting measure, on June 27, the U.S. Secretary of Commerce imposed an export embargo on soybeans, cottonseed, and various meal and oil products from these commodities. Less than a week later, on July 2, the embargo was lifted. The embargo actually did not affect the volume of soybean exports to Japan as the country imported a record volume from the United States in 1973. However, since Japan relied on the United States for this food staple (in 1973 the United States accounted for over 88 percent of Japan soybean imports) the embargo sent shock waves through the Japanese government and food sector.

"USDA took quick action to relieve Japan's feeling of vulnerability. In early 1974, Secretary of Agriculture Earl Butz took a trip to Asia and Japan to assure the Japanese that "we made a mistake" and that the United States would never embargo food products again and that we were a reliable supplier. Secretary Butz and the Japanese Minister of Agriculture Abe met in Washington, DC on August 12, 1975. The Butz-Abe Understanding grew out of this meeting, where the United States agreed to supply Japan with certain minimum levels of grains and soybeans that were discussed in the August 12th meeting. The annual amounts were 3 million tons of wheat, 3 million tons of soybeans and 8 million tons for feeding. In all three years of the Understanding (1976-78) the minimum levels were exceeded.

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"Every year since 1985, ASA Japan has hosted a Soybean Quality Conference to discuss customer concerns, provide the latest information on the quality of the new U.S. crop, and get the Japanese industry's insights and estimates of future needs. Around 200 participants, from crushers and traders to food manufacturers and the media, attend each year. The Conference in Japan has proved so successful that ASA now holds them in South Korea, China and Taiwan."

Figures show: (1) Bar chart of U.S. soybean exports to Japan (1,000 metric tons). They grew from 3.4 in 1946, to 572 in 1955, to 1,021 in 1960, to 2,001 in 1968, to 3,126 in 1972 to a peak of 4,646 in 1983, falling to 3,325 in 2007.

Photos show: (1) A farmer on a treadmill in a canal causing water to be lifted from the canal to irrigate a field of crops (Source: The Dorsett-Morse Expedition, at USDA National Agricultural Library). (2) A horse pulling a plow in a wet field as two farmers work with it. (3) George Strayer and his wife en route to Japan in 1955. (4) ASA Kitchen on wheels in Japan. (5) U.S. Soybean Seminar at the U.S. Trade Center in Tokyo.

A table shows the names ASA Japan country directors and the years each served. 1956-69 Shizuka Hayashi. 1972-73 Scott Sawyers. 1973-74 Howard Ackers. 1974-78 Lloyd Reed. 1978-83 Gil Griffis. 1983-87 Gunnar Lynum. 1987-93 Lars Wiederman. 1994-98 Kent Nelson. 1998-01 James Echle. 2001-02 Keiichi Ohara. 2002-08 Takehiko Nishio. 2008 Oct. 24-present LaVerne Brabant; he was named by the U.S. Soybean Export Council. Address: Agricultural Trade Officer, FAS, Japan.

1818. Longone, Janice B. 2009. The remarkable life of Ilhan New after he left La Choy Food Products Co. in about 1930 (Interview). *SoyaScan Notes.* Jan. 23. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** The Korean gentleman (Ilhan New) and the American gentleman (Wally Smith) were students at the Univ. of Michigan, where they became friends. Wally Smith's family had a grocery store, and they were looking for local fresh food. So New and Smith decided to grow mung bean sprouts. That is how La Choy started. They worked together for many years. In 1925 he married an American-born Chinese woman, who later became a physician

Then [in about 1930] Mr. New sold his share in La Choy to Smith, returned to Korea [the land of his birth] and he became a multi-millionaire. In Korea he made money in some sort of business, such a importing or engineering company. His business became very profitable and he started the New Han Engineering High School; its goal was to teach Koreans to be good in modern things like science, engineering, and business practices. Students could attend his university free of charge. "When he died–and this is the thing that grabs me–he left all of his money to the Korea Social and Educational Trust Fund, except for the money he left to his granddaughter, to get a college education."

There is a biographical dictionary of Korean leaders in which there is an entry for him. Jan will try to find a more specific reference. Address: Curator, William L. Clements Library, The Univ. of Michigan, 909 S. University Ave., Ann Arbor, MI 48109-1190. Phone: 734-764-2347.

1819. Malnutrition Matters. 2009. Alpro Soya & Malnutrition Matters food technology solutions: Brief overview 2009–Budget and plans for 2009. Ottawa, Ontario, Canada: Malnutrition Matters. 16 p.

• ***Summary:*** See next page. Page 2. New VitaGoat Installations–2008. Africa: Mozambique–1. Zimbabwe–1. South Africa–2. Zambia–2. Congo–5. Kenya–1. Asia: India–6. North Korea–20. Thailand–1. USA -1.

Page 3. VitaGoat Sites Status–January 2009. A map shows Africa, the Middle East, and South Asia. Blue triangles show in which countries 84 VitaGoats have been installed between 2004 and 2008. Red ovals show in which countries 45 VitaGoats have been committed to by 2009.

Page 4: Projects in Africa:

Zambia projects are well established (Africare and World Vision)

Congo project (United Methodists / WISHH) is being installed

New projects in Zimbabwe and South Africa

Mozambique (Humana) now has two VitaGoats

Most recent installations have been done by MM's partner Eden Foods (based in South Africa). A photo shows one African man seated on a VitaGoat while another pours soaked soybeans into the hopper which leads to the grinder.

Page 5:

Projects in Asia

North Korea–First Steps project: 34 VitaGoats installed, 30 on order (including SoyCows). Acute malnutrition in many areas of the country. Over 50,000 people benefit from the soymilk daily (20 earlier VitaCows are also present).

"Thailand–VitaGoat recently installed in Karen refugee camp near border with Myanmar; additional installations likely.

A photo shows: "Karen refugee children receiving soymilk in Mai La Oon refugee camp, near Mai Sarang, Thailand."

Page 6: Projects in India:

"World Bank project in Orissa: 20 VitaGoats in total, 8 installed now. Sustainable project to provide midday meals fortified with micronutrients to 15,000 students (micro-finance, school budget).

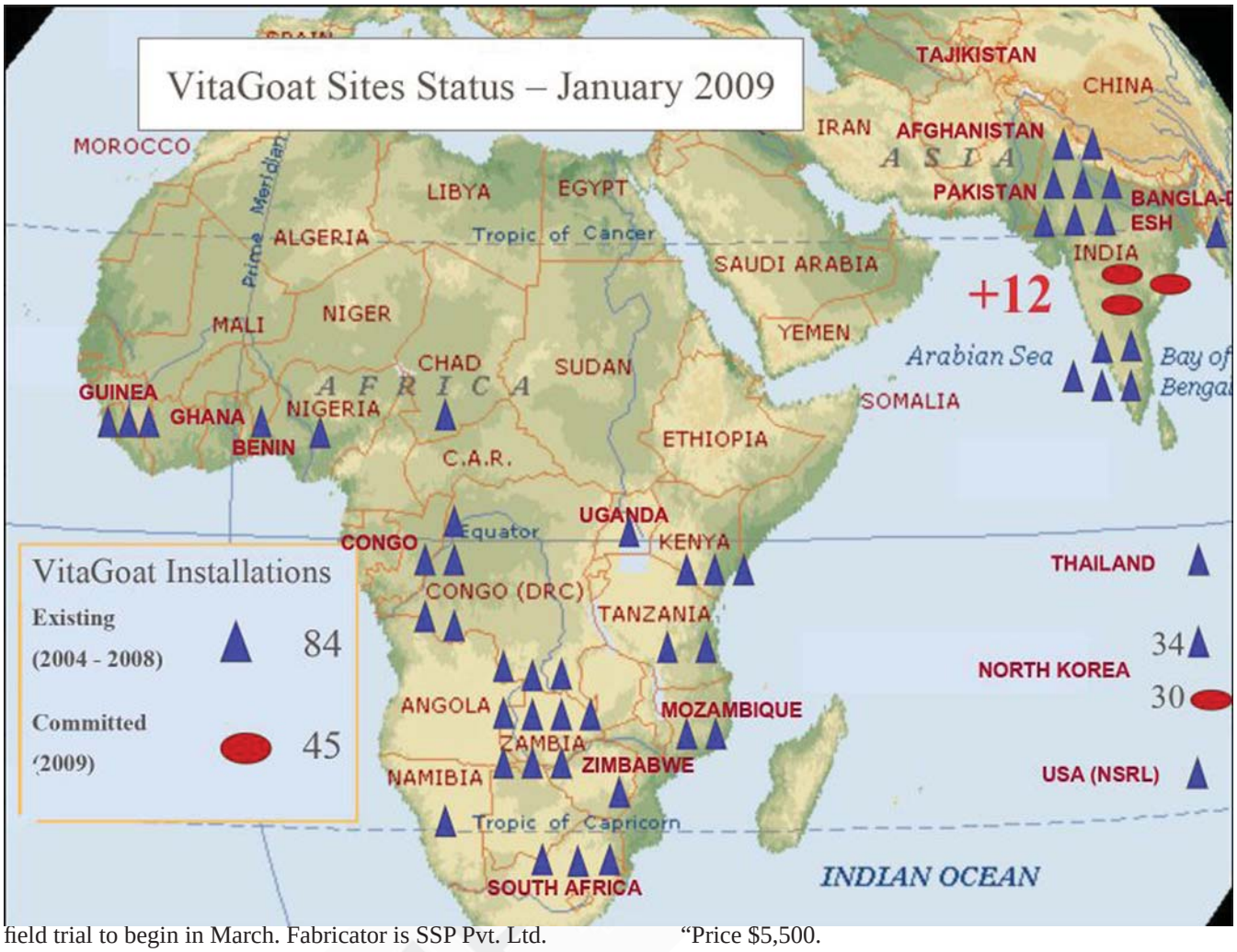
"Child Haven/Donner project: 8 VitaGoats–third phase in progress

"Informal alliance with GAIN (Global Alliance to Improve Nutrition) is proving helpful.

"Other new project opportunities include Naandi Foundation and Maharashtra government.

"SolarFlex Dryer: Now also manufactured in India, first

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field trial to begin in March. Fabricator is SSP Pvt. Ltd.

Page 7: "Other Milestones–2008 (not project specific).

"SoyCow `M' hybrid concept completed; first systems with electric grinders shipped to North Korea in 2008.

"SoyCow `E' (fully electric) also complete–electric boiler and electric grinder; first 5 systems shipped in January 2009.

"SolarFlex Dryer designed, built and tested; tech transfers to South Africa and India well advanced.

Page 8: "SoyCow `M' (VitaGoat hybrid) Newly developed configuration for installations with reliable electricity.

"Output soymilk and derivatives only.

"Electric grinder instead of cycle grinder.

"Hourly output 35L.

"Equipment cost approx. US $3,900 (same as standard VitaGoat). A photo shows this system. "Tofu box included but not shown in photo."

Page 9:

"SoyCow `E' (fully electric).

"Electric boiler instead of multi-fuel boiler.

"Electric grinder.

"Hourly output of 40 L.

"Price $5,500.

A photo shows this system. "Tofu box included but not shown in photo.

Page 10: "Comparison of systems." A table has 4 columns. Food produced. SoyCow E. SoyCow M. Vitagoat. The rows are: "Soymilk (including tofu, yoghurt, etc).

"Vegetable and fruit juices, purees & sauces

"Coarse flours (cornmeal, rice, soy, wheat). Peanut butter. Ground beans. (coffee, roasted soybeans)

"Electricity required

"Capacity [in liters/hour]

"Approximate price (+ taxes, shipping and duties).

Page 11-13: SolarFlex Dryer–2008.

Page 14: "Review of plans for 2008 / 2009:

"Double the estimated beneficiaries from 20,000 to 40,000. Beneficiaries increased to over 60,000.

"Increase corporate sponsorship to support enlarged programs; SolarFlex. Dryer funding effort underway–positive feedback already received. SSP has agreed to fund 50% of a $60,000 pilot project. 2 dryers to be installed in Orissa under World Bank project in 2009.

"Complete tech transfers for SolarFlex dryer to African, Indian and Colombian (FUPAD) partners; first locally built

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kits to be installed. African and Indian tech transfers well underway–local systems to be installed in India in Feb/March. FUPAD transfer did not materialize.

"Possible SolarFlex Dryer spin-off to profit-making company to enhance MM's corporate sustainability. SolarFlex Inc incorporated in June, 2008 (25% of equity owned by MM)

"Install 40 additional VitaGoats / SoyaGoats in sustainable projects worldwide.

"Done! (SoyCow E and M instead of SoyaGoats).

Page 15: "Review of plans for 2008 / 2009 [continued].

"Successfully implement World Bank Orissa project, including health study (completion 2009). Project well underway with 8 installations, but some delay.

"Obtain endorsement(s) from one or more State governments in India for VitaGoat school feeding programs. Done for Orissa; pilot project approval in Maharashtra.

"Initiate VitaGoat projects in Guatemala, Colombia and elsewhere in Latin America. Not done to date.

"Initiate projects in Southeast Asia (Cambodia) and Ghana. Thailand project initiated, Ghana expected in first half 2009

"Explore other technology transfers. Lower cost VitaGoat design project underway in India.

Page 16: "Our partners and sponsors:

"Alpro N.V.

"Child Haven–Donner Canadian Foundation

"First Steps (Canada)

"Rotary Canada–Donner Canadian Foundation

"WISHH (USA)

"YES Bank (India)

"Africare

"World Bank Development Marketplace.

Note 1. Malnutrition Matters has similar digital reports for each year from Jan. 2010 to the present. In early 2019 MM had a global presence of 305 VitaGoats / SoyCows. 266 SoyaKits. 42 SolarFlex Dryers. Impact:

"Currently 170,000 daily beneficiaries who receive or purchase soyfoods daily.

"500 entrepreneurs who make an average $60 monthly profit.

"Forecast for next 3 years is to: Increase beneficiaries to 300,000. Increase entrepreneurs to 2,500."

Note 2. A truly remarkable record! Address: Ottawa, Ontario K1J 7Y7 Canada.

1820. Yoon, Mun Sup; Lee, Jeongran; Kim, C.Y.; Kang, J.H.; Cho, E.G.; Baek, H.J. 2009. DNA profiling and genetic diversity of Korean soybean (*Glycine max* (L.) Merrill) landraces by SSR markers. *Euphytica* 165(1):69-77. Jan. [30 ref]

• ***Summary:*** "Approximately 7,000 accessions of Korean soybean... landraces, largely composed of three collections, the Korea Atomic Energy Research Institute's soybean (KAS), the Korean Crop Experiment Station's soybean (KLS) and the Korean Agricultural Development and Technology Center's soybean (KADTC) collections, have been have been conserved at the Rural Development Administration (RDA) genebank in Korea. The accessions within collections were classified based on their traditional uses such as sauce soybean (SA), sprouted (SP), soybean for cooking with rice (SCR), and others. A total of 2,758 accessions of Korean soybean landraces were use to profile and evaluate genetic structure using six SSR loci."

"Abbreviations: SSR Simple sequence repeat. SMLG Soybean molecular linkage group. SA Sauce soybean. SP Sprouted soybean. SCR Soybean for cooking with rice. RDA Rural Development Administration. KAS Korea Atomic Energy Research Institute's soybean." Address: Genetic Resources Div., National Inst. of Agricultural Biotechnology, Rural Development Administration, Suwon 441-707, Republic of Korea.

1821. Parkouda, Charles; Nielsen, D.S.; Azokpota, P.; Ouoba, L.I.I.; Amoa-Awua, W.K.; Thorsen, L.; Hounhouigan, J.D.; Jensen, J.S.; Tano-Debrah, K.; Diawara, B.; Jakobsen, M. 2009. The microbiology of alkaline-fermentation of indigenous seeds used as food condiments in Africa and Asia. *Reviews in Microbiology* 35(2):139-56. Feb. [145 ref]*

• ***Summary:*** "The rise in pH during production of these foods is due to the ability of the dominant microorganisms, *Bacillus* spp., to hydrolyze proteins into amino acids and ammonia. Studies have been undertaken which have investigated a number of these products like dawadawa, ugba, bikalga, kinema, natto, and thua-nao."

Note: The last 3 are soyfoods. Address: 1. Département Technologie Alimentaire/IRSAT/CNRST 03 BP 7047 Ouagadougou 03, Burkina Faso.

1822. Shurtleff, William; Aoyagi, Akiko. comps. 2009. History of miso, soybean jiang (China), jang (Korea) and tauco (Indonesia) (200 BC-2009): Extensively annotated bibliography and sourcebook. 2 vols. Lafayette, California: Soyinfo Center. 1,378 p. Subject/geographical index. Printed 16 April 2009. 28 cm. [4362 ref]

• ***Summary:*** A history of the many types miso and its relatives, worldwide.

Miso, or "fermented soybean paste," is one of East Asia's most important soyfoods. Miso is an all-purpose high-protein seasoning, which has no counterpart among Western foods or seasonings. Made from soybeans, rice or barley, and salt, its smooth or chunky texture resembles that of soft peanut butter. It comes in a wide range of warm, earthy colors ranging from light yellows to rusty reds, rich chocolate browns, or loamy blacks. Each miso has its own distinctive flavor and aroma, which for the darker, more traditional varieties is savory, and sometimes almost meaty,

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while for the lighter-colored types is subtly sweet and delicately refreshing. Miso's range of flavors and colors, textures and aromas, is at least as varied as that of the world's fine wines or cheeses. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1823. Choi, Ki-Soon; Lee, H.-J.; Kwo, D.-J. 2009. [Physicochemical and microbiological properties of Korean traditional *meju*]. *Korean J. of Food Preservation* 16(2):217-22. April. [24 ref. Kor; eng]

• ***Summary:*** "The objective of this study was to obtain basic data on Korean traditional meju collected in 17 regions of Korea, to define and control meju quality. The moisture, crude fat, crude protein, and amino nitrogen contents of meju were" measured and recorded. Address: 1. Dep. of Food Science, College of Life Science, Kangnung-Wonju National Univ., Kangneung, 210-702, Korea.

1824. *SoyaScan Notes.* 2009. Soybean germplasm collections on the IPGRI website (Overview). May 6. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** These four spreadsheet databases were sent to Soyinfo Center by Dr. Randall Nelson, curator, USDA Soybean Germplasm Collection, Urbana, Illinois. He created the databases (which reside only on his computer) using information found at the FAO website for germplasm collections: http://www.bioversityinternational.org / Information_Sources /Germplasm_Data bases /Germplasm_ Collection_Directory /index.asp. At the "Biodiversity Directory of Germplasm Collections Query Form," after "Taxon" enter "Glycine max" then click "Search" at bottom of page. Wait for several minutes for results to be displayed.

(1) The 40 largest global *Glycine max* [domesticated soybean] germplasm collections–in descending order of no. of accessions in collection. (1) Institute of Crop Germplasm Resources (CAAS), China, 23,578 accessions. (2) Soybean Germplasm Collection, USDA, USA, 18,046. (3) Asian Vegetable Research and Development Centre (AVRDC), Taiwan, 12,508. (4) Nanjing Agricultural University, China, 10,000. (5) Institute of Agroecology and Biotechnology, Ukraine, 7,000. (6) N.I. Vavilov Research Institute of Plant Industry, Russia, 6,126. (7) Centro Nacional de Pesquisa de Recursos Geneticos e Biotec. (CENARGEN), Brazil, 4,693. (8) Soybean Research Institute Jilin Academy of Agric. Sciences, China, 4,200. (9) All India Coordinated Research Project on Soybean, Govind Bal. Pant Univ., India, 4,015. (10) Centro Nacional de Pesquisa de Soja (CNPSO), EMBRAPA, Brazil, 4,000.

(11) Department of Genetic Resources I Nation. Inst. of Agrobiol. Resour. Japan, 3,741. (12) Crop Experiment Station Upland Crops Research Division, Korea, Republic of, 3,678. (13) Australian Tropical Crops Genetic Research Centre, Australia, 3,144. (14) Genebank, Inst. for Plant Genetics and Crop Plant Research (IPK), Germany, 3,063. (15) Regional Station, National Bureau of Plant Genetic Resources (NBPGR), India, 2,808. (16) Taiwan Agricultural Research Institute (TARI), Taiwan, 2,699. (17) National Research Centre for Soybean, India, 2,500. (18) Crop Breeding Institute DR & SS, Zimbabwe, 2,236. (19) Sukamandi Research Institute for Food Crops (SURIF), Indonesia 2,194. All the 2,194 *Glycine max* (cultivated soybean) accessions in this collection are from Australia, China (including Taiwan), Japan, and USA. None are apparently indigenous to Indonesia. Why? (20) Nanjing Agricultural University, China, 2,168.

(21) Instituto Agronomico de Campinas (I.A.C.), Brazil, 2,000. (22) National Plant Genetic Resources Laboratory, IPB/UPLB, Philippines, 1,764. (23) CSIRO Division of Tropical Crops and Pastures, Australia, 1,600. (24) Genetic Resources Dep.–Research Inst. for Cereals and Ind. Crops, Romania, 1,600. (25) G.I.E. Amelioration Fourragere, France, 1,582. (26) Soyabean Research Institute, Heilongjiang Academy of Agric. Sci., China, 1,558. (27) Institute of Oil Crops Research CAAS, China, 1,529. (28) Institute of Plant Breeding, College of Agriculture UPLB, Philippines, 1,508. (29) Instituto Nacional de Investig. Agricolas, Station de Iguala, Mexico, 1,500. (30) Station de Genetique et Amelioration des Plantes, INRA C.R. Montpellier, France, 1,404.

(31) Kariwano Laboratory, Tohoku Nat. Agricultural Experiment Station, Japan, 1,400. (32) Int. Institute of Tropical Agric. (IITA), Nigeria, 1,358. (33) Centro de Investigacion La Selva, (CORPOICA), Colombia, 1,219. (34) Institute of Crop Breeding and Cultivation, CAAS, China, (1,200). (35) Institute for Field and Vegetable Crops, Yugoslavia, 1,200. (36) Institute of Industrial Crops Jiangsu Academy of Agric. Sciences, China, 1,199. (37) Corporacion Colombiana de Investigacion Agropecuaria, CORPOICA, Colombia, 1,170. (38) Genebank Cereal & Oil Crops Inst. Hebei Academy of Agric. Sciences, China, 1,154. (39) Instituto Nacional de Investigaciones Forestales, Agricolas y Pecuarias (INIFAP), Mexico, 1,124. (40) Maharashtra Association for the Cultivation of Science, India, 1,081.

(2) Germplasm collections (105) that have *G. max*, *G. soja*, advanced cultivars, breeding and inbred lines, cultivars, genetic stocks, introgressed forms, landrace or traditional cultivar, mutants, wild / weedy species, or unknown. Listed alphabetically by country: Albania 1 collection. Argentina 3. Australia 3. Bolivia 1. Brazil 5. Bulgaria 1. Canada 1. Chile 1. China 15. Colombia 2. Cuba 1. Czech Republic 1. Ecuador 1. France 6. Germany 1. Hungary 2. India 8. Indonesia 3. Japan 5. Korea, Rep 1. Madagascar 1. Mexico 2. Nepal 2. Nigeria 1. Papua New 1. Paraguay 1. Peru 1. Philippines 2. Poland 1. Romania 2. Rwanda 1. Slovakia 1. South Africa 1. Spain 1. Sri Lanka 1. Sweden 1. Switzerland 1. Taiwan 3. Thailand 4. Ukraine 4. Uruguay 1. Venezuela 1. Vietnam 4. Yugoslavia 1. Zambia 1. Zimbabwe 1.

(3) The 23 largest global *Glycine soja* [wild annual

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soybean] germplasm collections–in descending order of no. of accessions in collection. (1) Institute of Crop Germplasm Resources (CAAS), China, 6,172 accessions. (2) Soybean Germplasm Collection, USDA, USA, 1,114. (3) Soybean Research Institute Jilin Academy of Agric. Sciences, China, 600. (4) Soyabean Research Institute, Heilongjiang Academy of Agric. Sc., China, 400. (5) Crop Experiment Station Upland Crops Research Division, Korea, Republic of, 342. (6) Asian Vegetable Research and Development Centre (AVRDC), 339. (7) N.I. Vavilov Research Institute of Plant Industry, Russia, 310. (8) Breeding Laboratory, Faculty of Agriculture, Iwate University, Japan, 151. (9) CSIRO Division of Tropical Crops and Pastures, Australia, 60. (10) Taiwan Agricultural Research Institute (TARI) Taiwan, 46. (11) Hunan Academy of Agriculture Sciences, China, 45. (12) Tieling District Agricultural Research Institute, China, 29. (13) Department of Agronomy National Chung Hsing University, Taiwan, 20. (14) Eastern Cereal & Oilseed Research Centre, Saskatoon Research Centre, Saskatchewan, Canada, 18. (15) Soyabean Breeding Laboratory, Tokachi Agric. Exp. Station, Nemuro, Hokkaido, Japan, 15. (16) Instituto Nacional de Investigaciones Forestales, Agricolas y Pecuarias (INIFAP), Mexico, 9. (17) All India Coordinated Res. Project on Soybean, Govind Bal. Plant Univ., India, 7. (18) Maharashtra Association for the Cultivation of Science, India, 6. (19) Sukamandi Research Institute for Food Crops (SURIF), Indonesia, 4. (20) Research Institute for Food Crops Biotechnology–RIFCB, Indonesia, 4. (21) Kariwano Laboratory, Tohoku Nat. Agricultural Experiment Station, Japan, 3. (22) Genebank, Inst. for Plant Genetics and Crop Plant Research (IPK), Germany, 2. (23) S.K. University of Agriculture and Technology, India, 1.

(4) Germplasm collections that have at least one wild perennial relative of the soybean (*Glycine* species, such as *Glycine clandestina*), in descending order of total number of accessions: (1) CSIRO Division of Plant Industry, Australia, 2,102. (2) USDA Soybean Germplasm Collection, USA, 919. (3) Plant Genetic Resources Unit, Agricultural Research Council, South Africa, 281. (4) CSIRO Division of Tropical Crops and Pastures, Australia, 87. (5) Asian Vegetable Research and Development Centre (AVDRC), Taiwan, 69. (6) N.I. Vavilov Research Institute of Plant Industry, Russia, 31. (7) Breeding Laboratory, Faculty of Agriculture, Iwate University, Japan, 23. (8) National Dept. of Agriculture, Dir. of Plant and Quality Control, South Africa, 23. (9) Seed Bank, Seed Conservation Sect. Royal Botanic Gardens, Kew, UK, 1.

1825. Illinois Soybean Association. 2009. Soybean history at a glance (Website printout, part). www.ilsoy.org/_dl/Kids/Sixth_Grade_History_as_a_Glance2.pdf Retrieved May 29.
• ***Summary:*** This is the #1 worst 1-page history or chronology of the soybean we have ever seen. Professionals on the subject have pointed this out to the Illinois Soybean Board and they have chosen to disregard the suggestions. So here goes with some incorrect, undocumented, and false myths under the title: "Soybean history at a glance."

"A historical chronology of the soybean's migration from Asia to modern-day use in America:

"An ancient Chinese legend tells that the wild soybean's nutritious properties were first discovered by a band of traveling merchants.

"2838 B.C. Chinese emperor Sheng-Nung [sic, Shen-Nung] writes Materia Medica–the first written record of soybean cultivation. In that record, soybeans were noted as being valued for their medicinal properties.

"Soybeans were first cultivated in northern China. From there, use spread into Japan, Korea and the rest of Southeast Asia."

"The soybean is mentioned in medical records from China, Egypt and Mesopotamia that date from 1500 B.C. or earlier. In ancient times, moldy and fermented substances from soybeans were commonly used as primitive antibiotics to treat wounds and reduce swelling."

The rest is not so bad, but there is no mention of The Book of Odes, of Samuel Bowen, etc.

To get to this page from the home page click: Classroom materials > K-6 Materials > Sixth grade. How's that for a strange view of the importance of history!

1826. Kim, Tae-Woon; Lee, J.H.; Kim, S.E.; Park, M.H.; Chang, H.C.; Kim, H.Y. 2009. Analysis of microbial communities in doenjang, a Korean fermented soybean paste, using nested PCR-denaturing gradient gel electrophoresis. *International J. of Food Microbiology* 131(2-3):265-71. May 31. [36 ref]
• ***Summary:*** "Doenjang is a traditional Korean fermented soybean paste that provides a major source of protein. The microbial diversity of 10 samples of doenjang (5 commercially manufactured products and 5 homemade products) was investigated using nested PCR-denaturing gradient gel electrophoresis (DGGE). In the first step, the nearly complete 16S rRNA and 18S rRNA genes were amplified using universal primers... The nested PCR-DGGE technique was used for the first time in this study to assess a microbial community in doenjang and proved to be effective in profiling microbial diversity." Address: 1-3. Inst. of Life Sciences & Resources and Graduate School of Biotechnology, Kyung Hee Univ., Yongin 446-701, Republic of Korea.

1827. Simon, Karen. 2009. Optimism abounds: Higher living standards create demand for soy in China. *Iowa Soybean Review* (*Iowa Soybean Association, Urbandale, Iowa*) 20(7):14-15. Spring.
• ***Summary:*** "China is the No. 1 customer for U.S. soybean growers' crop, and by far the largest importer of soybeans in the world. Since 2003, China has accounted for more than 45

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percent of the world's soybean imports... and it appears that China's demand for soybeans will only increase with time.

"Feed production [in China] has increased an average of 16 percent each year for the past 17 years."

"While the total population of China will continue to increase slightly, the urban population in China has increased dramatically from 17.9 percent of the total population in 1978 to 44.9 percent of the total population in 2007."

A bar chart gives the "World's largest soybean importers" (from the entire world) in million metric tons. They are: China 37.82, EU-27 5.10, Japan 4.01, Mexico 3.65, Argentina 2.95, Taiwan 2.15, Thailand 1.73, Republic of Korea 1.20, Turkey 1.20, Indonesia 1.10, Iran 1.05, Egypt 1.00, Israel 0.55, Malaysia 0.47, Syria 0.43, and Norway 0.42. China imports more soybeans than all the other nations on this list combined!

1828. Bernard, Richard L. 2009. Re: Update on work with Gardensoy varieties of edamame. Letter (e-mail) to William Shurtleff at Soyinfo Center, July 7. 3 p.

• ***Summary:*** "Six Gardensoy varieties were released in May 2000 (Gardensoy 11, 21, 22, 31, 41, and 42) and the seven more were released in May 2002 (Gardensoy 01, 02, 12, 23, 24, 32, and 43). These were open releases, available to anyone with no restrictions. I have sent out free trial seed packets each year since to any gardener wishing to plant them. These were small packets with about 50 seeds each, enough to plant a 8 to 10 foot trial row and were provided at no charge.

"I filled requests from about 200 gardeners in 2008 (With an average of 5 varieties to each gardener, this totaled about 1,000 packets.) I have already sent seeds to over 120 gardeners in 2009. A few years ago these varieties were sold by one seed company (Rupp Seeds, Wauseon, Ohio) but they dropped them after one year because of low demand.

"The 13 varieties have a good range in maturity (over 30 days) from Maturity Group 0 to 4 (the first digit of the variety number), and it is wise to plant several to spread out harvest time. The main difference between these varieties and the typical grain varieties grown in this country is the larger seed size with only slightly lower yields. Their advantage over Asian vegetable varieties is higher yield and better seed quality in our environment. They are generally more shatter-resistant, more lodging resistant, and more disease and insect resistant than typical Japanese and Korean vegetable varieties. They have Japanese or Korean vegetable varieties in their ancestry from which they get their larger seed size but also have American grain varieties in their parentage from which they get their better adaptability to our growing conditions."

With this e-mail, Dr. Bernard sends three attachments that he has written: (1) Garden-type vegetable soybean varieties (4 pages), which includes two tables giving details on each variety. (2) Growing, harvesting and cooking Gardensoys (1 p.), containing practical information for those receiving packets of the soybeans. (3) New garden-type soybean varieties (2 p.), with general information and a table giving details on the Gardensoy varieties and comparing them with two grain-type soybeans and 4 other large-seeded varieties.

Talk with Dr. Richard Bernard. 2009. July 4. Breeding and distributing Gardensoy varieties has been one of his main activities and hobby since his retirement from the University of Illinois as a soybean breeder; he pays the postage on the seeds (about $500 a year) out of his own pocket–so it is a work of love. He also dances three nights a week. From the year 2000 to 2007 he sent out about 500 packets a year of Gardensoy soybeans to roughly 100 gardeners who requested them. In 2008 he sent 1,000 packets; five packets to each of 200 gardeners, 50 soybeans per packet. People learn about these free soybeans from newspaper articles, a posting on the National Soybean Research Laboratory (NSRL) website at the university, etc. The university sent out a little news release article to the news media on the Gardensoy soybeans Occasionally a journalist will visit Dick at the farm and write a newspaper story about his work and the availability of Gardensoy. His concern recently has been too much publicity. About one-third of those who request free Gardensoy soybeans reply to Dick's request for comments. Almost all of these comments are very favorable; people generally like edamame.

Each Gardensoy variety has a Japanese or Korean vegetable-type in their ancestry. Gardensoy 41 is his favorite one to eat; it tastes best, has the largest seed size and it peels out of the pod better. He had never bred any large-seeded soybeans before he started breeding Gardensoy. His plan is to register each of the Gardensoy varieties that he sends out, but he hasn't done that yet. The Agronomy Society has a new periodical titled *Journal of Plant Registrations.* These varieties have improved agronomic characteristics compared with earlier Asian vegetable-type soybeans. In the 1960s, Iowa State Univ. did a lot of breeding of vegetable types, with C.R. Weber being the USDA soybean breeder there. When people request Gardensoy varieties, Dr. Bernard decides what varieties to send them based mainly on the latitude at which they will be growing them. He sends five varieties so as to spread out the harvest season over about 30 days. If all are planted at the same time in May, the earliest one is about 30 days earlier than the latest one. He thinks that most of the people who request Gardensoy varieties are non-farmers but gardeners, so he sends a sheet of growing instructions.

Dr. Bernard likes to take his Gardensoy soybeans (ready to eat, in the pods) to parties and local ballroom dances year-round. He has a sign that puts in front of the bowl of edamame that says, "Don't eat the shells." Some people just love to eat them; those that don't, don't say much. The one group that won't try them or doesn't like them are soybean

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farmers. They say, "I've eaten 'em off the wagon [uncooked] and I know what they taste like." He says, "If you ate corn off the wagon, what would that tell you about sweet corn." People in the Midwest already know that you don't eat soybeans. "When I tell city folks here that I work with soybeans, I know what they're gonna say next–I can almost put it to music. 'Oh, they *sure* make a lot of things out of soybeans.' Paint, plastic, automobiles. When I say something about eating them, they get a bad taste in their mouth. It's too bad, because its an excellent vegetable and good tasting. I enjoy them every day." He cooks then freezes extra edamame in the pods, then, during the rest of the year, thaws them and eats them either as edamame (in the pods, about half of the time) or shelled (as in salads). Dr. Bernard has had trouble at the University of Illinois getting his colleagues interested in eating whole soybeans, where you just cook 'em and eat 'em. They are more interested in extracted protein and processed foods.

Dr. Bernard has grown increasingly fond of edamame as a food; he sees it as a "food of the future." Address: Prof. of Plant Genetics (Retired), Dep. of Crop Sciences, AW-101 Turner Hall, Univ. of Illinois, Urbana, IL 61801-4798.

1829. Han, Andrew. 2009. Dry roasted soybeans in Korea (Interview). *SoyaScan Notes.* July 18. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** In Korea, dry roasted soybeans are called *kong* [also written *k'ong*]. However, they are midway between being dry roasted and oil roasted soybeans. Rather, whole dry soybeans are typically stir-fried in a wok with a little oil and salt, then eaten as a snack like peanuts.

Another variation on this basic theme is called *Kong Jang*–which Andrew's mother makes: Place whole dry soybeans in a small wok with soy sauce, sugar, and sesame oil. Stir-fry slowly over low heat, stirring constantly, for about 30-40 minutes–until the soybeans become softer and are well cooked. Address: Owner, Elmwood Stationers, 3643D Mt. Diablo Blvd., Lafayette, California 94549.

1830. Choi, Duk-Kyung. 2009. Daedueu kiwonkwa jang, shi, mit dubueu bokeube kwanhan jaekeomto [Reexamination of the origin of soybean and the distribution of soybean sauce, soybean paste, and dofu: From the documentary and excavated data from ancient China]. *Yoksa Minsokhak* (*History and Folklore*) 30(7):363-427. July. [69 ref. Kor; eng]

• ***Summary:*** The summary in English states: Soybean, which is being called the 'Food of the Future,' has had a close relationship with our dietary lives, and has been grown in the Korean peninsula. Apart from this importance of soybean, however, we have not been able to explain its origin, let alone the origins of its related processed foodstuffs.

Renshus (2 Chinese characters) in the era of Xizhou have the same origin with rongshus in the northeast region, and from the record that Jihuangong, having possessed rongshus after subjugating Shanrong, distributed them all over the world, we can verify that the soybeans in the Huabei region are derived from northeast region. The term Gaolidou, showing up in the beginning part of *Qiminyaoshu*, also tells us that northeast region is the main cultivation region of soybeans. The distribution scale of soybeans in the era of Han dynasty can be found from the excavation of Luoyang tombs. The buried earthenwares have on their sides the words like 'A ten thousand bags of soybeans,' 'meat sauce,' or 'soybean sauce.' This reveals the wish for a good soybeans harvest, and that soybeans as processed foodstuffs had already been widely used. In fact, according to Shiji, high-profit food in big cities of the time include vinegar, soybean sauce, malted wheat and soybean malt. This means that the demand for processed foodstuffs like soybeans, soybean sauce and soybean malt was expanded mainly in a certain class of people in cities. This expansion in the demand for soybeans was brought by the development of the processing tools which varied the uses of soybeans.

The origin of the fermented sauce made from soybeans can be witnessed in shujiang, appearing in Wushierbingfang (5 Cc), written in 3rd century B.C. It is supposed that it was originally used as a material for medicine, but gradually came to be used for food. Qinjian and Erniannuling (4 cc) are showing that government officials or ordinary people working in government offices are issued with soybean sauce when traveling on official business, giving a good evidence of the popularization of soybean sauce at the time. It is of high possibility that high officials are issued with the sauce made from fragrant and tasty soybeans, and the lower officials and ordinary people with the sauce made from barley or meat, which is much easier in making. But there is little probability that soybean sauce and soybean malt were widely distributed to ordinary people and the subordinates in the era of Han dynasty. Entering the Wei and Jin Era, however, we can find that soybean sauce has been widely distributed among the people in rapidity, from the fact of the large-scaled production of soybean malt and from Qiminyaoshu's attention to the cooking methods for soybean malt or soybean sauce, which is all made from soybeans.

Soybean curd, another processed foodstuff from soybeans, makes its first philological appearance in Wudai (2 Chinese characters). Recently, however, the origin of soybean curd became the subject of discussion again, by the excavation of a picture on a huaxiangshi in the 1st Dahuting (3 Cc) tomb, Mixian, Henan province, which seems to be describing the soybean curd-making process. Some support, arguing that this has the same making process with that of today, the theory of the invention of soybean curd in the era of Han dynasty by Liuan (3 Cc), and some others argue that that pertains to one of the liquor-making processes, all inviting a fierce controversy as to the truth. The problems, or the focuses of the discussion, are whether any subjective

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conjecture was added in the process of copying the picture carved on the stone, and whether the soybean curd.

Cherl-Ho Lee (2016, p. 5) states: Chinese history books and literature indicate that, since the Bronze Age, soybean cultivation had been concentrated in the region of Northeast Asia, in particular, Manchuria and the Korean Peninsula.

Note: The Bronze Age in Northeast Asia, which came after the Neolithic period, began around 1200 BC (Lee 2016, p. 4-5). Address: Prof., Dep. of History, Pusan National Univ. [Pusan, Korea].

1831. Malnutrition Matters. 2009. Food technology solutions (Website printout–part). www.malnutrition.org 1 p. Retrieved Aug. 30.

• ***Summary:*** This is one of the most interesting and innovative organizations working with soyfoods in the world today. Low-tech and appropriate technology systems, that operate with or without electricity, make soymilk, tofu, soy yogurt, soy coffee, peanut butter, and related foods at very low cost and high efficiency. Congratulations to Frank Daller, his team, and his overseas partners.

Contents: Home. Partners and sponsors. Background: Foods and malnutrition. Technology / expertise. Personnel / Associates. VitaGoat. SoyCow. SolarFlex Dryer. Projects: VitaGoat projects in Africa: KwaZula Natal, South Africa, Uganda, Zambia, Kenya, Tanzania, Namibia, Guinea, Chad, Mozambique; Also India, North Korea. Contact us. Address: 498 Rivershore Crescent, Ottawa, ON K1J 7Y7, Canada. Phone: 1-613-742-6888.

1832. Daller, Frank. 2009. Chronology of work with soy and Malnutrition Matters worldwide, especially soymilk and development of the VitaGoat (Interview). *SoyaScan Notes.* Aug. 31. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1951–Born in Bavaria, Germany.

1956–Emigrated to Toronto, Canada.

1989–Began occasional volunteer work with Child Haven International, a Canadian charity active in India.

1991–Introduced to Raj Gupta by Child Haven, which was considering doing a trial with SoyaCows at their children's homes in India.

1991–Saw first prototype of SoyaCow at Raj Gupta's house. He was then working as a research scientist with the Canadian government and moonlighting on soymilk processing with Grant Wood, a technologist also with the Canadian government.

1992–Moved to Ottawa, invested some money in ProSoya Inc., and began working as vice-president to complete technology development and begin commercial phase of operations.

1993–First beta models of SoyaCow–made in Canada sent for field trials at Child Haven homes in India.

1993-94–Began to develop technology transfers with Indian company SSP and Russian company ASSOY. Gives equipment design and know-how to foreign partner to make equipment for ProSoya and for the partner to sell (in their own country) after paying a royalty to a local NGO (Child Haven in India).

1993–ProSoya continued development of larger systems including continuous process soymilk plants.

1994–Became President of ProSoya Inc.

1997–Resigned and sold my shares in ProSoya Inc.

2000–Founded non-profit organization Malnutrition Matters (MM) with partner Brian Harrigan. Objective was to develop small-scale food processing systems including soy, for developing countries. By this time, ProSoya had almost stopped promoting the small SoyaCows, since the business was too small compared to larger commercial systems.

2001-03–MM developed VitaGoat system for non-electric production of soymilk and other foods.

2003–First three "beta" models of VitaGoat, built in Canada, were delivered to Africare projects in Guinea, Chad, and Mozambique.

2005–Transferred VitaGoat technology to G.D. Machines in India.

2007–Brian Harrigan left MM to work with Africare in Zambia for two years.

2007–MM won a Laureate Award from the Tech Museum of Innovation in San Jose [Silicon Valley], California. It was an honor without money.

2007–Alpro, N.V. of Belgium began sponsoring the VitaGoat. [Philippe Vandemoortele introduced Frank to Alpro after Philippe had ceased to be active in Alpro].

2008–MM Won World Bank Development Marketplace competition [project design with local partner] for VitaGoat school feeding project in Orisssa, India. With the funds from winning, MM developed the project in India.

2008–Developed new lower-cost version of SoyaCow (named SoyCow) with separate electric grinder and pressure cooker and lower-cost press, and with option of multi-fuel boiler used by all VitaGoat systems. [Note: Raj Gupta had not used the name SoyaCow for years].

2009 Aug.–Currently there are over 90 VitaGoats in operation worldwide. The greatest number [about 40] are in Africa, followed by South Asia and North Korea. Others in Thailand and Brazil, plus demo systems in–Europe, U.S. and Canada.

With each system that is installed, the cost of the equipment, shipping, installation and training fees are provided (as a commercial transaction) by a partner organization–typically a non-governmental organization (NGO) or a government sponsored organization–but rarely an individual businessperson.

For more details see the very interesting Malnutrition Matters website at www.malnutrition.org. Address: Founder, Malnutrition Matters, 498 Rivershore Crescent, Ottawa, ON K1J 7Y7, Canada. Phone: 613-742-6888.

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1833. Ketzenberger, Jolene. 2009. On a Korean kick: diners are developing a taste for Asian cuisine. *Indianapolis Star* (*The*) (*Indianapolis, Indiana*). Sept. 16. p. C1, C3.
• ***Summary:*** Chris Choi, a native of Korea and graduate of Michigan State University, bought H2O Sushi and increased the Korean influence.

"Ingredients that define Korean cuisine" include: Bean sprouts (both mung and soybean). Coarse red pepper flakes. "Miso: Fermented soybean paste with an intense flavor; for a milder version look for 'doenjang' on the label."

"Red pepper paste [*gochujang*]*:* A key ingredient in sauces and kimchee; look for it in Asian markets." Address: Star reporter.

1834. Jeong, Woo Ju; Lee, A.R.; Chun, J.; Cha, J.; Song, Y.S.; Kim, J.H. 2009. [Properties of cheonggukjang fermented with *Bacillus strains* with high fibrinolytic activities]. *J. of Food Science and Nutrition* 14(3):252-59. Sept. [22 ref. Kor; eng]
• ***Summary:*** "We previously isolated *Bacillus strains* with high fibrinolytic activities (FAs) from cheonggukjang prepared by traditional ways. To test their potential as starters for cheonggukjang, soybean was fermented for 72 hr at 37ºC with each isolate and a control lab strain: B. subtilis CH3-25 (BS3-25), B. amyloliquefaciens CH51 (BA51), B. amyloliquefaciens CH86-1 (BA86-1), and B. subtilis 168 (BS168, control, lab strain). Viable cell numbers of all cheonggukjang samples rapidly increased... The highest increase in the TPCs (total phenolic counts) was observed in cheonggukjang fermented with BA86-1 while the least was that fermented with BS168." Address: Div. of Applied Life Science (BK21), Graduate School, Gyeongsang National Univ., Gyeongnam 660-701, Korea.

1835. Unterman, Patricia. 2009. To Hyang gives L.A. competition. *San Francisco Examiner* (*The*) (*California*). Oct. 2. p. A20.
• ***Summary:*** "Urban legend has it that the best Korean restaurants on the West Coast are in Los Angeles." But To Hyang in San Francisco is "one of the most remarkable restaurants I've come across in years."

"This almost invisible little store front [at 3815 Geary Blvd., at 2nd Ave.], open less than a year, is a family affair headed by a Korean-only speaking chef-mother Hwa Soon Im, and her four personable, hip, bilingual daughters. Chef Im makes everything for her 35-item menu from scratch including chile paste, bean paste [*daen chang*], soy sauce [*kanjang*] and fish sauce."

"Daen jang chige ($10.99), a hearty vegetable and tofu stew seasoned with Im's mellow bean paste is gently hot, sweet and sour, a favorite of Korean children."

1836. Nguyen, C. Thi. 2009. Heavy on Korean funk, soul and stew: Seongbukdong. *Los Angeles Times* (*The*) (*California*). Nov. 25. p. 100.
• ***Summary:*** This tiny, neat restaurant on the edge of Koreatown is the creation of Young-hee Shon. "She was a housewife in Seong Buk Dong, a neighborhood of Seoul, and the source of her restaurant's name. But her cooking is pure Gyeongsang–the province in South Korea where she was born and raised." She came to Los Angeles 22 years ago and started working in various Koreatown restaurants. But she found none that captured the tastes of Gyeongsang. So she started her own. "Her bean paste casserole is also a must-eat. This is a soup heavily dosed with doenjang–Korean fermented [soy] bean paste. Her doenjang is another fine example of the Gyeongsang affection for direct, chunky flavors." "The doenjang of Seoul is mild by comparison. Her doenjang has a good saltiness to it."

1837. Lee, Eun-Hee; Chun, Jong-Hee. 2009. [Effects of chongkukjang intake on lipid metabolism and liver function in alcoholic fatty liver rats]. *J. of the Korean Society of Food Science and Nutrition* 38(11):1506-15. Nov. [50 ref. Kor; eng]
• ***Summary:*** "Therefore, chongkukjang intake seems to give a beneficial effect on improving lipid metabolism and liver function by increasing HDL-cholesterol level, antioxidative enzyme activites, alcohol enzyme activiities and decreasing serum lipids, liver TBARS and conjugated diene." Address: Dep. of Food and Nutrition, Inha Univ., Incheon 402-751, Korea.

1838. Lyddon, Chris. 2009. Global grain trade review: Despite soaring demand, record grain production puts surplus at highest point ever. *World Grain* 27(11):28-32, 34-36. Nov.
• ***Summary:*** A table titled "Global grain trade activity: Marketing years as indicated (in 1,000 tonnes)" gives the following statistics for soybeans: 2008-09 Top exporters: 1. United States 34,836. 2. Brazil 29,350. 3. Argentina 5,965. 4. Paraguay 2,300. 5. Canada 1,975. World total 76,324 (-4% from last year).

Top soybean importers: 1. China 39,800. 2. E.U.-27 12,800. 3. Japan 3,450. 4. Mexico 3,100. 5. Taiwan 1,830.

Top soybean meal exporters: 1. Argentina 25,000. 2. Brazil 12,772. 3. United States 7,983. 4. India 3,150. 5. Paraguay 1,167. World total 52,988 (-5%). Top soybean meal importers: 1. E.U.-27 22,150. 2. Indonesia 2,450. 3. Vietnam 2,300. 4. Thailand 2,100. 5. South Korea 1,850.

A two-page color spread shows (for major importing countries or regions, for *all* grains) "Grain imports and exports by major seaports" (in tonnes, calendar year 2008) (plus the increase or decrease compared with last year). A world map shows where each port is located. The tables of exporting ports have a blue background whereas the tables of importing ports gave a green background.

The main exporting ports in the USA are (in descending

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order of volume, 1,000 tonnes): 1. South Louisiana 22,828,781. 2. Tacoma, Washington 6,785,247. 3. Corpus Christi, Texas 5,423,867. 4. Houston, Texas 5,194,172. 5. Portland, Oregon 4,410,476. 6. Brunswick, Georgia 819,790. 7. Duluth, Minnesota 612,149. No importing ports are shown for the USA.

The main exporting ports for Brazil are: 1. Santos 10,101,975. 2. Parana 4,172,447. The main importing port for Brazil is: Santos 1,339,593.

The main exporting ports for Argentina are: 1. San Martin / San Lorenzo 34,636,170. 2. Rosario 14,847,183. 3. Bahia Blanca 7,350,005. 4. Quequen 3,202,964. 5. Ramallo 1,172,462. 6. Lima (Argentina; just northwest of Buenos Aires) 814,746.

The main importing ports for Europe (E.U.-27, which does NOT include Norway, Switzerland, Russia; Candidate countries are Croatia, Macedonia, Turkey) are: 1. Rouen, France 6,349,742. 2. Hamburg, Germany 3,690,955. 3. Rotterdam, Netherlands 2,457,000. 4. Rostok, Germany 2,361,000. 5. Amsterdam, Netherlands 1,393,000. 6. Ghent, Belgium 671,929. 7. Antwerp, Belgium 506,185.

Note: The main importing port for Russia is Novorossiysk 6,317,000, located on the Black Sea in southern Russia in Krasnodar Krai. To get there a ship must pass through the Mediterranean Sea, the Bosporus, then the entire Black Sea. Address: European editor; chris.lyddon@ntlworld.com.

1839. *SoyaScan Notes.* 2009. Chronology of major soy-related events and trends during 2009 (Overview). Dec. 31. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** Jan. 7–The USDA calls for an audit of the soybean checkoff program. The American Soybean Association had filed a complaint on 10 Dec. 2008.

May–Monsanto files a lawsuit against DuPont for patent infringement; DuPont countersues, accusing Monsanto of being anti-competitive.

June 15–Vandemoortele N.V. (Belgium) and Dean Foods (Texas) announce an agreement whereby Dean Foods (owner of White Wave's Silk® soymilk) will acquire Vandemoortele's Alpro Division. The transaction's price is approximately 325 million euros [$400 million]. It is expected to be completed in the third quarter of 2009. With its Alpro® soya and Provamel® brands, Alpro is the European leader in branded soy-based beverage and food products and had net sales of approximately 260 million euros in 2008. Alpro has five manufacturing plants in Europe–in Belgium, the United Kingdom, France and the Netherlands, and employs approximately 750 people.

June–SunOpta opens a soymilk / soybase plant in Modesto, California, about 5 minutes drive from the plant owned by the WholeSoy Co.

July 13–Monsanto acquires WestBred, LLC, a Montana-based company that specializes in wheat germplasm. Worldwide, over the past 5 years, there is growing interest among farmers and farm organizations in genetic engineering of wheat.

Aug. 17–Monsanto and DuPont (via Pioneer Hi-Bred), the world's two biggest sellers of genetically engineered seeds, turn up the volume in their latest skirmish. DuPont accuses Monsanto of monopolistic practices. The two giants are battling for control of the seed business.

In 2009 Shurtleff & Aoyagi publish seven free digital history books on Google Books. They are histories of Soybeans and Soyfoods in Mexico and Central America (1877-2009); Miso, Soybean Jiang (China), Jang (Korea), and Tauco / Taotjo (Indonesia) (200 B.C. to 2009); History of Soybeans and Soyfoods in South America (1882-2009); Edamame, Green Vegetable Soybeans, and Vegetable-Type Soybeans; Soybeans and Soyfoods in Africa (1857-2009); Mildred Lager–History of Her Work with Soyfoods and Natural Foods in Los Angeles (1900-1960); Clive M. McCay and Jeanette B. McCay–History of Work with Soyfoods, the New York State Emergency Food Commission, Improved Bread, and Extension of Lifespan (1927-2009).

For a complete list of these books go to <www.soyinfocenter.com> and search in the upper right corner.

1840. Kuroda, Yosuke; Tomooka, N.; Kaga, A.; Wanigadeva, S.M.S.W.; Vaughan, D.A. 2009. Genetic diversity of wild soybean (*Glycine soja* Sieb. et Zucc.) and Japanese cultivated soybeans [*G. max* (L.) Merr.] based on microsatellite (SSR) analysis and the selection of a core collection. *Genetic Resources and Crop Evolution* 56(8):1045-55. Dec. doi:10.1007/s10722-009-9425-3 [34 ref]
• ***Summary:*** "Abstract: Wild soybeans, *Glycine soja,* are a source of genetic variation to improve soybeans. To improve the efficiency evaluation of conserved germplasm a core or mini-core collection approach that maximizes allelic diversity in a proportion of the whole collection has frequently been advocated. The genetic diversity of a wild soybean collection (1,305 accessions) plus Japanese cultivated soybeans (53 accessions) were analyzed at 20 SSR marker loci. Higher levels of allelic diversity were found in wild soybeans (28 alleles per locus) than Japanese cultivated soybean (five alleles per locus)..."

Figures: (1) "Distribution of wild soybean (*Glycine soja*) and locations from which accessions analyzed came from. In brackets above (a-c) is the number of accessions from the region in the selected main core collection, below is the number of accessions analyzed from that region. White circle (b) is the location of accessions in the selected main core collection."

(2) "Principal component analysis of wild and cultivated soybean from East Asia. a. All accessions. b. Accessions from far eastern Russia. c. Accessions from north China. d. Accessions from South Korea. e. Accessions from north central China (including Taiwan). f. Accessions from Japan

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(wild and cultivated)."

(3) "Estimated posterior probability of K (2-70) for wild soybean (n = 1,306) and cultivated soybeans in Japan (n = 53)."

(4) "Number of alleles in specific sample size simulated."

Tables: (1) Variation in 20 microsatellite loci in wild and cultivated soybeans.

(2) Sample size, number of alleles, expected heterozygosity, observed heterozygosity of wild soybean (*G. soja*) by country and region.

(3) Matrix of genetic distance (DA) between wild soybeans from different regions of East Asia and cultivated soybean from Japan.

(4) Composition of two core sets of germplasm. Address: 1-3, 5. Genebank, National Inst. of Agrobiological Sciences, 2-1-2 Kannondai, Tsukuba, Ibaraki 305-8602, Japan.

1841. Ahn, K.J. 2009. [Characterization and production of antibiotic by *Bacillus subtilis* 028-1, a Chungkookjang fermenting strain]. *Korean J. of Microbiology* 45:185-192. [Kor; eng]*

1842. Eom, S.M.; Jung, B.Y.; Oh, H.I. 2009. Changes in chemical components of cheonggukjang prepared with germinated soybeans during fermentation. *J. of Applied and Biological Chemistry* 52:133-41. *

1843. Hwang, Jae-Sung; Kim, S.J.; Kim, H.B. 2009. Antioxidant and blood-pressure reduction effects of fermented soybean, Chungkookjang. *Korean J. of Microbiology* 45(1):54-57. [20 ref. Kor; eng]
• ***Summary:*** "Daidzein, antioxidants, angiotensin I-converting enzyme (ACE) inhibitor such as Lys-Pro which are rich in Chungkookjang might contribute to the reduction of blood pressure." Address: 1. Dep. of Biotechnology, The Research Inst. for Basic Sciences, Hoseo Univ., Asan 336-795, Republic of Korea.

1844. Kim, Yong-Ho; Lee, K.A.; Kim, H.S. 2009. [Volatile flavor components in soybean sprouts]. *Korean J. of Crop Science* 54(3):314-19. [17 ref. Kor; eng]
• ***Summary:*** "The identification of volatile constituents in foods is important in creating flavor compounds to improve the flavor of foods. This study was conducted to identify the flavor compounds in soybean sprouts cultivated with 4 different types of soybean seeds. A total of 52 flavor compounds were identified and composed mainly of alcohols (16), aldehydes (17), ketones (10), acids (2), furans (2), and miscellaneous compounds." Address: 1. Dep. of Medical Biotechnology, Soonchunhyang Univ., Asan-si, 336-745, Korea.

1845. Hwang, Ye Won; Kim, S.Y.; Jee, S.H.; Kim, Y.N.; Nam, C.M. 2009. Soy food consumption and risk of prostate cancer: A meta-analysis of observational studies. *Nutrition and Cancer* 61(5):598-606. [39 ref]
• ***Summary:*** "Soybean products have been suggested to have a chemo preventive effect against prostate cancer." This meta-analysis was based on five cohort studies and 8 case-control studies. Summary odds ratios (OR) comparing high versus low categories of soybean consumption were calculated. Among individual soy foods, only tofu yielded a significant value of 0.73. Intake of soybean milk, miso, or natto did not significantly reduce the risk of prostate cancer. "Genistein and daidzein were associated with a lower risk of prostate cancer." Address: 1. Graduate School of Public Health, Yonsei Univ., Seoul, Korea.

1846. Nguyen, Andrea Quynhgiao. 2009. Asian dumplings: Mastering gyôza, spring rolls, samosas, and more. Berkeley, California: Ten Speed Press. 234 p. Illust. (color photos by Penny De Los Santos). Index. 28 x 19 cm. [38 ref]
• ***Summary:*** Another very attractive book and well-written book by Andrea Nguyen. In the Introduction, the section titled "Ingredients" (p. 8+) discusses soy sauce (p. 16) and tofu (p. 16-17).

Soy related recipes include: Steamed vegetable dumplings [vegetarian] (Zhengjiao, Chinese, with 3 oz. brown pressed tofu filling, and light (regular) soy sauce, p. 35-36). Kimchi dumplings (Kimchi mandu, Korean, with 10 oz firm tofu, p. 44-45). Korean meat and vegetable dumplings (Gun mandu, with 6 oz firm tofu, p. 46-47). Steamed filled buns (Zheng bao, Chinese, with Vegetable and tofu bun filling {p. 101}, p. 95-96). Baked filled buns (Ju bao, or Guk bao in Cantonese, Chinese, with Vegetable and tofu bun filling {p. 101}, p. 97-99). Vegetable and tofu bun filling (Cai bao, Chinese, p. 101).

Chapter 9, "Sauces, Seasonings,..." contains several soy dipping sauces: Tangy soy dipping sauce (great with Chinese jiaozi or Japanese gyôza, p. 215). Korean dipping sauce (for Korean Mandu, p. 215). Sweet soy sauce (good with Cantonese steamed rice rolls {p. 156-60}, p. 217). Address: Food writer, Santa Cruz, California.

1847. Tamang, Jyoti Prakash. 2009. Food and identity: A study among the Nepalis of Sikkim and Darjeeling. In: Tanka B. Subba, A.C. Sinha, G.S. Nepal, and D.R. Nepal, eds. 2009. Indian Nepalis: Issues and Perspectives. New Delhi, India: Concept Publishing. xvii + 398 p. See p. 297-310. Papers presented at the Conference on Identity and Nationality of the Indian Nepalis: Issues and Perspectives, held at Gangtok, 20-22 April 2006. [Eng]
• ***Summary:*** Page 3 contains a basic description of kinema. On pages 3-4 is an interesting description of "Kwanti," which is a special food of the Newars [the indigenous people of Nepal's Kathmandu Valley]. It is "prepared by mixing

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nine varieties of sprouted pulses and beans, such as white grams, dry peas, soybeans, black-eyed beans, white kidney beans, green grams, black grams, lentils and moth beans. Soybeans are soaked for 4-9 days, and other beans are soaked for 1-2 days. Sprouted beans are cooked with butter and spices to make a thick soup which is served with boiled rice. It is eaten in the festival called *Kwanti Purnima*, which usually falls in August."

On pages 6-7 is a section titled "Antiquity of kinema" which states: "The word *kinema* has been derived from *kinamba* of the Limbu language in which *ki* means fermented and *namba* means flavour (Tamang, 2001). The kingdom of Limbuwan (presently the districts of eastern Nepal–Terathum, Taplejung, Panchthar, Dhankuta and Ilam) was established by the Limbus before the seventh century. They ruled that part of Nepal until the unification of Nepal in 1769. Though there is no historical document on the origin of kinema, it is widely believed that the Limbus started its production and consumption. The unification of Nepal and migration of people from one place to another might have popularized this food among the other Nepali groups like Rai, Tamang, Gurung, Magar and Sunuwar. Kinema is not traditionally eaten by the Nepali Brahmins. Although the reason is not documented, it is believed that the Brahmins usually regard kinema as basi meaning stale. Another reason may be its strong flavour. However, for many ethnic communities in the eastern Himalayas and Southeast Asian countries it is a delicacy. The Lepchas call it *satlyangser* and the Bhutias call it *bari* in Sikkim. In Meghalaya, the Khasis call it *tyrumbai* [*turangbai*]*;* in Manipur a similar product is known [by the Meities] as *hawaijar;* in Mizoram, the Mizos call it *bekang-um* [*bekang*]*;* and in Nagaland the Naga people call it *aakhuni.* It is called *natto* in Japan; *chungkok-jang* in Korea; *thua-nao* in Thailand; *pe-poke* in Myanmar and *douchi* [sic] in China."

Fermented foods are much more numerous in North East India than in the rest of India. Address: Food Microbiology Lab., Sikkim Government College, Gangtok, Sikkim 737 102, India.

1848. Nordquist, Ted. 2010. Re: Early work with health foods, sour dough bread, and tofu in Sweden. Letter (e-mail) to William Shurtleff at Soyinfo Center, Jan. 6. 1 p.
• ***Summary:*** "You may not know this, but while studying for my PhD I worked part time at the Mental Hospital and also at Sweden's largest and first Health Food Store in Uppsala, founded and run by Birgitta Åkerheden and her husband. I introduced to this store a sandwich / soup café section and introduced sour dough whole grain bread by bringing sour dough starter from San Francisco and working with the local Skuttunge Bagari to manufacture the sour dough bread for the sandwiches. I then introduced to the store 'alfalfa sprouts' showing them how to grow these and sell them in the store.

"When I then tried to introduce tofu at the store the owner asked me why I did not start my own tofu factory. It was a good question. You know the rest.

"I actually made about 12 different foods from tofu and invited the investment banks to this store to get start up money. Birgitta and I worked all day and had a huge demo ready for the bankers at closing time 6:00 PM. Of the 5 banks invited, none of them showed up!

"I was able to borrow $10,000 from my mother and $10,000 from my Korean neighbor, Professor Ki Yong Kim, head of Seoul University Computer Department. Eleven years later I paid Kim back at 18% interest (We continue to share Christmas cards). (Like most children, I never paid my Mother back, but I have 'loaned' a lot more than that amount to my children, so I think my Mom is OK with the final result)." Address: TAN Industries, Inc., 351 California St., Suite 1330, San Francisco, California 94104; 660 Vischer Ct., Sonoma, CA 95476.

1849. Cho, Geum Joon.; Park, H.T.; Shin, J.H.; et al. 2010. Age at menarche in a Korean population: secular trends and influencing factors. *European J. of Pediatrics* 169(1):89-94. Jan.
• ***Summary:*** "... using representative Korean data from the 2005 Korean National Health and Nutrition Survey. Three thousand five hundred sixty-two women born between 1920 and 1985 were enrolled to identify secular trends in the age at menarche and 620 girls born between 1986 and 1995 were recruited to evaluate the factors influencing the age at onset of menarche. Mean age at menarche decreased from 16.90 +/- 1.25 years for women born between 1920 and 1925 to 13.79 +/- 1.37 years for those born between 1980 and 1985, indicating a downward trend of 0.68 years per decade (95% CI, 0.64-0.71) in age at menarche. Mean age at menarche of girls born between 1986 and 1995 was 13.10 +/- 0.06 years as estimated by the Kaplan-Meier method..." Address: 1. Dep. of Obstetrics and Gynecology, Korea Univ. Anam Hospital, Korea Univ. College of Medicine, 126-1, 5-ga Anam-dong, Seongbuk-gu, 136-705, Seoul, South Korea.

1850. Kwon, Dae Young; Daily, J.W., III; Kim, H.J.; Park, S. 2010. Antidiabetic effects of fermented soybean products on type 2 diabetes (Review). *Nutritional Research* 30(1):1-13. Jan. *
• ***Summary:*** "Historically, the incidence of type 2 diabetes has been lower in Asian populations compared with those in Western countries. One possible reason for the lower incidence among Asians is that they consume fermented soybean products, which are unique to the traditional Asian diet. Some have hypothesized that dietary phytoestrogens and soy peptides in fermented soybean foods consumed in traditional Asian diets may help prevent and slow the progression of type 2 diabetes."

"Although the lack of human intervention trials does

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not permit definitive conclusions, the evidence does suggest that fermented soy products may be better for preventing or delaying the progression of type 2 diabetes compared with nonfermented soybeans." Address: Emerging Innovative Technology Research Division, Korean Food Research Institutes, Sungnam, Korea.

1851. *Atlanta Constitution* (*The*) (*Atlanta, Georgia*). 2010. Classified ad: Restaurant Korean cook. Feb. 7. p. G7.
• ***Summary:*** "A Korean restaurant is looking for a Korean cook who can cook Korean dishes such as Dwenjang jjigae,... galbi, soondubu, bulgogi and etc. 6 months work experience is required. Please send letter or resume to Bang Ga Nae LLC, at 3312 Peachtree Industrial Blvd. #5, Duluth, GA 30096."

1852. Barnes, Stephen. 2010. The biochemistry, chemistry and physiology of the isoflavones in soybeans and their food products. *Lymphatic Research and Biology* 8(1):89-98. March. [64 ref]
• ***Summary:*** "Abstract: In this review of the chemistry, absorption, metabolism, and mechanisms of action of plant isoflavones, emphasis is placed on the isoflavones in soy and the food products derived from them. Soybeans have been part of food history in Asia for several millennia but did not reach the Americas and Europe until the eighteenth century. In the twentieth century, there was a tremendous increase in the cultivation of soybeans in the United States and more recently in South America. Soy foods have entered the U.S. food supply in ever-increasing amounts both in the form of traditional products (soy milk, tofu) and in more subtle ways in dairy and bread/cake products. The isoflavones in non-fermented foods are for the most part in the form of glycoside conjugates. These undergo changes due to different processing procedures. Isoflavones and their metabolites are well absorbed and undergo an enterohepatic circulation. They are often termed phytoestrogens because they bind to the estrogen receptors although weakly compared to physiologic estrogens. This estrogenicity is not the only mechanism by which isoflavones may have bioactivity–they inhibit tyrosine kinases, have antioxidant activity, bind to and activate peroxisome proliferator regulators alpha and gamma, inhibit enzymes in steroid biosynthesis, strongly influence natural killer cell function and the activation of specific T-cell subsets, and inhibit metastasis. These various properties may explain the much lower incidence of hormonally-dependent breast cancer in Asian populations compared to Americans and Europeans.

"History: History The soybean is a member of the *leguminosae* family, plants that form root noodles that house nitrogen-fixing soil bacteria (Rhizobia) in a symbiotic relationship, an event that is essential for life on this planet. Legumes have been used in a crop rotation system to restore the nitrogen in the soil on ground used for agriculture. The soybean, now called *Glycine max,* has had a long history as a domesticated plant, with records of its use as far back as the eleventh century BC in China. Missionaries took it into Korea and Japan in the third and fourth centuries AD [1=Hymowitz 1990]. It did not reach Europe until 1739 in Paris and 1790 in Kew gardens in London [1]. The first recorded use in the United States was in 1765 in Savannah, Georgia [1]... In 1960, the annual world production of soybeans was 27 million tons, with 69% being grown in the United States. By 2007, annual world production had risen to 206.4 million tons with nearly 90 million tons grown in Brazil and Argentina.

"Isoflavone Biosynthesis: The signals released by the soybean that attract the rhizobial bacteria are the isoflavonoids [3=Rolfe 1988] These are a subclass of the much more common flavonoids. These in turn are members of the large family of polyphenols that are widely found in plants. Isoflavonoids are formed by the same biosynthetic pathway for flavonoids [4]. First, phenylalanine reacts with malonyl CoA to form 4-hydroxycinnamoyl CoA (Fig. 1). Chalcone synthase catalyzes the reaction of this intermediate with three more molecules of malonyl CoA to form isoliquiritigenin or naringenin chalcone. Chalcone isomerase catalyzes the ring closure of the heterocyclic ring. Isoflavone synthase introduces a 2-hydroxyl group, which in turn is removed by an isoflavone dehydratase to yield daidzein (7,4'-dihydroxyisoflavone) and genistein (5,7,4'-trihydroxyisoflavone) (Fig. 1). The biosynthesis of glycitein (7,4'-dihydroxy-6-methoxyisoflavone), a major isoflavone in the soy germ (hypocotyls) is not understood. The numbering scheme for isoflavones is shown in Figure 2.

"Isoflavones in the soybean are converted to 7-O-β-glucosides by a glucosyltransferase and then to their 6"-O-malonates by a malonyl transferase. This chemical form is stored in vacuoles until used by the plant and is the major form in harvested soybeans. Although the yellow or black soybeans are the most familiar forms, an early harvesting before ripening results in a green immature soybean. This is cooked by boiling still in the pod and is served as edamame. It has similar levels of isoflavones to the yellow and black soybeans [5, 6].

"Soy Foods in Asia: Although soybean-containing foods have become more popular in the United States over the past 50 years, they are in general quite different from the forms of soy consumed in Asia [7]. Unlike American soy foods, the latter are often fermented. Soybeans are converted using microorganisms to miso (added to soups and stews in Japan), soy paste (in Korea) and tempeh (with a texture like meat in Indonesia). Soy sauce is another familiar soy product and is made either by acid hydrolysis (no isoflavones) or by prolonged fermentation. The proteins and lipids in soybeans are extracted with boiling water to form soy milk, an important alternative to mother's milk in countries with a high incidence of lactase insufficiency. Soymilk is curdled to

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prepare tofu, which can be pressed to remove water. Tofu can be fried or added to numerous other dishes.

"Soy Foods in the United States: In the United States, soybeans are grown mostly as a source of edible oil using a hexane extraction approach (Fig. 3). The defatted soy flour is enriched in protein (50% by weight). This has been traditionally used as the protein source in domesticated and research animal diets [8]. The soy flour is heated to produce a variety of related products–this includes toasting at 250ºC. These are used in many bread and cake products, particularly in doughnuts. Soy flour is washed with water to remove soluble carbohydrates–this creates soy protein concentrate, which contains 70% protein by weight (Fig. 3). Alternatively, soy flour is extracted with hot, aqueous 65% alcohol to remove carbohydrates, lipids, and other small molecules, including the isoflavones (also color and taste). This is another form of soy protein concentrate. Both the soy protein concentrates can be extruded to form textured soy protein, another meat-like product. Soy protein isolate (SPI), >92% protein, is prepared by first solubilizing the proteins in soy flour with a mild alkaline extraction (leaving behind complex carbohydrates and lipids) and precipitating the proteins by lowering the pH to 4.5 (Fig. 3). The soluble sugars remain in solution. SPI is found in many canned food products. It's added to improve the appearance of the food. It is also widely used by serious athletes who are on low-fat, high-protein diets. It's also used to prepare low-fat forms of soymilk. As in Asia, these soymilks are converted to tofu. However, this is typically done aseptically producing shelf-stable products. In a recent development, soy products are being made where microorganisms that hydrolyze the isoflavones are added to soy protein preparations.

"Hidden Soy in Foods: Just as for those who suffer from peanut or milk allergies, there are those for whom avoiding soy is essential. And with the widespread presence of soy in food products, this can be a difficult task. Read the food labels carefully–a product having added 'hydrolyzed vegetable protein,' or just 'vegetable protein' contains soy. Besides the clearly labeled new 'soy' foods (soy cheese, soy ice cream, soy yoghurt), soy can turn up in strange, but often familiar places. For instance, a soy-based batter is used to coat doughnuts-it provides the needed mouth-feel. When roasting the Christmas turkey, the expectation is that cooking will produce profuse gravy-to ensure that will happen, producers pump a solution of SPI into the turkey before it is sold. In some brands of canned tuna, the tuna meat is soaked in a soy broth. Chili often has added soy protein. Energy bars that are low-fat and high in protein may contain SPI. Licorice and licorice teas and most meatless products contain significant amounts of isoflavones. Extensive lists of common foods and their isoflavone content have been published [9, 10]. There is also a compilation of the isoflavone content of foods provided by a study funded by the U.S. Departments of Agriculture and the Army that can be obtained from the following website:

< http://www.nal.usda.gov/fnic/foodcomp/Data/isoflav/isoflav.html >

The contents continues: Changing chemistry of the isoflavones in foods. Other foods or supplements containing isoflavones (especially the American groundnut, *Apios Americana*), and the root of kudzu (*Pueraria lobata*). Absorption, metabolism and excretion of isoflavones. Mechanisms of action of isoflavones ("A new chapter in estrogen action was opened in 1996 with the discovery of" estrogen receptor beta, by Kuiper et al. It was related to estrogen receptor alpha, which is located on chromosome 6, it was instead located on chromosome 14). Address: Dep. of Pharmacology & Toxicology, MCLM 452, Univ. of Alabama at Birmingham, Birmingham, AL 35294.

1853. American Soybean Association. 2010. History of the American Soybean Association, 1998-1999 (Website printout–part). www.soygrowers.com/history/default.htm Retrieved April 22.

• ***Summary:*** "1998: ASA opened a new chapter for soybean producers this year when Congress enacted legislation that allows vehicle fleets regulated under the Energy Policy Act of 1992 to earn credits toward meeting EPACT requirements by operating on B-20. This legislation is significant because it provides credits for the use of biodiesel fuel that can be made from soybean oil, and it provides biodiesel blends that offer consumers the economics necessary to make B-20 the "low cost leader" in the EPACT market. Biodiesel has been one of ASA's top priorities for several years.

"+ ASA issued Grower Advisories pertaining to import clearances for soybeans grown from genetically modified seedstock in major export markets.

"+ A $6 billion ag assistance package was enacted that included $2.575 billion in total funding to address crop disaster losses, and another $3.15 billion in market loss payments to producers eligible for Freedom to Farm contracts. Also, ASA successfully urged Congress to approve income averaging, increased deductibility of health insurance for farmers, and a 5-year carryback for operating losses. The approved tax cuts are estimated to save producers more than $1 billion over the next five years.

"+ ASA worked diligently to ensure that Ag appropriators approved funding for the Foreign Market Development Cooperator Program at the current operating level of $32 million and $90 million for the Market Access Program. ASA utilizes funding from the FMD and MAP, along with producer checkoff dollars, to promote U.S. soybean exports in more than 80 counties.

"+ Funding was secured for the International Monetary Fund at $17.9 billion. IMF funding is vital to ensuring stability in U.S. Soybean export markets in both the short and long-term. ASA also succeeded in convincing USDA to include half a million tons of soy in a Russian Food

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Aid Program and another $61 million of soybeans and soy products in other P.L. 480 Title 1 programs.

"+ Early this year, ASA participated in the White House Rose Garden ceremony, during which President Bill Clinton signed into law the Agricultural Research, Extension, and Education Reform Act. This legislation was one of ASA's top priorities because it approved funding for increased agricultural research funds, as well as crop insurance. Agricultural research is slated to receive $600 million over five years, and it authorized $485 million over five years to pay insurance agents and companies for expenses to write crop insurance policies.

"+ On Nov. 10, the Food and Drug Administration gave initial approval to allow health claim labels on products containing soybean protein based on data contained in a petition presented by Protein Technologies International, Inc., and a follow-up petition filed by ASA in October. Approval by FDA of evidence that including soy protein in a healthy diet reduces serum cholesterol and may reduce the chance of heart disease will have consumers around the world seeking foods labeled to contain soy protein. A final rule was expected in 1999.

"+ In November, ASA formally opened its 14th international marketing office in Istanbul, Turkey, to increase demand for U.S. soybeans and products in the Middle East.

"+ ASA took the lead in working with biotechnology and seed companies to ensure that U.S. growers didn't lose $9 billion of U.S. Soybean export markets due to the presence of unapproved biotechnology-derived soybean varieties.

"+ To help maintain U.S. soy exports despite Asia's economic crisis, ASA worked to obtain and increase credit guarantees from USDA for the purchase of soybeans and soy products. In part due to ASA's aggressive initiative, USDA approved additional GSM-102 export credit guarantees for Asia including increases from $250 million to $400 million for Indonesia, $100 million to $300 million for Thailand, and zero to $100 million for Malaysia. In addition, Korea received an estimated $1.1 billion, an increase from $154 million from the previous year.

"+ The Loan Deficiency Payment (LDP) rate was increased by 34 cents as result of ASA's policy efforts during the 1996 Farm Bill process. LDPs were based on a $5.26 per bushel loan rate.

"+ ASA increased its membership for the fourth consecutive year, ending the year at 31,737 members. Even more was added to the value of an ASA membership with the launch of the first issue of the Washington Insider Report [ashington, DC]. This new publication, distributed quarterly to all ASA members, focuses on key policy issues facing soybean farmers. To help ensure continuation of the national soybean checkoff, ASA created a special Vote YES committee to develop funding and prepare for the possibility of a producer referendum.

"+ There was a record attendance of producers and exhibitors at Commodity Classic in Long Beach [California], making the third annual event a huge success. Show attendance reached 3,676 and more than 500 trade show booths were sold. More than $23,000 was raised for safety education through the 1998 Stephen M. Yoder Foundation Auction and from associated raffles."

"1999: The American Soybean Association applauded approval by the U.S. Food and Drug Administration (FDA) of a new soy health claim based on a petition filed by ASA in 1998. FDA published its final rule on October 25, that soy protein included in a diet low in saturated fat and cholesterol may reduce the risk of coronary heart disease by lowering blood cholesterol levels. As a result, food labels may now contain messages, such as "25 grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." Research funded by the soybean checkoff shows that the use of soybeans in food products will increase at a rate of 10% a year for the next five years, up from about 37 million bushels to more than 60 million bushels.

"+ Biodiesel implementation moved a big step forward with the release of the Department of Energy's interim final rule to allow public vehicle fleets to earn EPACT credits. ASA also was pleased with USDA's August 13, announcement that the agency planned to purchase an unprecedented level of 20,000 gallons of biodiesel during the year, and with pro-biodiesel legislation that was introduced in the Senate on November 17. That legislation, entitled the "Biofuels Air Quality Act" would allow biodiesel to compete for funds in the Congestion Mitigation Air Quality Improvement (CMAQ) program. Similar legislation was introduced in the House on August 6. The Senate and House bills expand the CMAQ program's authority to allow funding of alternative fuel projects that include purchases of biodiesel, which is a proven cleaner-burning fuel made from natural, renewable sources, such as soybean oil. ASA also asked that the government introduce biodiesel-blended fuels in at least 50% of the government's diesel-powered vehicles by 2002.

"+ While drought and flood conditions in several areas of the country prevented another record-breaking U.S. soybean harvest, producers continued to face the lowest prices paid for their soybeans since the early 1970s. Three ideal growing seasons, one right after the other, in the majority of soybean production areas in both the United States and in South America, caused soybean stocks to grow, while at the same time, export growth stalled as a result of depressed economies in key Asian markets. These factors were primarily responsible for drifting soybean prices paid to farmer down from an average per bushel price of $7.35 in 1996, to $4.35 in 1999.

"+ Fortunately, ASA's soybean safety net policy work during the 1996 Farm Bill process helped see many

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producers through a tough year. ASA's success in raising the soybean loan rate $.34 would provide growers with nearly $1 billion of additional farm revenue from the loan deficiency payment program.

"+ Even with ASA's earlier policy efforts and successes, it was clear that stronger and more comprehensive efforts would be needed to improve the outlook for soybean producers. In February, ASA farmer leaders made public a comprehensive list of farm income and market demand policy initiatives for the Administration and Congress to act upon. ASA's proposal included economic loss assistance, farm income protection, food assistance and export initiatives, biodiesel, and trade policy initiatives. Also included were key domestic policy initiatives concerning the Food Quality Protection Act implementation, the environment and conservation, research, transportation and tax initiatives. ASA also outlined major issues for changes in Federal crop insurance programs.

"+ ASA urged Congress to provide economic loss payments to producers, similar to payments provided to farmers in 1998, and also advanced with congressional leaders inclusion of soybean-specific payments and provisions in any farm aid package. Subsequently, Congress did approve an $8.7 billion emergency farm spending plan that also included an authorization of $475 million in direct payments to oilseed producers to help partially offset low prices. It was estimated that this oilseed payment would provide producers with 15 additional cents per bushel of soybeans.

"+ In April, ASA and the National Oilseed Processors Association (NOPA) provided Secretary of Agriculture Dan Glickman with a comprehensive list of recipient countries, quantities, and products for a proposed $1 billion concessional sale and donation program for soybeans, soybean meal, soybean oil, and soy protein products. Secretary Glickman requested this list during a March 16 meeting with ASA leaders in Washington when ASA urged him to utilize Commodity Credit Corporation (CCC) funds for a purchase and donation program that could help alleviate a disastrous decline in prices and soybean producer income.

"+ ASA also initiated, for the first time, discussions with a group of international food aid groups who were interested in programming soy into their USDA requests. These private voluntary organizations (PVOs) provided concrete proposals to USDA for the implementation of food aid. This combination of ASA's "pushing" and the PVOs "pulling" helped convince USDA of the merits of assisting people in the most needy countries in the world while bolstering demand and improving prices paid to farmers.

"+ To urge further action on ASA's request for a $1 billion soy donation, 72 House members cosigned a letter to Secretary of Agriculture Dan Glickman in November, calling for USDA to move quickly to mitigate the downward pressure on soybean prices during harvest. ASA also met with several Senators and Representatives to urge them to place calls to the White House, Agriculture Department, and Office of Management and Budget to "dislodge" this and other food aid programs which have been held up pending reviews.

"+ At year's end, ASA was still waiting for a major food aid announcement, which was being delayed by bureaucratic red tape. Meanwhile, some significant amounts of soy were already being included in major food aid programs, such as the purchase by Russia of an additional 117,000 metric tons of soymeal under the P.L. 480, Title I program for shipment December 17, 1999 to January 7, 2000.

"+ On November 15, U.S. and Chinese negotiators completed bilateral talks on China's accession to the World Trade Organization (WTO). The agreement that U.S. trade negotiators reached with China included significant opportunities to expand market access that ASA has worked toward for years. According to U.S. government sources, the ongoing WTO accession negotiations include assurances that will formalize access to the Chinese market–the largest growth market for soy in the 21st century–and includes commitments to expand access over the next few years.

"+ Based on the announced WTO Accession Terms for Agriculture, there will be no tariff rate quota (TRQ) for soybeans, and the duty is bound at the current applied level of 3%. The agreement stated that soybean oil will be subject to a 9% duty and the TRQ quantity will be based on average 1995-97 calendar year imports calculated on the basis of data from Oil World. Soybean oil also will be designated a "most-favored-oil"–meaning that any permanent or temporary duty reduction provided to other oils also will be extended to soy oil. ASA also began an extension policy effort in 1999 to promote approval of Permanent Normal Trade Relations (PNTR) with China, which the U.S. Congress was scheduled to debate in 2000.

"+ ASA counted among its accomplishments the lifting of sanctions on the sale of U.S. food to Iran, Sudan and Libya. ASA continued to work to expand sanctions relief to Iraq, North Korea, and Cuba to help improve soybean producer profitability.

"+ Confusion about the marketability of biotech-derived crops was at the forefront of many producers' thoughts. During these challenging times, ASA called upon all of its resources to actively communicate with growers, customers and other stakeholders about the safety of biotech soybeans to minimize the negative effects of activities and efforts to undermine public confidence in agricultural biotechnology.

"+ In November and December, ASA implemented a series of "Planting Decision 2000" Town Hall meetings around the country to help producers make well-informed planting decisions for 2000. ASA also produced "Planting Decision Guide" that provided producers accurate information on the factors affecting the demand for both biotech and non-biotech soybeans. ASA distributed the

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Planting Decision Guide to more than a quarter million soybean producers." Address: 12125 Woodcrest Executive Drive, Suite 100, St. Louis, Missouri.

1854. Kim, Tae Woon; Lee, J.H.; Park, M.H.; Kim, H.Y. 2010. Analysis of bacterial and fungal communities in Japanese- and Chinese-fermented soybean pastes using nested PCR-DGGE. *Current Microbiology* 60(5):315-20. May. [26 ref]
• ***Summary:*** "The microbial diversity of Japanese- and Chinese- fermented soybean pastes was investigated using nested PCR-denaturing gradient gel electrophoresis (DGGE). Five Japanese-fermented soybean paste samples and three Chinese-fermented soybean paste samples were analyzed for bacteria and fungi." Address: Kyung Hee Univ., Suwon, Republic of Korea.

1855. Shin, Hai-Rim; Boniol, M.; Joubert, C.; et al. 2010. Secular trends in breast cancer mortality in five East Asian populations: Hong Kong, Japan, Korea, Singapore and Taiwan (Open Access). *Cancer Science* 101(5):1241-46. May. [80 ref]
• ***Summary:*** "Breast cancer risk is increasing in most Asian female populations, but little is known about the long-term mortality trend of the disease among these populations." Address: 1. International Agency for Research on Cancer, Lyon, France.

1856. Shukla, Shruti; Park, H.K.; Kim, J.K.; Kim, M. 2010. Determination of biogenic amines in Korean traditional fermented soybean paste (Doenjang). *Food and Chemical Toxicology* 48(5):1191-95. May. *
• ***Summary:*** "Twenty-three samples of traditionally available Korean fermented soybean paste samples (Doenjang) were analyzed in order to determine the content of biogenic amines."

"The findings of this study enhance the safety of not only Doenjang but other salted and/or fermented food products." Address: 1. Dep. of Food Science and Technology, Yeungnam Univ., 214-1 Dae-dong, Gyeongsan-si, Gyeongsangbuk-do, Republic of Korea.

1857. Shike, Jennifer. 2010. Bernard breeding better edamame at 83 (News release). College of Agricultural, Consumer, and Environmental Sciences (ACES), Univ. of Illinois at Urbana-Champaign. 2 p. June 16.
• ***Summary:*** "At the age of 83, when many people have long since retired, University of Illinois researcher Richard Bernard unveiled his 14th variety of Gardensoy edamame.

"Bernard has been breeding soybeans and edamame, or vegetable soybeans, since 1954. And he has no intentions of stopping now.

"In fact, after the release of Gardensoy 51, he is looking ahead to his next projects: developing varieties that have higher protein content, higher concentration of omega-3 fatty acid, and creating varieties that do not have the genes that cause allergic reactions.

"Bernard's fascination with edamame began in the 1930s and 1940s when edible soybeans were a popular vegetable being pushed in the United States for their nutritive value.

"'As a boy, I was curious and tried them,' Bernard said. 'I've been enjoying them ever since. The first varieties I tried were Etum and Tastee, and they are still among my favorites.'

"A city kid from Detroit, Bernard grew up working in an auto factory before joining the army. After the war, he was hitchhiking through southwestern Illinois when a farmer stopped and picked him up.

"'The farmer mentioned soybeans, and I had to ask what they were,' Bernard said. 'He hit the brakes and made me go out in the field and take a look. That was my first experience with soybeans. Little did that farmer know what he was starting when he stopped the truck and took me out into that field.'

"Bernard went on to obtain his bachelor's and master's degrees from The Ohio State University, and his Ph.D. from North Carolina State University where he studied peanuts. At NC State, he worked next door to Herbert Johnson who was leading USDA soybean breeding efforts nationwide at the time.

"Johnson later hired Bernard as a USDA research agronomist at the U of I, where he coordinated northern regional testing for soybean varieties and became the curator of the U.S. Germplasm Collection.

"'I developed varieties of soybeans for Illinois farmers,' Bernard said. 'The majority of Midwest acres planted in the 1960s and 1970s were my varieties.'

"One accomplishment in particular stood out in Bernard's mind. 'Back then, a cultivar named 'Harosoy' was widely grown,' he said. 'It was probably the most susceptible to Phytophthora root rot–a devastating disease that had recently hit the area.'

"Bernard backcrossed in a gene for resistance to the disease, resulting in Harosoy 63. This variety saved farmers a lot of money.

"In the 1980s, he began breeding edamame as a hobby with a goal to develop 'especially good eating' large-seeded edamame with higher protein content. He also wanted to develop edamame that would grow well in Illinois.

"'Large-seeded edamame have a better mouth feel for eating,' Bernard explained. 'Those varieties mainly come from Japan and Korea, but they tend to be prone to shattering and susceptible to diseases. I wanted to create edamame varieties with improvement in those areas.'

"Bernard released the first six edamame varieties in 2000, followed by seven more in 2002. He named them Gardensoy with numbers following to reflect the soybean

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maturity group and release order. His latest release, classified in soybean maturity group V, adds a later-maturing variety to the mix and will be the last one to harvest before the frost hits.

"'For years, I mailed out free seed packets for people to grow Gardensoy in their home gardens,' he said. 'Most people have a hobby that costs them money. I consider that the price of mine.'

"Overcoming misconceptions about eating soybeans has been Bernard's greatest challenge in breeding edamame over the years. 'People are harder to change than soybeans,' Bernard said. 'In the Midwest, people have been slower to accept edamame, despite its great taste and nutritional value.'

"As more and more people learn about the great taste, convenience and nutritional benefits of this complete protein vegetable, demand for edamame has increased. However, most of the demand has been met through the import of product from China, said Theresa Herman, U of I research specialist.

"Gardensoy varieties are perfect for growing in gardens, Bernard said. Due to harvesting and storage challenges, only a few operations in the United States are currently producing edamame on a large scale. However, consumer interest is quickly increasing along with the number of farmers growing edamame to sell at farmer's markets.

"'The U.S. edamame industry has yet to take off in a big way, but with increasing demand, sustainability of local production is more and more likely,' Herman said. 'As more edamame are grown and consumed in the U.S., it remains to be seen whether the Gardensoy varieties will be chosen favorites. However, Dr. Bernard will always be in the group of pioneers who saw the potential of this crop in the U.S.– for human health and for grower profit.'" Address: Urbana, Illinois.

1858. Shanmugasundaram, S.; Yan, Miao-Rong. 2010. Vegetable soybean. In: Guriqbal Singh, ed. 2010. Soybean: Botany, Production and Uses. Wallingford, Oxfordshire, UK, and Cambridge, Massachusetts: CAB International (CABI). xii + 494 p. See p. 427-60. Chap. 19. [96 ref]
• ***Summary:*** One of the best documents seen to date on vegetable soybeans. The authors are the world's leading experts on the subject. Contents: Introduction (Vegetable soybean is called *edamame* in Japan, *mao dou* in China, *poot kong* in Korea and *tua rae* in Thailand): Definition, distinction from grain soybean, nutritional value. Production. Cultural practices: Location, season and cropping system, temperature, soil type, land preparation and sowing, fertilization and irrigation, insect pest and disease control, harvesting, seed production. Genetic improvement. Processing and utilization. International trade. Potential for developing countries. Conclusions. Address: 1. New Jersey, USA; 2. The World Vegetable Center, Shanhua, Tainan, Taiwan.

1859. Ko, Bong-Kuk; Kim, K.M.; Hong, Y.S.; Lee, C.H. 2010. Metabolomic assessment of fermentative capability of soybean starter treated with high pressure. *J. of Agricultural and Food Chemistry* 58(15):8738-47. Aug. 11. [60 ref]
• ***Summary:*** "Meju, a brick of dried fermented soybean naturally inoculated with microorganisms, is a starter used for producing traditional Korean fermented soybean products such as soybean paste (doenjang) and soy sauce (ganjang). In order to reduce aging time during production of soybean paste and soy sauce, high pressure (HP) treatment was applied to the meju starter at 500 MPa of pressure for 10 min at 15ºC." Address: 1. School of Life Science and Biotechnology, Korea Univ., Seoul 136-701, Republic of Korea.

1860. *Honolulu Star-Advertiser* (*Hawaii*). 2010. He'eia Fishpond Limu Salad (Paepae o He'eia). Sept. 22. p. 47.
• ***Summary:*** The recipe includes:
"2 pounds Gorilla Ogo, or any other ogo
"Sauce:
"½ cup shoyu
"½ cup apple cider vinegar
"1 tablespoon kochujan (kim chee paste)"

1861. Kim, H.G.; Hong, J.H.; Song, C.K.; Shin, W.H.; Kim, K.O. 2010. Sensory characteristics and consumer acceptability of fermented soybean paste (Doenjang). *J. of Food Science* 75(7):S375-S383. Sept. [28 ref]
• ***Summary:*** "This study was conducted to examine the sensory profiles of fermented soybean paste (Doenjang), to understand consumers' acceptability of different types of Doenjang samples and to identify the sensory characteristics that drive consumer acceptability of Doenjang products."

"Introduction: Various fermented soybean products, such as soy sauce, Japanese miso, and tempeh, have been used in Asia for hundreds of years. Consumption of the fermented soybean products is gradually expanding around the world, due to its various health benefits, such as anticancer, antihypertension, immunity, and antioxidative activity." Address: 1-2. Dept. of Food Science and Engineering, Ewha Womans Univ., Seoul 120-750, South Korea.

1862. Kim, Jihye; Kim, H.J.; Joung, H.; et al. 2010. Overnight urinary excretion of isoflavones as an indicator for dietary isoflavone intake in Korean girls of pubertal age. *British J. of Nutrition* 104(5):709-15. Sept.
• ***Summary:*** "Little is known about the bioavailability of isoflavones in children. Previous studies have shown that children excrete more isoflavone in urine compared with adults. Thus we examined the relationship between usual dietary isoflavone intake and the urinary excretion of isoflavonoids in Korean girls of pubertal age. Twelve girls each were selected from the lowest and the highest

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quartiles of isoflavone intake among 252 Korean girls aged 8-11 years. Age, BMI and sexual maturation stage were matched between the two groups. Dietary intakes for 3 d by diet record and overnight urine samples were collected at baseline and at 6 and 12 months. Total and individual isoflavone (daidzein, genistein and glycitein) intakes were calculated from diet records. The parent isoflavone compounds (daidzein, genistein and glycitein) and their metabolites (equol, O-desmethylangolensin (O-DMA), dihydrodaidzein and dihydrogenistein) present in the urine samples were analysed using liquid chromatography-MS. Intake levels of total and individual isoflavone compounds were significantly higher in the high isoflavone (HI) group than the levels in the low isoflavone (LI) group ($P < 0.05$). Urinary excretion of all isoflavone parent compounds was significantly higher in the HI group than in the LI group ($P < 0.0001$). Among isoflavone metabolites, only O-DMA and total metabolites were significantly different ($P < 0.05$). Total isoflavone intake was highly correlated with the urinary excretion of total parent compounds (r 0.68; $P < 0.01$), parent compounds plus their metabolites (r 0.66-0.69; $P < 0.01$) and total isoflavonoids (r 0.72; $P < 0.0001$). In conclusion, overnight urinary excretion of total isoflavonoids is a reliable biomarker of usual isoflavone intake in Korean girls of pubertal age."

"Estimated adolescent soyfood and isoflavone intake: 12 girls 1st quartile intake. Age 10.3±0.5 years. 12 girls 4th quartile intake. Age 10.2±0.7 years. Soyfoods intake is not reported. Isoflavone intake 3.0±0.913 mg/day." Address: 1. Dep. of Food and Nutrition, Daegu Univ., Gyeongbuk 712-714, South Korea.

1863. Gupta, Rajendra ("Raj") P. 2010. Overview and current status of soymilk worldwide (Interview). *SoyaScan Notes.* Oct. 13. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Raj finds it very difficult to say which part of the world has the brightest future for soymilk. All over the world, there is a slow but steady growth of interest in soymilk and in ProSoya's technology for making it. ProSoya's main large system is 2,000 liters per hour capacity, but the biggest system it has sold is 6,000 liters per hour. This capacity refers to a concentrated product (soya base), which approximately doubles in volume when reconstituted to regular strength. The protein level of the concentrate is about 5%. The solids content is 10-11%. Also, the okara is rewashed to extract more nutrients from the soybeans. It is these big machines that keep ProSoya afloat financially.

ProSoya sells large-scale equipment to countries all over the world. One year Korea looks promising, the next year Germany, or Ghana or Latin America. Those machines almost always become the center of a successful business that continues to do well. They are purchased by people who know how to run a food business. Some machines are creating new markets while others are adding capacity to existing companies or enabling co-packing.

In Russia more than 1,000 SoyaCows (called Soyushkas) have been sold. Initially, many were in government ministries but now the majority are owned by small entrepreneurs. People line up in the morning to buy fresh, hot soymilk directly from the manufacturers.

As for ProSoya's license to Russia, nothing has changed. The company that ProSoya licensed to make SoyaCows in Russia has never paid ProSoya the royalties that it agreed in the licensing agreement to pay. So Raj has accepted that situation as it is. "It is not worth it to chase people in countries like that. Our company works on the honor system. But we did profit a lot from Russia because they bought some of our very large machines. As a result we gained some credibility in Russia, which resulted in more sales." ProSoya continued to sell SoyaCows in both Russia and Eastern Europe.

"It is very difficult to make predictions. SoNice was launched in the United States at about the same time as Silk. It as selling much better than Silk at one point. But the company that was making SoNice at that point [Pacific ProSoya Foods] ran into financial difficulties, because they were expanding too rapidly, so Silk pulled way ahead.

Raj has known Ratan Sharma, PhD, for a long time and they still keep in touch on a regular basis, but Ratan has not received any money from ProSoya Inc. in Canada for many years. Years ago, ProSoya used to pay Child Haven royalties, and that money was used to pay Ratan's salary. Ratan has done a lot of good work, and he continues to devote a lot of time to it–even though he doesn't make a lot of money from it. He also works as a consultant for the American Soybean Association (ASA-IM) and that is probably his main source of income. He also gets paid by ASA to nurture these SoyaCows and to write brochures and give presentations. Address: President and CEO, ProSoya Inc., 2-5350 Canotek Road, Ottawa, ONT, K1J 9N5, Canada. Phone: 613-745-9115.

1864. Park, Min Kyung; Cho, I.H.; Lee, S.; Choi, H.K.; Kwon, D.-Y.; Kim, Y.-S. 2010. Metabolite profiling of *Cheonggukjang,* a fermented soybean paste, during fermentation by gas chromatography-mass spectrometry and principal component analysis. *Food Chemistry* 122(4):1313-19. Oct. 15. [23 ref]

• ***Summary:*** "Metabolite profiling by applying principal component analysis (PCA) to a GC-MS data set was performed to assess changes in a select number of pre-defined metabolites during the fermentation of Cheonggukjang. A total of 20 amino acids, 12 organic acids, and nine fatty acids were found as targeted metabolites in Cheonggukjang. As fermentation proceeded, the levels of most amino acids decreased during the early stage of fermentation, but increased in the later part of fermentation.

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On the other hand, amounts of fatty acids increased throughout the fermentation process, while those of most organic acids, except for tartaric acid [TA], decreased. A PCA score plot illustrated good separation of the Cheonggukjang samples according to fermentation period by combining principal component 1 (PC 1) (36.8%) with PC 2 (30.3%). Tryptophan, citric acid, beta-alanine, itaconic acid, 2-hydroxyglutaric acid, gamma-aminobutyric acid, leucine, malic acid, and tartaric acid were the major components that differentiated the various samples."

Note: Why is Korean natto described as "a fermented soybean paste"? Address: 1-2. Dep. of Food Science and Technology, Ewha Womans Univ., Seoul 120-750, Republic of Korea.

1865. Lee, J.H.; Kim, T.W.; Lee, H.; Chang, H.C.; Kim, H.Y. 2010. Determination of microbial diversity in meju, fermented cooked soya beans, using nested PCR-denaturing gradient gel electrophoresis. *Letters in Applied Microbiology* 51(4):388-94. Oct. [25 ref]

• ***Summary:*** "Significance and Impact of the Study: This is the first report showing the differences and similarities in the populations of micro-organisms in meju samples using nested PCR-DGGE, a culture-independent method. The results may be applicable to the development of improved meju, in which the indigenous micro-organisms required for fermentation can be standardized." Address: 1-3. Inst. of Life Sciences & Resources and Graduate School of Biotechnology, Kyung Hee Univ., Yongin, Korea.

1866. *SoyaScan Notes.* 2010. Did the Chinese or Japanese or Koreans traditionally feed soymilk to infants or to recently-weaned children? No! (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** A personal view by William Shurtleff:

I have lived in Japan with a Japanese family for 6½ years, spoke fluent Japanese, traveled all over China, and read huge amounts of literature about soy in China and Japan.

I would say that the Japanese and Chinese do NOT feed soymilk to infants or even to weaned infants. Rather they DO feed tofu as one of the earliest weaning foods. They mash it with rice gruel, so both are very soft. Remember that traditional Asian soymilk causes infants intestinal gas which tofu generally does not, or at least much, much less.

Of course it depends partly on what age you mean by "infants." At what age does an infant cease to be an infant? Wikipedia says of "infant": "It is typically applied to children between the ages of 1 month and 12 months; however, definitions vary between birth and 3 years of age."

However, I have seen one article which states: "Soy-based infant formula has been used for centuries in Korea." (Source: Lee et al. 2003. Korean J. of Nutrition. 36(8):841-50. Oct.) I assume this infant formula was started after the baby was weaned from breast milk.

Except for this one Korean document, I have never seen or heard of soymilk used as an infant food or a weaning food, except in a few early French-language articles such as: Labbé 1911, and Beltzer 1911–and maybe a few other articles.

The statements in these two articles that soymilk is fed to infants are rare exceptions. I imagine that Beltzer learned it from Labbé and that Labbe did not know much about the subject.

Read the writings of Dr. Harry Miller (M.D., on our website, www. soyinfocenter.com) who established the first soy dairy in China in 1936, who lived in China as a missionary in China for many decades, and who introduced soymilk for infants (Soyalac) to the United States. He wrote a great deal and a biography has been written about him, yet I do not recall that he ever said that Chinese feed soymilk to infants. Address: Soyinfo Center.

1867. Kim, Moon Young; Lee, Sunghoon; Van, Kyujung; et al. 2010. Whole-genome sequencing and intensive analysis of the undomesticated soybean (*Glycine soja* Sieb. and Zucc.) genome. *Proceedings of the National Academy of Sciences, USA* 107(51):22032-37. Dec. 21. [44 ref]

• ***Summary:*** The genome of the soybean (*Glycine max*) has recently been sequenced; it is one of six crop species that have been sequenced. This paper reports the genome sequence of *Glycine soja,* the undomesticated [wild] ancestor of *G. max* (in particular *G. soja* var. IT182932).

"The 48.8-Gb lllumina Genome Analyzer (lllumina-GA) short DNA reads were aligned to the *G. max* reference genome and a consensus was determined for *G. soja.* This consensus sequence spanned 915.4 Mb, representing a coverage of 97.65% of the *G. max* published genome sequence and an average mapping depth of 43-fold. The nucleotide sequence of the *G. soja* genome, which contains 2.5 Mb of substituted bases and 406 kb of small insertions / deletions relative to *G. max,* is approx. 0.31% different from that of *G. max."*

"Data presented in this study suggest that the *G. soja/G. max* complex may be at least 0.27 million y old, appearing before the relatively recent event of domestication (6,000-9,000 y ago). This suggests that soybean domestication is complicated and that more in-depth study of population genetics is needed. In any case, genome comparison of domesticated and undomesticated forms of soybean can facilitate its improvement." Address: 1. Dep. of Plant Science and Research Institute for Agriculture and Life Sciences, Seoul National Univ., Seoul 151-921, Korea.

1868. Hwang, Jong-Hyun. 2010. [The fermentative characteristics of Cheonggukjang prepared by starter culture of *Bacillus* spp. with fibrinolytic activity]. *J. of the Korean Society of Food Science and Nutrition* 39(12):1832-38. Dec.

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[26 ref. Kor; eng]
• ***Summary:*** "The objective of this study was to improve the flavor of Cheonggukjang prepared by the culture optimization of starter with the fibrinolytic activity. After 25 strains isolated from the commercial Cheonggukjang and Doenjang in different regions were compared, 7 Bacillus strains with proteolytic and slime-producing activities were selected... Therefore, Cheonggukjang fermented with CJJN-4 starter at 40ºC had the improved flavor, such as change of amino or ammonia type nitrogen production, and higher fibrinolytic activity." Address: Dep. of Food Science and Technology, Chungju National Univ., Chungbuk 368-701, Korea.

1869. Jung, Won-Ko; Choi, I.W.; Hong, G.E.; Pyun, C.W.; Park, K.; Park, P.J.; Seo, S.K.; Choi, Y.H.; Lee, C.H. 2010. Effects of isoflavone aglycone-rich fermented soybean paste extracts on osteoblastic differentiation of MG-63 cells (Open Access). *J. of the Korean Society for Applied Biological Chemistry* 53(6):803-09. Dec. [23 ref. Eng]
• ***Summary:*** "Fermented soybean extracts containing large amount of isoflavone aglycones were prepared from Korean traditional fermented soybean paste (KFSP) to examine beneficial effect of isoflavone aglycones-rich KFSP on bone formation activities of osteoblastic cells. To determine positive effects of KFSP on osteoblastic differentiation, alkaline phosphatase activity was measured as phenotypic marker for early stage in osteoblastic differentiation and osteocalcin (OC), and type I collagens were measured as terminal stage markers of differentiation in MG-63 cells. Stimulatory effects of KFSP on bone morphogenic protein-2 (BMP-2), important inducer of differentiated factors for bone formation, remodeling, and mineralization, was examined. Soybean paste fermentation produced higher amount of isoflavone aglycones. KFSP more effectively stimulated production of BMP-2 and increase levels of alkaline phosphatase, OC, type I collagen, and bone mineralization during osteoblastic MG-63 cell differentiation than non-fermented soybean paste extracts."

Note: The name of this journal is confusing; it seems to have two names. One is given above. The other is simply *Applied Biological Chemistry*, published by Springer. Address: 1. Dep. of Marine Life Science, and Marine Life Science Research Center, Chosun Univ., Gwangju 501-759, Republic of Korea.

1870. Choi, Goo-Hee; Kim, K.C.; Lee, K.H. 2010. [Quality and antioxidant characteristics of soft tofu supplemented with red ginseng extract during storage]. *J. of the Korean Society of Food Science and Nutrition* 39(3):414-420. [19 ref. Kor; eng]
• ***Summary:*** "Although the soft tofu manufactured with red ginseng extract showed a lower sensory preference in supplementation over 0.20% due to color, there was not much difference found until 0.18% red ginseng extract addition." Address: 1. Div. of Food and Biotechnology, Chungju National Univ., Chungbuk 368-701, Korea.

1871. Lee, S.O. 2010. A study on the hazard analysis and HACCP system for Chongkookjang manufacturing. M.Sc. thesis. Hoseo University, Asan, South Korea. *
Address: Asan, South Korea.

1872. Lim, Seong-Il; Song, Sun-Mi. 2010. [Changes in characteristics of low-salted kochujang with licorice (*Glycyrrhiza glabra*), mustard (*Brassica juncea*), and chitosan during fermentation]. *J. of the Korean Society of Food Science and Nutrition* 39(4):560-66. [28 ref. Kor; eng]
• ***Summary:*** "Changes in characteristics of low-salted Kochujang added with mixed additives (licorice 0.8%, mustard 0.7%, chitosan 2%) were investigated during fermentation for 40 days. There was no significant difference in viable and yeast cell counts and color among all treatments, whereas lactic acid bacteria counts of 6.8% and 5.9% salted Kochujang added with the mixed additives ($p<0.05$) were significantly lower than that of control... In sensory evaluation, 5.9% salted Kochujang with the additives had the highest score in overall palatability. These results indicate that salt contents of Kochujang could be lowered up to 5.9% by addition of the mixture of licorice, mustard and chitosan, resulting in improvement of palatability and shortening of fermentation time." Address: 1. Traditional Food Research Group, Korea Food Research Inst., Gyeonggi 463-746, Korea.

1873. Yang, K.; Jeong, N.; Moon, J.K.; Lee, Y.H.; Lee, S.H.; Kim, H.M.; Hwang, C.H.; Back, K.; Palmer, R.G.; Jeong, S.C. 2010. Genetic analysis of genes controlling natural variation of seed coat and flower colors in soybean. *J. of Heredity* 101(2010):757-68. *

1874. Baum, Richard. 2010. The fall and rise of China. Chantilly, Virginia: The Great Courses. 24 CDs; 48 lectures [75* ref]
• ***Summary:*** A superb course on the history of China from about 1700 to 1989, accompanied by a course guidebook, with a biography of the teacher, lecture guides, timeline (600 BCE to 1989), glossary, biographical notes on key Chinese figures, and bibliography.

The detailed timeline / chronology of China, especially since about 1700, is the best we have seen. Here is a sample of a few pages from the middle of that timeline:

1949 Oct.–Mao Zedong announces birth of People's Republic of China (PRC).

1949 Dec.–Chiang K'ai-shek retreats to Taiwan.

1950 Feb.–Mao Zedong signs treaty of friendship and alliance with Joseph Stalin.

1950-1952–Land reform conducted in rural China.

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1950-1953–Korean War brings China and U.S. into military conflict.

1951-1952–Suppress Counterrevolutionaries and Three Anti campaigns launched.

1953 March–Joseph Stalin dies; Nikita Khrushchev eventually succeeds him.

1953 July–Cease-fire in Korea.

1953-1957–PRC launches 5-year economic plan with Soviet advice and money.

1956–China completes economic transition to socialism; Nikita Khrushchev denounces Joseph Stalin; popular unrest erupts in Hungary and Poland.

1956-1957–Mao Zedong introduces Hundred Flowers campaign.

1957 May–Stung by criticism, Mao Zedong halts Hundred Flowers campaign, punishes intellectuals.

1958 spring–Great Leap Forward begins.

1959 Aug.–Mao Zedong lashes out at critics of the Great Leap Forward.

1959-1961–Three Hard Years bring widespread famine.

1959-1962–Mao Zedong denounces Soviet "revisionism."

1961-1962–Liu Shaoqi and Deng Xiaoping reverse Mao Zedong's radical policies.

1962 Sept.–Mao Zedong launches Socialist Education movement.

1964-1965–Lin Biao initiates Mao Study in People's Liberation Army and schools.

"1965 Nov.–Leftists criticize revisionist literary works.

"1966 Aug.–Mao Zedong unleashes Red Guards.

"1966-1967... Cultural Revolution spawns political violence.

"1967 spring–Liu Shaoqi denounced as "China's Khrushchev."

"1968 Aug.–Soviet troops invade Czechoslovakia.

"1969 March–Fighting erupts on Sino-Soviet border.

"1969 summer–USSR threatens attack on Chinese nuclear facilities.

"1969-1970–Richard Nixon and Mao Zedong begin to consider U.S.-China détente.

"1971 April–Zhou Enlai invites U.S. ping-pong team to Beijing.

"1971 July–Henry Kissinger makes secret trip to Beijing.

"1971 Sept.–Lin Biao dies in suspicious plane crash.

"1972 Feb.–Richard Nixon flies to China, signs Shanghai communique.

"1973-1976–Succession struggle heats up as Mao Zedong's health fades.

"1974 Aug.–Richard Nixon resigns in wake of Watergate scandal.

"1975 April–Chiang K'ai-shek dies, is succeeded by Chiang Ching-kuo.

"1976 Jan.–Zhou Enlai dies, is succeeded by Hua Guofeng.

"1976 April–Deng Xiaoping purged for inciting "counterrevolutionary incident."

1976 Sept.–Mao Zedong dies after naming Hua Guofeng his successor.

"1976 Oct.–Mao Zedong's widow, Jiang Qing, and three associates arrested for treason.

"1977 July to 1978 Nov.–Deng Xiaoping mounts political comeback.

"1987 Nov.–Deng Xiaoping supports free speech at Democracy Wall.

Prof. Baum tells the history of China as a narrative–a story. Address: Distinguished Prof. of Political Science, UCLA, Los Angeles, California.

1875. Kupfer, Helmut Karl Peter. 2010. Wine in Chinese culture: historical, literary, social and global. Berlin: LIT Verlag. iii + 303 p. See p. 43. 24 cm. *

• ***Summary:*** An outstanding work. Contains many chapters by various authors in four parts: I. Aspects of wine archaeology, ancient viticulture and fermentation. II. History of wine culture in China and Central Asia. III. Wine in Chinese literature. IV. Wine in Chinese society.

Page 43: During the late Han dynasty, "the technology for making *li* from *nie* (as sprouted rice) was transmitted to Japan through Korea, where *nie* was known as *getsu* (1 Chinese character given) and *li* as *rai* (1 Cc). Getsu was also displaced in Japan in the medieval period, when the Japanese learned how to prepare rice koji and to use it to make saké (1 cc) wine."

Page 84: "Most fermented Chinese foods are made using *qu*. The Japanese transcription *koji* has come to be generally used in non-Chinese speaking countries."

Koji is also mentioned on pages 80 and 81.

1876. Nagai, Toushirou; Tamang, Jyoti Prakash. 2010. Fermented legumes: Soybean and non-soybean products. In: Jyoti P. Tamang and K. Kailasapathy, eds. 2010. Fermented Foods and Beverages of the World. Boca Raton, Florida: CRC Press / Taylor & Francis. xii + 448 p. See p. 191-224. [125 ref]

• ***Summary:*** An ethnic fermented food is one used by a certain ethnic group. Contents: Introduction. Fermented soybean foods: Bacilli-fermented, sticky and nonsalty soybean foods (natto, kinema, thua nao, chungkokjang, hawaijar, tungrymbai, aakhone, bekang, peruyaan, pepok, sieng), mold-fermented soybean foods (tempe, douchi, sufu, doenjang, miso, shoyu / soy sauce, tauco).

Fermented non-soybean legume foods: Dawadawa (preparation and culinary, microbiology), ugba (preparation and culinary, microbiology), maseura (preparation and culinary, microbiology), wari (preparation and culinary, microbiology), oncom (preparation and culinary, microbiology), dhokla and khaman (preparation and culinary,

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microbiology). Conclusion.

Among the Bacilli-fermented, sticky and nonsalty soybean foods, natto, for example, has the following contents (p. 194-96): Introduction, history, preparation and culinary, socioeconomy, microbiology and food safety, biochemistry, nutritional composition, and functional properties. Kinema and thua-nao similarly subdivided, however some lesser-known soyfoods and some non-soy foods are described in less detail.

The Introduction (p. 192-93) discusses Dr. Tamang's revised "KNT triangle" theory, with two maps. "Within the proposed triangle-bound countries, many fermented sticky nonsalty soybean foods are consumed by the different ethnic groups of people in Cambodia, Laos, Vietnam, Darjeeling hills and Northeast states of India, eastern part of Nepal, southern part of Bhutan, Myanmar, and southern parts of China (Figure 6.2). Beyond this hypothetical 'KNT triangle' there is no report of kinema-like products that are sticky and ammonia-flavored fermented soybean foods, and the proposed 'KNT triangle' does not include salted, nonsticky and non-bacilli fermented soybean products such as *tempe, miso, sufu, soy sauce,* etc. (Tamang 2010)."

Fermented soyfoods can be classified in various ways: (1) Those fermented by bacteria (primarily *Bacillus subtilis*), such as natto, thua nao, kinema, etc. (all have a characteristic stickiness), and those fermented by molds, such as soy sauce, miso, tempeh, etc. (2) Nonsalted (those to which no salt has been added, such as natto, kinema, tempeh), and salted (such as soy sauce, miso, douchi, etc.) (p. 194). Pepok (p. 207) is an ethnic fermented soyfood from northern Myanmar (formerly Burma). To make pepok: Soak soybeans in water overnight, drain, and bring to a boil. Then wrap in leaves and allow to ferment for 2-4 days. Mash the fermented beans with salt and hot chili pepper, roll out into disks, and dry in the sun. Use as a seasoning or consume after roasting.

Sieng (p. 207) is a traditional fermented soyfood from Cambodia. To make sieng: Soak soybeans in water overnight, drain, and bring to a boil. Spread in shallow bamboo baskets and allow to ferment naturally for 2 days by bacteria adhering to the baskets or suspended in the air. Then immediately transfer the fermented soybeans to salt water and soak for 5-7 days; occasionally tree sap or enzymes are added to the salt water. Use with salt and spices as a seasoning.

Tables: (1) Nutritional composition of boiled soybeans (as a control), natto, and tempe [incl. vitamins, minerals, and fatty acids]. (2) Nutritional composition of kinema and raw soybeans.

Figures (photos unless described otherwise): (1) Map of the natto triangle (based on Nakano 1972). (2) Stylized map of the KNT (kinema–natto–thua nao) triangle. (3) Chopsticks lifting up natto from a polystyrene paper package. *Bacillus subtilis* (natto) produces a polyglutamate, a viscous material, which is called *ito*, meaning "string," in Japanese. (4) Natto in a classical package made of rice straw. (5) A bowl of kinema–freshly fermented. (6) Kinema curry in a bowl and on a plate. (7) Thua nao in a plastic bag, with the label in Thai. (8a) The front of a package of chungkokjang, labeled in Korean, with a photo on the label of the product in a thick spicy stew (*chigae*). (8b-c) Top view and side view of a mound of chungkokjang. (9a) The front of a package of Rusto's Tempeh. (9b-c) Top view and side view of a cake of tempe. The spaces between soybean cotyledons are packed tightly with white mycelia of *Rhizopus oligosporus*. Address: 1. Genebank, National Inst. of Agrobiological Sciences, Tsukuba, Japan; 2. Food Microbiology Lab., Sikkim Government College, Sikkim Univ., Gangtok, Sikkim, India.

1877. Richmond, Simon. 2010. Lonely Planet Korea. 8th ed. Footscray, Victoria, Australia; Oakland, California: Lonely Planet. 440 p. See p. 188. Illust. (some color). Maps (some color). Index. 20 cm.

• ***Summary:*** This is a guidebook to Korea. including North Korea. 110 maps. Korean characters are given for the names of most places and foods–which we find very helpful. "In the year 2000 the Korean government adopted a new method of romaising the Korean language. Most of the old romanisation system was retained. The new system is used throughout this book (p. 411)

*Ganjang* (soy sauce) is mentioned on pages 68, 69, 70, 75, 178 and 188.

Page 188: In Gangwon-do, "Gangneung's prized specialty is *sundubu* (3 Kc = Korean characters given), soft or uncurdled tofu [soymilk curds] made with sea water in Chodang, the 'tofu village.' At its plainest, *sundubu* is served warm in a bowl, with *ganjang* (soy sauce) on the side. It can also be prepared in *jjigae* (5 Kc; stew) or *jeongol* (5 Kc; casserole)."

In Chodang, there are about 20 restaurants, one of the best-known of which is Chodang Halmeoni.

*Sundubu* (soymilk curds or soft uncurdled tofu) is mentioned on pages 72, 78, 186, 188 and 189.

*Doenjang* (fermented soybean paste) is mentioned on pages 56, 68, 70, 78, 134, 188, 246, 257 (spelled *twenjang*) and 346.

*Doenjang jjigae* (soybean paste stew) is mentioned on pages 78, 134, 188, and 246.

Tofu (*dubu*) is mentioned on pages 70-74, 78, 127, 134, 136, 179, 188, 294, and 388.

Soft tofu is mentioned on pages 204, 257, 299.

1878. Tamang, Jyoti Prakash. 2010. Himalayan fermented foods: Microbiology, nutrition, and ethnic values. Boca Raton, Florida: CRC Press. xix + 295 p. See p. 65-78. 230-31, 233. Illust. 25 cm. [584 ref]

• ***Summary:*** This is a very interesting, original, well researched and well written book. It is also the best source of detailed, well documented information on kinema and its

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close relatives seen to date.

The word Sanskrit word Himalayas means literally "abode of the snows." This region is the home of over 65 million people. Those in the eastern Himalayas are of Mongolian ethnicity and ancestry.

Chapter 3, titled "Fermented legumes," includes a section titled "3.1 Important fermented soybean foods" which states (p. 65): "Some of the common ethnic nonsalted sticky fermented soybean foods of the eastern Himalayas are *kinema* (Nepal, Darjeeling hills, Sikkim, and South Bhutan), *hawaijar* (Manipur), *tungrymbai* (Meghalaya; food of the Khasi and Garo peoples), *bekang* (Mizoram; food of the Mizo people), *aakhone* (also called *axone*, Nagaland; food of the Sema Naga), and *peruyyan* (Arunachal Pradesh). Manipur, Meghalaya, Mizoram, Nagaland, and Arunachal Pradesh are small states in northeastern India.

All of these foods are similar to *kinema.*

Note: As a guide to the Seven Sister states of North East India, we are including a color map of the area created for Soyinfo Center.

For all these six foods is given: The name of the food, a close-up photo of the food, indigenous knowledge of preparation, a flow chart showing the indigenous method of making the food, culinary practices (how the food is prepared / cooked and eaten), economy (its role in the local economy), microorganisms (dominant and secondary).

Section 3.3 is "Microbiology" (of fermented legumes): Kinema (microorganisms, source of inoculation in kinema production optimization of fermentation period, in situ fermentation of kinema, selection of starter culture, monoculture fermentation of kinema, development of pulverized starter for kinema production, phylogenetic similarity of *Bacillus* strains from Asian fermented soybeans), other fermented soybean foods of north east India.

Section 3.4 is "Nutritive value" (table 3.1 compares the nutritional composition of raw soybean and kinema). And section 3.5 is "Conclusion."

The long and very interesting section (9.1.1) on the "Antiquity of kinema" (p. 230-34) states that it is a food of the Kirat ethnic group (to which the Limboo belong) of eastern Nepal. The origin of the word "kinema" can be traced back to the word *kinaba* of the Limboo language (*ki* = fermented; *namba* = flavor). It is not clear whether *kinema* appeared first, then was disseminated and diversified, or vice versa. The Limboo believe that their discovery and domestication of the soybean (which they named *chembi*) is mentioned in one of their oral myths known as *mundhuns.* This myth, which is described here in detail, might have been written between 2500 and 100 BC (p. 231).

Kinema is made by fermenting whole soybeans, without inoculation, with strains of *Bacillus subtilis* bacteria. It is alkaline in nature / pH, has a sticky, stringy texture and a strong flavor.

Natto [salty natto, not itohiki natto] is believed to have been introduced to Japan from China during the Nara period around 710-714 AD (Ito et al. 1996; Kiuchi 2001). Kinema might have originated in east Nepal around 600 B.C. to 100 A.D. during the Kirat dynasty.

Products closely resembling kinema are popular foods in many non-Brahmin communities in the eastern Himalayas. "The Lepcha [the aboriginal inhabitants of today's Sikkim] call it *satlyangser;* the Tibetans and Bhutia [of Bhutan and Sikkim] call it *bari;* the Khasi [of Meghalaya] call it *tungrymbai;* the Meitei [of Manipur] call it *hawaijar;* the Mizo [of Mizoram] call it *bekang;* the Sema Naga [of Nagaland] call it *aakhone;* and the Apatani [of Arunachal Pradesh] call it *peruyyan."*

Soybean products closely resembling kinema outside of the Himalaya region are *natto* of Japan, *chungkokjang* of Korea, and *thua-nao* of Thailand [From Google Books Preview].

Dr. Sasuke Nakao (1972) coined the term "natto triangle," but Dr. Tamang proposes that the hypothetical triangle be renamed "Kinema–Natto–Thua-nao triangle" (or KNT triangle).

Note: Four facts support Dr. Tamang's elegant new triangle:

(1) Indonesia and its mold-fermented tempeh should not have been part of the original natto triangle.

(2) Nakano (1972) guessed that natto might have come to Japan from Java during the Muromachi period, however extensive research on natto and tempeh after 1972 offers no support to his guess.

(3) Many new relatives of natto have been discovered since 1988, many of them by Dr. Tamang and co-workers. All of these (except the relatives of dawadawa made from soybeans found in West Africa) fall within the KNT triangle.

(4) No mold-fermented soyfoods–such as tempeh, miso, soy sauce, jiang, or fermented tofu–fall within the new KNT triangle.

An illustration / map (Fig. 9.1) shows this improved triangle with Japan (natto), Nepal-India-Bhutan (kinema), and Thailand (thua nao) at its three vertices / corners; it also includes chungkokjang (Korea), pepok (Myanmar), sieng (Thailand), and [incorrectly, mold-fermented] *douche* [*douchi*] from south China. These mildly alkaline, sticky fermented foods are popular among the peoples of Mongolian origin. This may be due to their typical flavor called *umami* (Kawamura and Kara 1987). This flavor is developed during the hydrolysis of soy protein (by protease enzymes) into amino acids during fermentation. Have people of Mongolian origin evolved or developed particular senses which incline them to enjoy the umami flavor? In the eastern Himalayas green vegetable soybeans are also boiled and eaten.

Section 10.3, "Commercialization through ethnic food tourism," suggests that just as tourists visit the vineyards of

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France, tempeh shops in Indonesia, and artisans or factories that make shoyu or sake in Japan, there are potential tourist sites for experiencing how traditional foods are made in the Himalayan villages. For kinema, try visiting Aho village in Sikkim.

About the author (p. xix): A good biography and portrait photo are given. In the "Acknowledgments" (p. xvii) he writes: "I am thankful to my wife Dr. Namrata Thapa for constant support and technical assistance in the preparation of this book. Over the past 16 years the team of brilliant Ph.D. students that I have recruited from the Food Microbiology Laboratory, Sikkim Government College, Gangtok, has been the real driving force in researching and identifying the scientific mechanisms of ethnic Himalayan fermented foods." He then lists their names. Address: Food Microbiology Lab., Sikkim Government College, Gangtok, Sikkim 737 102, India.

1879. Tamang, Jyoti Prakash; Samuel, Delwen. 2010. Dietary cultures and antiquity of fermented foods and beverages. In: Jyoti P. Tamang and K. Kailasapathy, eds. 2010. Fermented Foods and Beverages of the World. Boca Raton, Florida: CRC Press / Taylor & Francis. xii + 448 p. See p. 1-40. [188 ref]

• ***Summary:*** Contents: Cultural foods: Hindu foods, Buddhist foods, Christian foods, Muslim foods. World dietary culture: Use of hands, use of chopsticks, use of cutlery, evolution of dietary culture. Antiquity and cultural aspects: Fermented vegetables, fermented soybeans and non-soybean legumes, fermented cereals, fermented milks, fermented fish, fermented meats, fermented beverages and alcoholic drinks. Conclusion.

Section 1.3.2 titled "Fermented soybeans and non-soybean legumes," begins with a concise and well documented paragraph on the origin of the domesticated soybean in the eastern half of north China around the 11th century BC around the end of the Shang dynasty (ca. 1700 to 1100 BC), then its dissemination / spread from this primary soybean gene pool to central and south China, and the Korean peninsula. The soybean then spread to Japan, and throughout Southeast Asia and into northern India during the following centuries.

The next paragraph discusses the two earliest Chinese fermented soyfoods: *chi* (*shi*) [fermented black soybeans] and *jiang* (*chiang*) [Chinese-style miso]. *Chi*, now known as *douchi* was "next to salt use in China."

Note: Actually, salt was rarely used directly to season food in China; in the early days jiang, and later soy sauce had that honor. Yet salt was a major ingredient in both jiang and soy sauce.

Recipes for making 3 different types of *chi* and 14 different types of *jiang* are given in the *Qimin Yaoshu* (6th century B.C.). Soy sauce is presently an essential seasoning in Chinese cooking, "but it was not an ancient and deliberate preparation. It developed as a by-product of some jiang relishes and did not become of culinary importance until the Song dynasty (960-1279) (Sabban 1988)."

There follows a discussion of the early development of fermented soyfoods in Japan, including the Taiho Laws (AD 701) and the *Engishiki* (AD 906). Salted fermented black soybeans, which originated in China, took root in central Japan, where they were known by various names such as *hama-natto* and *daitokuji-natto;* in Taiwan they were known as *in-shi* (Yokotsuka 1991).

The subsequent few paragraphs contain three statements which we believe are incorrect and are not found in the sources cited: (1) "*Natto,* a fermented sticky soybean, was introduced to Japan from China by Buddhist priests during the Nara period around AD 710-794 (Ito et al. 1996, Kiuchi 2001 [p. 9]). Note: This statement is based on a misinterpretation of the documents cited and on the confusion resulting from the fact that the Japanese word "natto" can be used to refer to two very different foods, natto and fermented black soybeans. Both documents are referring to the introduction to Japan (by a Buddhist priest) of salted, fermented black soybeans (*douchi*) and not of *itohiki* natto. For example, Kiuchi (2001, p. 9, written in English) states: "The two main varieties of *natto* [in Japanese] are *itohiki-natto* and *shiokara-natto,* which [referring only to the latter] was introduced to Japan from China during the Nara period (790-794) by a Buddhist priest."

(2) "The production of shoyu and miso in China was recorded around 1000 BC, with the transfer of the indigenous knowledge to Japan happening at around AD 600 (Yokotsuka 1985). Yokotsuka is perhaps the world's leading authority on this subject. However nowhere in this excellent chapter by Yokotsuka can we find anything that would justify the surprising statement (especially the date 1000 B.C. for shoyu) above.

(3) "Tempe made in present day Indonesia was originally introduced by ethnic Chinese centuries ago." No source is cited. Address: 1. Food Microbiology Lab., Sikkim Government College, Sikkim Univ., Gangtok, Sikkim, India; 2. Div. of Nutritional Sciences, Kings College London, London, United Kingdom.

1880. Tamang, Jyoti Prakash. 2010. Diversity of fermented foods. In: Jyoti P. Tamang and K. Kailasapathy, eds. 2010. Fermented Foods and Beverages of the World. Boca Raton, Florida: CRC Press / Taylor & Francis. xii + 448 p. See p. 41-40. [228 ref]

• ***Summary:*** In the section titled "Types of fermented foods" (p. 46-67) is a subsection on "Fermented soybeans and non-soybean legumes." About 90% of fermented legumes are soybean-based foods while the rest are non-soy. Fermented soyfoods have long been made in Asia, especially by Chinese, Nepalis, Japanese, Thais, Koreans, Indonesians, and many minor ethnic groups. Consumption of ethnic fermented

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soyfoods "is not part of the traditional food culture of non-Mongoloid races."

Table 2.2, "Some fermented legume products of the world," has six columns: (1) Name of fermented food (alphabetical). (2) Substrate (e.g., soybean, Locust bean). (3) Sensory property and nature (e.g., alkaline, sticky, paste). (4) Culinary (e.g., side dish, condiment). (5) Microorganisms. (6) Country. Those having soybean as a substrate are aakhone, bekang, chee-fan, chiang [jiang], chungkokjang, douchi, doenjang, furu, hawaijar, kecap, ketjap, kinema, meitauza, meju, miso, natto, pepok, peruyaan, sieng, shoyu, soy sauce, sufu, tauco, tempe, thua nao, tofu si? [China, Japan], and tungrymbai. Address: Food Microbiology Lab., Sikkim Government College, Sikkim Univ., Gangtok, Sikkim, India.

1881. Kim, Hyun-Wook; Choi, J.H.; Choi, Y.S.; Han, D.J.; Kim, H.Y.; Lee, M.A.; et al. 2011. Effects of soybean sauce and pre-rigor muscle on physicochemical properties of frozen Hanwoo patties. *Korean J. for Food Science of Animal Resources* (*Hangug Chugsan Sigpum Haghoeji*) 31(1):19-26. Feb. 10.5851/kosfa.2011.31.1.019 [37 ref. Kor]
• ***Summary:*** Hanwoo patties are Hanwoo beef patties. Address: Dep. of Food Science and Biotechnology of Animal Resources, Konkuk Univ., Seoul 143-701, Korea.

1882. Kwon, Dae Young; Hong, Sang Mee; Ahn, Il Sung. 2011. Isoflavonoids and peptides from meju, long-term fermented soybeans, increase insulin sensitivity and exert insulinotropic effects in vitro. *Nutrition* (*Burbank, California*) 27(2):244-52. Feb.
• ***Summary:*** "Objective: Although soybeans have been shown to alleviate metabolic syndromes, fermented soybeans may have even greater effects. We investigated the antidiabetic effects of meju, a soy food that is fermented up to 2 mo, and the mechanism by which it exerts its effects."

"Conclusion: The compositional changes in isoflavonoids and peptides that occurred during a longer fermentation period, without the use of salt, enhanced the antidiabetic effect of soybeans." Address: 1. Food Functional Research Division, Korean Food Research Institutes, Sungnam-Si, Korea.

1883. *SoyaScan Notes.* 2011. Updated USDA database on the isoflavone levels in foods, commercial ingredients, soybeans and soyfoods (Overview). April 23. Compiled by William Shurtleff of Soyinfo Center. [1 ref]
• ***Summary:*** The link is now http://www.ars.usda.gov/SP2UserFiles/ Place/12354500/ Data/isoflav/ Isoflav_R2.pdf. "Legumes and legume products" starts on p. 16. Start by going to page 24, which is where the soy section begins. Then you can do a PDF search for fermented soyfoods such as: Tempeh, miso, soy sauce, natto, or Sufu (fermented tofu)–and you will see that they are NOT lower in total (or specific isoflavones) than nonfermented soyfoods such as: Tofu, soymilk, soybeans (immature), soybeans (mature), etc.

1884. Bladholm, Linda. 2011. Korean soul food at Yuki Hana: fork on the road. *Miami Herald* (*The*) (*Florida*). June 9. p. 43.
• ***Summary:*** "The food of South Korea is a balance of cot, cold, spicy, sweet and mild. The chile pepper arrived via trade with China and Japan in the 16th century and Koreans have embraced it ever since. Many dishes here start with gochujang, fermented chile pepper paste, but none are overly hot. Others are seasoned with dwenjang, a misolike soybean paste."

1885. Kau, Andrew L.; Ahern, P.P.; Griffin, N.W.; Goodman, A.L.; Gordon, J.I. 2011. Human nutrition, the gut microbiome and the immune system. *Nature* 474(7351):327-36. June 15. [100* ref]
• ***Summary:*** Our gut health and our immune system are greatly influenced by the foods we eat, especially fermented foods.

Abstract: Dramatic changes in socio-economic status, cultural traditions, population growth and agriculture are affecting diets worldwide. Understanding how our diet and nutritional status influence the composition and dynamic operations of our gut microbial communities, and the innate and adaptive arms of our immune system, represents an area of scientific need, opportunity and challenge. The insights gleaned should help to address several pressing global health problems."

"The need: A number of reviews have appeared recently about efforts to decipher the interactions between the innate and adaptive immune system and the tens of trillions of microbes that live in our gastrointestinal tracts (`the gut microbiota'). Here we emphasize how the time is right and the need is great to better understand the interrelationships between diet, nutritional status, the immune system and microbial ecology in humans at different stages of life, living in distinct cultural and socioeconomic settings. Why now? The answer lies in a confluence of forces occurring at the present time that will affect the future.

Ten reasons are given. A schematic shows "envisioned interrelationships between the gut microbiota, the immune system and diet that underlies the development of malnutrition."

"Under-nutrition is associated with a variety of defects in the innate and adaptive immune system that, in turn, are associated with increased predisposition to diarrheal illnesses. Recurrent (enteric) infections predispose to macro- and micronutrient deficiencies, as well as impaired intestinal mucosal barrier function [77]. These factors lead to a cycle of further susceptibility to infection and worsening nutritional status. A confounding problem is that vaccines designed to protect children from certain pathogens

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(including enteropathogens) exhibit poor efficacy in areas of the world where poor nutrition is rampant [74]. A testable hypothesis is that the gut microbiota may contribute to disease risk and pathogenesis through effects on nutrient processing and absorption, and on immune function. These interrelationships are illustrated in the Figure. Diet shapes gut microbial community structure and function while the microbiota adapts in ways that promote nutrient processing; the ability of the microbiota to process a given diet affects the nutrient and energetic value of that diet. The microbiota and immune systems co-evolve: malnutrition affects the innate and adaptive immune system as well as the microbiota. The microbiota serves as a barrier to enteropathogen infection; this barrier function may be disrupted by malnutrition as well as by perturbations in immune system function. The microbiota affects nutrient processing and nutrient distribution to the host, including the expression of host genes involved in nutrient transport and metabolism." Address: Center for Genome Sciences and Systems Biology, Washington University School of Medicine, St. Louis, MO 63108.

1886. Kim, Yi-Seul; Kim, M.C.; Kwon, S.W.; Kim, S.J.; Park, I.C.; Ka, J.O.; Weon, H.Y. 2011. Analyses of bacterial communities in meju, a Korean traditional fermented soybean bricks, by cultivation-based and pyrosequencing methods. *J. of Microbiology* 49(3):340-48. June. [66 ref]
• ***Summary:*** "Despite the importance of meju as a raw material used to make Korean soy sauce (ganjang) and soybean paste (doenjang), little is known about the bacterial diversity of Korean meju. In this study, the bacterial communities in meju were examined using both culture-dependent and independent methods in order to evaluate the diversity of the bacterial population... In conclusion, this study indicated that the bacterial communities in meju were very diverse and a complex microbial consortium containing various microorganisms got [sic, not] involved in meju fermentation than we expected before."

Two types of meju are produced in Korea. Korean homemade meju is the traditional product, and Japanese refined meju is the commercial product. Address: 1. Agricultural Microbiology Team, National Academy of Agricultural Science, Rural Development Administration, Suwon 441-707, Republic of Korea.

1887. Hwang, In Guk; Hwang, Y.; Kim, H.Y.; Lee, J.S.; Jeong, H.S.; Yoo, S.M. 2011. [Quality characteristics of tofu (soybean curd) added with Cheongyang hot pepper (*Capsicum annuum* L.) juice]. *J. of the Korean Society of Food Science and Nutrition* 40(7):999-1005. July. [35 ref. Kor; eng]
• ***Summary:*** "Overall, Caps. pepper juice could be used as an effective ingredient to improve the sensory and antioxidant properties of tofu without affecting the quality properties." Address: 1. Dep. of Agro-food Resources, National Academy of Agricultural Science, Rural Development Administration, Gyeonggi 441-857, Korea.

1888. Morris, Danielle H.; Jones, M.E.; Schoemaker, M.J.; Ashworthy, A.; Swerdlow, A.J. 2011. Secular trends in age at menarche in women in the UK born 1908-93: results from the Breakthrough Generations Study. *Paediatric and Perinatal Epidemiology* 25(4):394-400. July. *
• ***Summary:*** "Menarcheal age decreased over time in Western countries until cohorts born in the mid-20th century. It then stabilised, but limited data are available for recent cohorts. Menarche data were collected retrospectively by questionnaire in 2003-10 from 94,170 women who were participating in the Breakthrough Generations Study, aged 16-98 years, born 1908-93 and resident in the UK. Average menarcheal age declined from women born in 1908-19 (mean=13.5 years) to those born in 1945-49 (mean=12.6 years). It was then stable for several birth cohorts, but resumed its downward trend in recent cohorts (mean=12.3 years in 1990-93 cohort). Trends differed between socio-economic groups, but the recent decline was present in each group. In conclusion, menarcheal age appears to have decreased again in recent cohorts after a period of stabilisation." Address: 1. Section of Epidemiology, Institute of Cancer Research, Sutton, Surrey, UK.

1889. Brown, Lester R. 2011. World on the edge by the numbers–Grain production falling as soil erosion continues. *www.earthpolicy.org*. Aug. 2. www.earth-policy.org/data_highlights/2011/highlights17. [1 ref]
• ***Summary:*** "The thin layer of topsoil that covers much of the earth's land surface is the foundation of civilization. As long as soil erosion on cropland does not exceed new soil formation, all is well. But once it does, it leads to falling soil fertility and eventually to land abandonment. As countries lose their topsoil through overgrazing, overplowing, or deforestation, they eventually lose the capacity to feed themselves. Among those facing this problem are Lesotho, Haiti, Mongolia, and North Korea.

"Lesotho, one of Africa's smallest countries with only 2 million people, is paying a heavy price for its soil losses. A U.N. team visiting in 2002 found that crop production there "is declining and could cease altogether over large tracts of country if steps are not taken to reverse soil erosion, degradation, and the decline in soil fertility." During the last 10 years, Lesotho's grain harvest dropped by half as its soil fertility fell. Its collapsing agriculture has left the country heavily dependent on food imports."

Graphs show grain production in each of these four countries from 1961 to 2010. All show a downward trend in recent years. Address: President, Earth Policy Inst., 1350 Connecticut Ave., N.W., Suite 403, Washington, DC 20036. Phone: 202-496-9290.

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1890. Kumar, Vineet; Rani, A.; Goyal, L.; Pratap, D.; Billore, S.D.; Chauhan, G.S. 2011. Evaluation of vegetable-type soybean for sucrose, taste-related amino acids, and isoflavones contents. *International J. of Food Properties* 14(5):1142-51. Aug. 16. doi:10.1080/10942911003592761 [16 ref]

• ***Summary:*** "Vegetable soybean differs from the conventional soybean in its distinct taste. Genetic variability has been scarcely investigated in vegetable soybean for taste-related compounds viz. sucrose, aspartic acid, glutamic acid, glycine, alanine, and isoflavones. In the present study, analysis of green seeds of 12 vegetable-type genotypes, between reproductive stages of R6 and R7 (i.e., when the pods were completely filled but the seeds and pods shell not yet turned yellow), revealed ranges of 1.28-7.12, 0.37-1.51, 0.64-2.82, 0.17-0.72, 0.11-0.51 g/100 g for sucrose, aspartic acid, glutamic acid, glycine, alanine content, respectively, while a range of 8.64-33.19 mg/100 g was observed for total isoflavones content. Genotypes with high levels of sucrose, aspartic acid, glutamic acid and alanine scored high for taste. Results did not indicate any significant relationship between isoflavones content and the taste score.

"Introduction: Vegetable soybean can be a potential mode for harnessing health components of soybean in countries like India, United states, Brazil, and Argentina, where the traditional soy products viz. soy milk, tofu, miso, natto from the South-East Asian countries could not become popular due to the off-flavour associated with them and the time consuming process involved in their preparation."

In Korea, vegetable soybean is known as *poot kong.* Address: National Research Centre for Soybean, Khandwa Road, Indore, MP India.

1891. Shurtleff, William; Aoyagi, Akiko. comps. 2011. William J. Morse–History of his work with soybeans and soyfoods (1884-1959): Extensively annotated bibliography and sourcebook. Including Charles Vancouver Piper and Palemon Howard Dorsett. Lafayette, California: Soyinfo Center. 482 p. Subject/geographical index. Printed 6 Sept. 2011. 28 cm. [866 ref]

• ***Summary:*** Begins with a chronology of Morse's work. Contains 126 photos and several maps. http://www.soyinfocenter.com/books/147. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1892. Jang, Young-Sun; Jeong, Jong-Moon. 2011. [Anti-obesity effects of black bean chungkugjang extract in 3T3-L1 adipocytes and obese mice induced by high fat diet]. *J. of the Korean Society of Food Science and Nutrition* 40(9):1235-43. Sept. [41 ref. Kor; eng]

• ***Summary:*** "In this study, we investigated the antioxidative activity (scavenging activity of 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical and superoxide anion radical) and anti-obesity effects of black bean chungkugjang extract (BBCE)... Based on these results, it can be concluded that BBCE may have beneficial effects on reducing fat mass and serum lipid content." Address: 1. Technology Research Center, Ben's Lab Co., Ltd., Gyeonggi 445-743, Korea.

1893. Lee, Gyoung-Ah; Crawford, G.W.; Liu, L.; Sasaki, Y.; Chen, X. 2011. Archaeological soybean (*Glycine max*) in East Asia: Does size matter? *PloS ONE* 6(11): e26720. doi:10.1371/journal.pone.0026720. Published: Nov. 4. [69 ref]

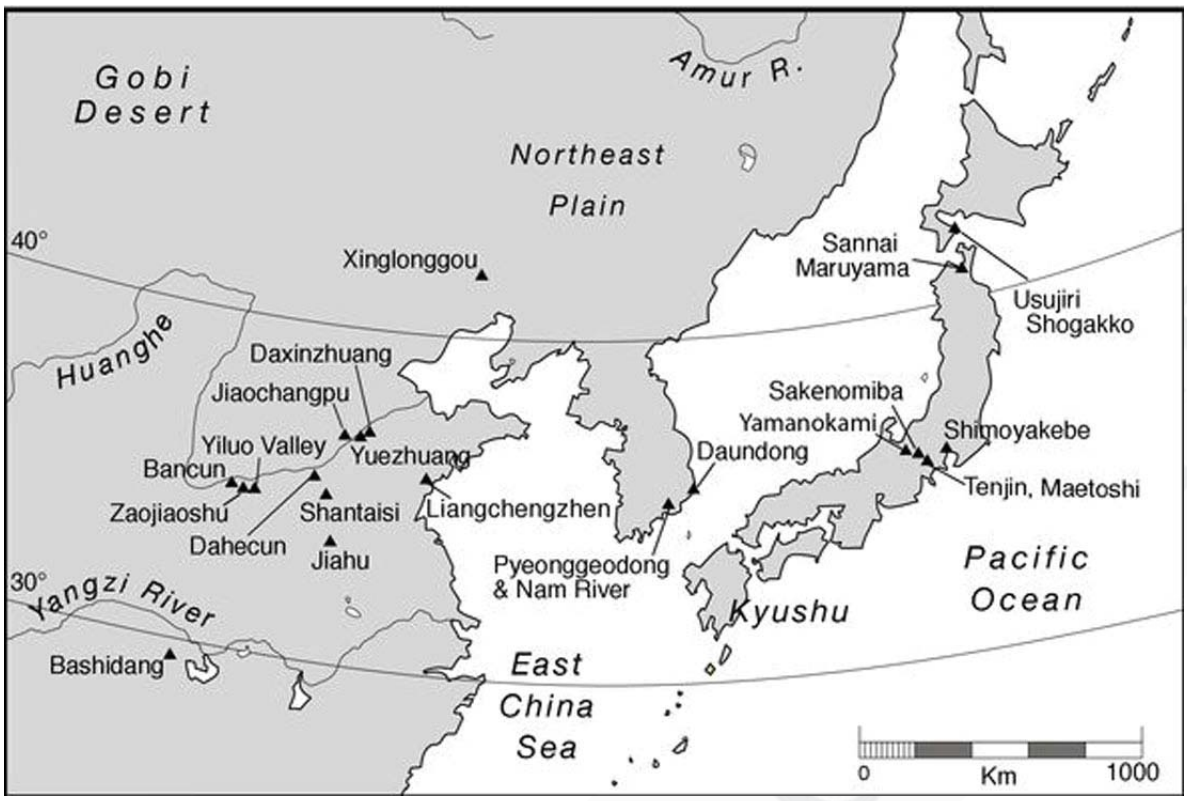
• ***Summary:*** The authors, archaeologists, say that soybean adoption came earlier than previously thought. Moreover, domestication occurred outside of China, in countries such as South Korea and Japan.

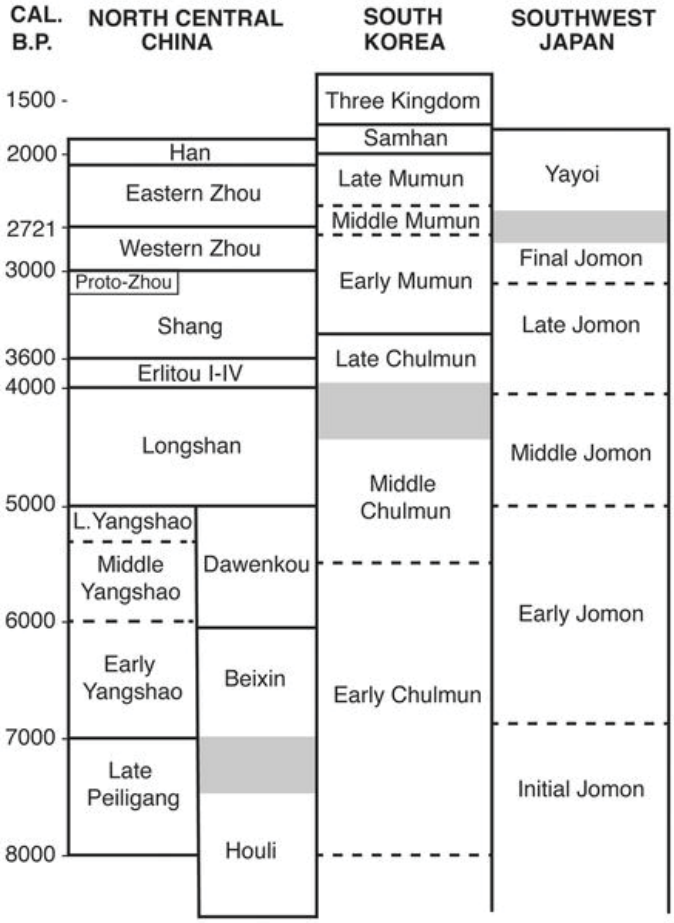
"The recently acquired archaeological record for soybean from Japan, China and Korea is shedding light on the context in which this important economic plant became associated with people and was domesticated. This paper examines archaeological (charred) soybean seed size variation to determine what insight can be gained from a comprehensive comparison of 949 specimens from 22 sites. Seed length alone appears to represent seed size change through time, although the length x width x thickness product has the potential to provide better size change resolution.

"A widespread early association of small seeded soybean is as old as 9000-8600 cal [calculated] BP [Before the present] in northern China and 7000 cal BP in Japan. Direct AMS radiocarbon dates on charred soybean seeds indicate selection resulted in large seed sizes in Japan by 5000 cal BP (Middle Jomon) and in Korea by 3000 cal BP (Early Mumun). Soybean seeds recovered in China from the Shang through Han periods are similar in length to the large Korean and Japanese specimens, but the overall size of the large Middle and Late Jomon, Early Mumun through Three Kingdom seeds is significantly larger than any of the Chinese specimens. The archaeological record appears to disconfirm the hypothesis of a single domestication of soybean and supports the view informed by recent phyologenetic research that soybean was domesticated in several locations in East Asia."

Note: "BP" stands for "Before the present" where "the present" is taken as 1950. "cal" means calculated to adjust for historically uneven distributions of carbon 14 in the environment. "AMS" stands for "accelerator mass spectrometry." AMS radiocarbon dating is a form of radiocarbon dating that is more precise and requires less carbon than conventional radiocarbon methods. Address: 1. Asst. Prof., Anthropology Dep., Univ. of Oregon; 2. Prof., Anthropology Dep., Univ. of Toronto Mississauga [Southern Ontario, Canada]; 3. Stanford Univ. Archaeology Center [Stanford, California].

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1894. Park, H.G. 2011. [Government role for education of soybean breeders in Korea]. *Korea Soybean Digest* 28(1):59-63. Nov. [20 ref. Kor; eng]*
• ***Summary:*** "Current Status of cultivation and consumption of soybean in Korea: Korea must import annually about 1.2-15 million tons of soybean abroad since her self-sufficiency rate of soybean is only 7-9%. Soybean cultivated area in Korea was once 308,000 ha in 1960's, but now decrease to only 71,000 ha, Soybean yield is about 1.5-1.9 t/ha, much lower than that of US (=2.28t/ha). Wholesale price of locally produced soybean is surprisingly high 6.914 Won/kg (about $5.76/kg) compared 3,168 Won/kg for imported one. Main usages of soybean in Korea are for tofu, soy sauce, soy paste, soymilk, bean sprout and others. We, Koreans, have very highly negative attitude to GM soybean so far. We don't have single ha of GM soybean cultivated in the country, but have imported annually about 1 million tons of GM soybean mainly from US, Brazil and Argentina. We noticed that China's black-hole like import of soybean (52.5 million tons in 2010) would be a key factor for international stability of soybean supply and price." Address: Korea.

1895. *SoyaScan Notes.* 2011. Why seitan has not become as popular as tofu as a source of plant protein in the USA (Overview). Dec. 21. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** 1. Historical: Tofu has been a basic food in all countries of East Asia for at least 1,000 years. This includes China, Japan, Korea, Vietnam, and Indonesia. So wherever people with ancestry from these countries live, tofu is made. It has no class affiliation and is inexpensive, so it is eaten by people of all classes and income levels from these countries. And it appears in virtually all cookbooks for these cultures. So there has long been a large demand for tofu in the USA.

2. Tofu manufacturers in the USA: Since 1900 there have been plenty of tofu shops to supply the demand. Between 1905 and 1975 at least 528 different Japanese-owned tofu manufacturers were established in the USA. Probably at least that many Chinese-owned tofu makers also started.

3. Seitan historical: It was invented in about 1962 by George Ohsawa, the macrobiotic teacher, together with Mr. Kiyoshi Mokutani, the owner of a small soy sauce company (Marushima shoyu) in Japan. So it has a very short history. And originally (starting in 1969) it was all imported from Japan.

4. Macrobiotics: Seitan has been limited mostly to macrobiotic community. Wikipedia says incorrectly that seitan is another name for wheat gluten. Not true. Seitan is a product made from wheat gluten just like tofu burgers are made from tofu.

5. Evolution of the meaning of the word: Seitan was originally a salty seasoning, not a protein source. But over the years the meaning of the word gradually changed; it came to refer to any wheat gluten seasoned with soy sauce.

6. Not widely made in the USA since not much demand.

7. Very expensive compared with tofu, in part because not widely available so had to be sent by UPS or mail.

8. Wasteful process. It is made from wheat by discarding all but about 14% of the original wheat and using only the protein. Or, if you start with "vital wheat gluten" (a powder) the quality of the seitan is not nearly as good as if you start with whole wheat flour.

9. Process causes pollution: Dumping all of that starch into any sewage system pollutes the system and usually leads to either a fixed fee or a fine on the manufacturer.

10. Few books about seitan, and no much press coverage or information. Only 3 books about seitan (with "seitan" in the title) have ever been published in English: Jacobs 1987, Wingate 1988, and Bates 1993. Just the opposite with tofu.

1896. Kim, Jihye; Kim, Shin Hye; Huh, Kyoung; et al. 2011. High serum isoflavone concentrations are associated with the risk of precocious puberty in Korean girls. *Clinical Endocrinology* 75(6):831-35. Dec. [32 ref]
• ***Summary:*** "The gradual decrease in the age of onset of puberty raises concerns about the contribution of phytoestrogen intake on sexual maturation. However, no data are available on the association between serum isoflavone (genistein, daidzein) concentration and central precocious puberty (CPP). The aim of the study was to test the association between serum isoflavone concentrations and the risk of CPP in Korean girls."

The results suggest that elevated serum isoflavones may be associated with the risk of CPP in Korean girls.

Note: Puberty is the time during which sexual and physical characteristics mature. As a medical term, precocious puberty is when these body changes happen earlier than normal (ncbi.nlm.nih). Address: 1. PhD, Dep. of Food and Nutrition, Daegu Univ., Gyeongsan, Korea.

1897. Kim, Jeong-Yeon; Hwang, S.J.; Eun, Jong-Bang. 2011. [Microbiological and organoleptic characteristics of *gochujang*, Korean traditional red pepper paste added with different levels of sweet persimmon powder]. *J. of Applied Biological Chemistry* 54(4):303-08. Dec. [21 ref. Kor; eng]
• ***Summary:*** "To develop food and organoleptic quality of gochujang 0, 3, 4, and 5% of sweet persimmon powder were added to Korean traditional red pepper paste during fermentation and microbiological and organoleptic characteristics were investigated." Address: 1. Dep. of Food Science and Technology, Chonnam National Univ., Functional Food Research Center, Gwangju, Republic of Korea [South Korea].

1898. Ann, Yong-Geun. 2011. [Changes in components and peptides during fermentation of Cheonggookjang]. *Korean J. of Food and Nutrition* 24(1):124-31. [36 ref. Kor; eng]

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• ***Summary:*** "We analyzed content and peptides in order to investigate the productivity from Cheonggookjang (fast-fermented soybean paste), fermenting it for 180 hours at 40ºC. Results showed that pH was 7.07 at the start and became 7.41 in 24 hours, it eventually increased to 8.63 after 180 hours. Acidity was 0.2 in 12 hours, 0.5 in 12 hours, and then remained on 0.1 thereafter." Address: Dep. of Food and Nutrition, Chungcheong College, Cheongwon 363-890, Korea.

1899. Hwang, Su-Jung; Kim, Jeong Yeon; Eun, Jong Bang. 2011. [Physical characteristics and changes in functional components of gochujang with different amounts of sweet persimmon powder]. *J. of the Korean Society of Food Science and Nutrition* 40(12):1668-74. [36 ref. Kor; eng]
• ***Summary:*** "We investigated the physical characteristics and changes in the functional components of red pepper paste, or gochujang, during fermentation at 20º C for 90 days with different amounts of sweet persimmon powder. The viscosity of the paste decreased a little with increasing fermentation time." Address: 1. Faculty of Herbal Food Cuisine & Nutrition, Daegu Haany Univ., Gyeongbuk 712-715, Korea.

1900. Lee, C.H.; Youn, Y.; Song, G.S.; Kim, Y.S. 2011. Immunostimulatory effects of traditional doenjang. *J. of the Korean Society of Food Science and Nutrition* 40(9):1227-34. [36 ref. Kor; eng]
• ***Summary:*** "We investigated the immunostimulatory effects of doenjang, a famous Korean traditional food made from fermented soybean paste, on the immunohistochemical reaction in the gastrointestinal (GI) tract and immune response in mice. Male C57BL/6N mice (6 weeks-old) were divided into 4 experimental diet treatment groups and a basal diet (control) group, and fed with different diets for 4 weeks." Address: Dep. of Anatomy, College of Oriental Medicine, Woosuk Univ., Jeonbuk 565-701, Korea.

1901. Shin, D.H. 2011. Research for safety improve and quality improvements of small business and traditional fermented soybean products. South Korea: National Institute of Food and Drug Safety Evaluation research report. *

1902. Shukla, Shruti; Kim, J.K.; Kim, M. 2011. Occurrence of biogenic amines in soybean food products. In: Hany El-Shemy, ed. 2011. Soybean and Health, Rijeka, Croatia: InTech. See p. 181-206 *

1903. Sung, Jung-Min; Kim, Ok-Sun; Ryu, Hye-Sook. 2011. [Changes in enzyme activity and sensory characteristics of kochujang with different ratios of added deoduk (*Codonopsis lanceolata*) root powder]. *J. of the Korean Society of Food Science and Nutrition* 40(8):1150-56. [34 ref. Kor; eng]
• ***Summary:*** "*Deoduk* (*Codonopsis lanceolata*) root powder was added to traditional kochujang to improve the quality of traditional kochujang. The microbial characteristics, enzyme activities, and sensory characteristics were investigated during fermentation. The aerobic bacterial count in kochujang was not remarkably different, and yeast and mold decreased during fermentation."

Note: Deoduk, also called deodeok or lance asiabell, is a flowering plant native to East Asia (China, Japan, Korea, and the Russian Far East). Address: 1. Korea Food Research Inst., Gyeonggi 463-746, Korea.

1904. Youn, Kumju; Kim, Jiyoung; Yeo, Hye-Reem; Jun, Mira. 2011. [Improving the functional quality of kochujang added with red ginseng and fermented wild herbal extract]. *J. of the Korean Society of Food Science and Nutrition* 40(12):1675-79. [23 ref. Kor; eng]
• ***Summary:*** "To improve the quality and palatability of Kochujang, the physicochemical properties, antioxidant capacity, and sensory evaluation of Kochujang were assessed when red ginseng and wild herbal extract were added during fermentation. This study investigated the antioxidant capacities of general Kochujang (GK) and Kochujang prepared with red ginseng and fermented wild herbal extract (RGK) by employing various in vitro antioxidant assays such as DPPH and FRAP assays... We concluded that RGK improves not only functional properties but also sensory properties as well." Address: 1. Dep. of Food Science and Nutrition, Dong-A Univ., Busan 604-714, Korea.

1905. Dajanta, K.; Chukeatirote, E.; Apichartsrangkoon, A. 2011. Analysis and characterisation of amino acid contents of thua nao, a traditionally fermented soybean food of Northern Thailand (Open Access). *International Food Research Journal* (*Selangor, Malaysia*) 18:595-99. [17 ref]
• ***Summary:*** "In this study, an analysis of free amino acid (FAA) profiles was determined using reversed-phase high performance liquid chromatography. For this, thua nao samples conventionally produced were collected from six local markets (Mae Wang, Mae Hia, Mae Taeng, Jom Thong, San Patong and San Sai) in Chiang Mai, Thailand and used for the analysis. Results indicate a variation in amino acid compositions and contents among these thua nao products. The quantities of total FAA were found between 11.03–61.23 g/kg, as dry basis. Predominant amino acids were Trp, followed by Glu, Cys, Lys and Leu. All essential amino acids (EAA) were present in considerable amounts in which the proportions of EAA7 and EAA10 values were 2.67–13.99 and 7.24–36.54 g/kg dry basis, respectively. The most abundant taste FAA class was the bitter FAA representing more than 50% of total FAA. This is the first paper to report thua nao amino acid profiles with an expectation to further shed light on its nutritive qualities.

"Introduction: Thua nao is a Thai traditional fermented soybean which is popular and widely consumed in the

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northern part of Thailand. It is protein-rich and thus has long been used as a meat substitute. Traditionally, thua nao has been prepared by naturally fermenting the boiled soybeans in a bamboo basket, covered with banana leaves for 2-3 days at ambient temperature. After fermentation, raw thua nao must be cooked by steaming or roasting in which spices and other ingredients may be added during cooking. Alternatively, raw thua nao is crushed and formed into a disc shape, exposed to sunlight resulting in a dried product, the so-called 'thua nao kab'. Other traditionally fermented soybeans similar to thua nao have also been found in Asian countries such as Japanese natto, Indian kinema, Chinese douche, and Korean chungkukjang." Address: 1, 3. Dep. of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai Univ., Chiang Mai, 50100 Thailand.

1906. Mangels, Reed; Messina, Virginia; Messina, Mark. 2011. The dietitian's guide to vegetarian diets: Issues and applications. 3rd ed. Sudbury, Massachusetts: Jones & Bartlett Learning. xi + 596 p. Illust. Index. 23 cm. 1st ed. 1996. 2nd ed. 2004. [342 soy ref]
• ***Summary:*** Chapter 9, "Soyfoods" (p. 249-89) is excellent. Its contents: Introduction. Isoflavones: Isoflavone content of soyfoods, isoflavone absorption and metabolism. physiologic properties of isoflavones. Asian soy intake. Nutritional composition of soybeans and soyfoods: Protein, fat, carbohydrate, vitamins, minerals (iron, zinc, calcium). Chronic disease prevention and treatment: Coronary heart disease (cholesterol reduction, lipid-independent effects), cancer (breast cancer, prostate cancer), osteoporosis, alleviation of menopausal symptoms, renal function. Controversies: Soy infant formula, cognitive function, thyroid function, fertility and feminization, breast cancer patients, allergy. Intake recommendations.

Table 9-1 (p. 251-52), "Chemical and common names and molecular weights (MW) of the 12 isoflavone isomers found in soybeans" includes the following foods and USDA IDN [identification number]: Tofu: Firm, firm #2, regular, silken firm, extra firm, extra firm #2. Natto. Soymilk, Miso, Tempeh. Soybeans, raw, US food grade. Soybeans, cooked. Soybeans, raw, Japan. Soybeans, raw, Korea. Soybeans, raw, Taiwan. Soybeans, green, cooked. Soybean curd, fermented. Soymilk skin (foo jook / yuba, cooked). Soymilk skin (foo jook / yuba, raw). Isolated soy protein. Soy protein concentrate: Water washed, alcohol washed. Soyflour: Full fat, defatted.

The Glossary of vegetarian foods (p. 447+) includes: Soyfoods: Edamame, soybeans, soy flour, soymilk, soy nuts, tempeh, textured vegetable protein (TVP, a brand name), tofu. Meat analogs: Commercial meat substitutes, seitan. Milks and dairy analogs: Nondairy cheese, nondairy frozen desserts, nondairy milks, sour cream substitute, yogurt. Address: 1. PhD, RD, LDN, The Vegetarian Resource Group, Maryland; Univ. of Massachusetts, Amherst, Mass.; 2-3. Nutrition Matters, Port Townsend, Washington; Loma Linda Univ., Loma Linda, California.

1907. Choi, Ben. 2012. Gochujang: Korean go-to, all-in-one magic chile sauce (Web article). *Awl* (*The*) https://www.theawl.com/2012/01/gochujang-korean-go-to-all-in-one-magic-chile-sauce/
• ***Summary:*** "Our relationships with condiments can become rote: ketchup/fries, mustard/hotdog, salsa/chips–even sriracha/pho. We robotically dip, drizzle and douse without a conscious thought. In this column, we'll be trying to shake up our collective condiment consciousness. Proust wrote, "The only real voyage of discovery consists in not seeking new landscapes but in having new eyes," and with that in mind, I thought I'd take you along in search of lost time–to my first condiment: Gochujang.

"As a Korean kid growing up in American Samoa, I was part of a subculture made up of the families of Korean fishermen and sailors that had sprung up around the tuna industry of the South Pacific. (I know, there's a musical in here, somewhere.) The heart of this community was Korea House, a blue-shingled, cantilever-roofed building, behind which were buried about a dozen earthenware vessels the size of Greek amphorae–it was in these we aged our gochujang.

"Gochujang is a fermented paste made of red chili powder, glutinous rice powder, pureed soy beans and salt, seasonings like garlic and onion, all sweetened with a little sugar syrup and aged for, like, eons in buried earthen vessels. It's about the consistency of hoisin sauce; perfectly uniform but slightly grainy. It brings to the table the perfect savory mix of flavors: spicy, salty and sweet, with an earthy finish and loads of umami. You may know it as the main finishing condiment for bibimbap, but it's truly versatile, good for anything that involves rice or noodles, stir-fries and any soups or stews that could use a peppery, reddish cast. Oh, and it's a main ingredient in spicy BBQ marinades, especially with pork.

"One of the coolest and most flexible uses of gochujang is as a mother-condiment, the basis for other sauces and pastes. It can be mixed with doenjang (Korean red miso) to form ssamjang, which is great for lettuce wraps (ssam) and dipping vegetables, both raw and lightly blanched. But perhaps the best kick-around variation is chogochujang, which goes excellently with fish, sauteed and blanched greens, and can pretty much be used as Korean ketchup. Keep chogochujang in your fridge in a squeeze bottle; it will definitely come in handy for omelets, fried rice, etc. Use it as a marinade for burgers. You can even mix in a little extra oil and use it as a salad dressing! Don't sweat orthodoxy with this condiment. (Interestingly, the peppers that go into gochujang were originally brought from America as part of the Columbian Exchange.)

"Condiments have a way of serving as passports

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between traditional cuisines. In American Samoa, gochujang served as a go-between for Asian, Polynesian and American taste stylings. I can remember enjoying gochujang and chogochujang with kalua pig, breadfruit, kimchi and spam or canned corned beef on a taro leaf for a Sunday afternoon meal.

"Later, when my family moved to L.A., and my parents were busy running a corner store, gochujang became a staple of the latchkey lifestyle for me and my brothers. Breakfast might be bokumbap, kimchi fried rice with Spam, tinged red with a healthy dose of gochujang and topped with an over-easy egg. For snacks we would make little maki rolls out of rice, canned tuna dressed with chokochujang and pickles. In a pinch, you can even make a meal of beef jerky or Slim Jims–remember, we were growing up in a convenience store–as long as you have some rice, some kind of vegetable and gochujang for dipping..." Address: Overlooking San Francisco Bay, California.

1908. Shurtleff, William; Aoyagi, Akiko. comps. 2012. History of natto and its relatives (1405-2012): Extensively annotated bibliography and sourcebook. Lafayette, California: Soyinfo Center. 657 p. Subject/geographical index. Printed 15 Feb. 2012. 28 cm. [1934 ref]
• ***Summary:*** Begins with an attempt to answer the question "What is natto?," followed by a brief chronology of natto and its relatives. Contains 136 historical photos (most in color), graphs, and illustrations http://www.soyinfocenter.com/books/151. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1909. Nguyen, Andrea Quynhgiao. 2012. Asian tofu: Discover the best, make your own, and cook it at home. Berkeley, California: Ten Speed Press. [viii] + 232 p. Illust. (color photos by Maren Caruso). Index. 24 x 24 cm. [21 ref]
• ***Summary:*** Another very attractive book and well-written book by Andrea Nguyen. In researching this book, Andrea traveled to many countries in East- and Southeast Asia. The color photos and the book design are both superb.

Contents: Introduction: East Asian stronghold (China, Japan, Korea), wavering Southeast Asia (Vietnam, Thailand, Cambodia, Laos, Singapore, Malaysia, Indonesia, Philippines, Myanmar / Burma), South Asian newcomer (India), tofu in America (Samuel Bowen, Benjamin Franklin, Commodore Matthew Perry, Civil War soldiers, Piper & Morse, George Washington Carver, Mildred Lager, World War II), alternative to mainstream (Boys Market in Los Angeles, *Diet for a Small Planet*, *The Book of Tofu*, Jeremiah Ridenour, Los Angeles Tofu Festival), tofu today (United Soybean Board Survey, Hodo Soy, Dong Phuong Tofu [Westminster, Orange County, California]).

Tofu buying guide: Tofu types (tofu blocks {silken, medium, medium firm, firm, extra firm, super firm}, pressed tofu, tofu noodles, tofu skin [yuba; an unfortunate term since yuba has nothing to do with tofu] {fresh tofu skin packets = dou fu bao, tofu skin rounds = dou fu pi or fu pi, dried tofu sticks [dried yuba sticks] = fu zhu or "tofu bamboo"}, fried tofu {fried tofu slices}, tofu pudding (like silken tofu but made by pouring rich soymilk into a tallish pot with a little calcium sulfate and tapioca starch dissolved in water in the bottom), fermented tofu {red or white}, soy milk).

Note: This is the earliest English-language document seen (Oct. 2012) that uses the term "fresh tofu skin packets" or the term *dou fu bao* in connection with yuba.

Tofu cooking tips: Cutting, draining, frying.

Homemade tofu tutorial (incl. homemade soy milk, soy milk lees, homemade silken tofu, homemade tofu pudding, block tofu, confetti tofu, oboro tofu, zaru tofu, seasoned pressed tofu, tea-smoked pressed tofu, white fermented tofu, frozen tofu, fresh tofu skin, soy-simmered fried tofu).

Recipes–Fresh and satisfying: Snacks and starters. Soothing and soft: Soups and hot pots. Homey and wholesome: Main dishes. Versatile and delicious: Salads and sides. Religion and artistry: Mock meats. Building on traditions: Buns, dumplings, crepes, noodles and rice. Amazing transformations: Sweets and desserts. Basics. Ingredients (glossary). Acknowledgments. Measurement conversion charts.

Note 1. This book contains many recipes that use meat, poultry, or fish as ingredients.

Note 2. The Vietnamese term for tofu is *dau phu.*

Note 3. The author (unfortunately) uses the term "tofu skin" to refer to yuba. Address: Food writer, Santa Cruz, California.

1910. Lee, Young Duck; Park, Jong-Hyun. 2012. [Rapid fermentation starter *Enterococcus faecium* of soybean for soy-sauce like product]. *Korean J. of Food and Nutrition* 25(1):188-95. [Kor; eng]
• ***Summary:*** The goal was to produce rapidly traditional kanjang, the Korean soy-sauce with rich flavors, lactic acid bacteria of *Enterococcus* species isolated from *Chungkukjang.*

Note: This journal was launched in 1988. Address: Dep. of Food Science and Biotechnology, Gachon Univ., Seongnam 461-701, Korea.

1911. Agranoff, Jonathan. 2012. Re: Details of making and selling tempeh in London starting Sept. 1985. Letter (e-mail) to William Shurtleff at Soyinfo Center, April 4. 1 p.
• ***Summary:*** "I started making tempe in London in 1985 when I was a second year Food Science undergraduate student at Kings College, London University. In fact that year I was in the nutrition research and development centre with a couple of other nutritionists and undertook a small project on tempe made from different water sources looking at bacterial contamination.

"I started making tempe in the microbiology lab when

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I got back to England but got evicted from there as no-one knew what it was and they thought my fungus was going to contaminate the rest of the lab so I moved it to my room and fermented the first batch under my bed in university accommodation. I subsequently improved hygiene standards and developed a dry dehulling method using a small hand operated 'maize mill' and used inoculum from Bogor market I brought back with me. I then modified an old refrigerator with a lamp and thermostat as a heating element and started making 10-15 kg a week, putting it on my bicycle and taking it up to the Indonesian Embassy in central London where the majority of Javanese diplomats had never had tempe in London before, only sometimes when someone came back from Amsterdam with a piece.

"My tempe was at that time the only fresh tempe available in that quantity in the UK and I began making it at home once a week and distributing it on weekends just after fermentation to the homes of the Indonesian community in NW London. I returned to Indonesia roughly every 1-2 years with a project or other program and also made a series of radio documentaries for the BBC's Indonesian section on tempe, specifically on tempe Bongkrek, unraveling the story of the 1988 mass poisoning incident in Ajibarang, Banyumas and even interviewing the man who had made the deadly batch. I can let you have a copy of that if you're interested too. I also did a trip recently to Tondano, North Sulawesi where I was intrigued to check on the theory of the origin of tempe and 'spontaneous generation' from wild *Rhizopus* and the story of the Kyai Mojo exodus from East Java to Tondano where it was said this community did not bring any ragi but managed to make tempe from naturally growing mold. They didn't, and this story was completely wrong and I discovered something very odd had evolved instead.

"Anyway, long story, let me know if you'd like any more."

Shurtleff replies with several questions, to which Jonathan gives excellent replies:

(1) Did you ever have a business with a business name? "I started making tempe as a 'home industry' in September 1985. This was on my return from a long summer vacation on a project in the nutrition research and development centre in Bogor where I did some fieldwork in microbiology and where I first learned how to make tempe. Back in London, I had no formal business name, I just made it for the Indonesian community after I told them I had been researching tempe in Indonesia and they were very interested if I could make tempe for them. In London I used to time the fermentation so it would mature on my afternoon off classes so I could take it to sell, making a maximum of 15 x 400g packs. The embassy always invited me to their cultural and diplomatic events as they knew I would turn up with a stack of fresh tempe. I found tempe was such an important diplomatic tool for Indonesians too, later I introduced it later to communities in Zimbabwe and Burma. In Harare, while working for a British Overseas Development programme in 1988, I made it for a project with the embassy and the Zimbabwean nutritionists and federation of women's groups headed by Mugabe's wife at the time was fascinated with it. It had become a social tool to show what was unique about Indonesia and everyone liked it. I did a similar exercise in Nairobi [Kenya].

"I was interested in this since in 1985 I had met with all the participants of the United Nations University's (Tokyo) sponsored tempe training for scientists from Nigeria / Benin?, South Africa, Ethiopia (?), Egypt, Thailand, Korea, etc. who were all in Bogor at the time.

"In 1991 I started medical school in Southampton University and moved to that city. My converted refrigerator incubator and giant cooking pans came down too and my parents were pleased to be able to clean their kitchen at last after 10 years of encrusted soybeans and calls at 4 am to check fermentation temperature for overheating tempe. There were about 40 Indonesian PhD students at Southampton and they soon learned where the tempe was made. I also supplied some Indonesian restaurants in Oxford and London at the time which helped subsidize medical school."

(2) What year and month did you first sell any tempeh to anyone? "September 1985 first started making tempe in London."

(3) Where–at what address–did you make the first tempeh you sold? "I made this tempe at home, 27 Oman Avenue, London NW2, UK."

(4) Did you create a label for your tempeh? If yes, do you have any left–and could you send me a scan? "I didn't have a label for that tempeh."

(5) Where did you get your soybeans and tempeh starter? "In the beginning I obtained my tempe starter from Pasar Bogor or sometimes from tempe factories on each trip to Indonesia. I did use the lab at university to make some starter but it was too laborious, and again at home grown on rice. Subsequently I have been using the LIPICO commercial ragi from Bandung. My soybeans come from a local oriental supermarket [in London], I used to buy 45 kg sacks that was usually Canadian soy."

(6) You mentioned in your 1st e-mail receiving our *Book of Tempeh* on your 21st birthday. Did you learn how to make tempeh from our book? "I was given you're 'The Book of Tempeh' I think in 1988, but actually I had learned how to make tempe before that in 1985 but tried out lots of recipes from your book and tried making ragi, and was fascinated to see a parallel world to mine 20 years earlier in California!" Address: M.D., London, England.

1912. Shurtleff, William; Aoyagi, Akiko. comps. 2012. History of soy sauce (160 CE to 2012): Extensively annotated bibliography and sourcebook. Lafayette, California: Soyinfo Center. 2527 p. Subject/geographical index. Printed 31 May 2012. 28 cm. [1934 ref]

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• ***Summary:*** Begins with a detailed chronology of soy sauce based on published documents. Contains 228 historical illustrations and photos (most in color). http://www.soyinfocenter.com/books/153.

Soy sauce: Worldwide, soy sauce is the most widely used and best known product made from the soybean. It is the defining flavor for many of the cuisines of East and Southeast Asia. Soy sauce arrived in many Western countries before the soybean, and before it was generally understood that the soybean was one of its main ingredients. We believe that soy sauce has *the* most interesting history of the many different soyfood products. Etymology of soy sauce in English:

The words "soy," "soya" and "soja," and the term "soy sauce" came into English from the Japanese word shoyu via the Dutch. Thus, the name of the soybean was derived from the name of the sauce made from it.

The first European-language document in which the words for "soy" or "soy sauce" appeared was Dutch. Why?

After 1633 (when the Portuguese were expelled from Japan by the Tokugawa shogunate), the Dutch were the only Europeans allowed to trade with Japan. Their trading activities, conducted by the Dutch East India Company (VOC), were limited to a tiny artificial island named Deshima in Nagasaki harbor in the south of Japan, far from the capital at Edo (today's Tokyo). Among the goods the VOC exported from Japan were shoyu (soy sauce), miso, and saké.

At first they exported these goods to VOC trading posts in Asia, but in 1737 they began exporting small amounts (via Batavia, today's Jakarta, Indonesia) to Amsterdam, Netherlands, where they were auctioned to international merchants.

All of the early Dutch documents that mention shoyu are handwritten letters, the originals of which are located at the VOC archives at The Hague, Netherlands. Soyinfo Center hired a Dutch researcher (Herman Ketting, who could read handwritten Dutch documents from the 1600s) to find and copy as many of these early documents as possible. We helped him to get on the trail by sending him 6-8 early citations from books on the history of Kikkoman.

The Dutch merchants who exported shoyu in kegs from Japan did their best to spell it as it sounded–phonetically. Here is how that spelling evolved–based on documents now at Soyinfo Center; each appears in this book:

1647 Oct.–soije
1651 June–sooje
1652 July–soij
1652 Aug.–soije
1652 Oct.–soije
1652 Oct.–zoije
1654 July–soijo
1655 Aug.–soija
1656 March–soeije
1657 Aug.–soija
1659 Aug.–soija
1660 June–soije
1665 Feb.–soija
1669 Feb.–soija
1669 Feb.–soija
1674 Nov.–sooij
1675 Nov.–soija
1676 March–soija
1676 June–soija
1678 Nov.–soija
1680 June–soije

The link from Dutch to English and other European languages was probably forged on the docks and in the warehouses of Amsterdam, as British and other European merchants bid at auction for a liquid seasoning (shoyu) made in Japan with a variety of exotic but similar Dutch names.

These merchants gave their new sauce a name which they hoped would catch on in their own language and also help it to sell. Then they started to distribute it widely; by Dec. 1750 it had reached the North America–arriving first in New York Harbor bearing the name "India Soy."

Here are the earliest known names for soy sauce in various Western languages other than Dutch:

English:

1679–saio (John Locke, in his journal).

1688–Soy (William Dampier, in his log). This was the spelling that caught on in English. For the next 250 years, soy sauce was usually called "soy" in English.

1696–Souy (John Ovington).

1727–Soeju (Engelbert Kaempfer; he lived in Japan on Deshima from Sept. 1690 to Nov. 1692).

1744–Chinese Soy, Japan Soy (White's China and Flint-Glass Warehouse, London, ad).

1750–Indian Soy (Rochell & Sharp, ad, New York City).

1752–Japan Soy (Berto Valle, ad, London).

1754–India Soy (John Breues, merchant from Perth, probably Scotland).

1754–soy of Japan (Society of Gentlemen, London).

1756–Joppa soy (G. Pastorini, ad, London).

1769–Soye, East-India Soye (William Stork, North America).

1795–soy-sauce (C.P. Thunberg).

1803–soy sauce (Susannah Carter).

1804–Soy, Sooju (James Mease, Pennsylvania).

1810–Chinese Soy, Japanese Soy (James Mease, Pennsylvania).

1832–Canton Soy (John Remond, ad, Massachusetts).

1866–Shoyu, Sh'taji (James C. Hepburn, Japanese and English Dictionary).

French:

1753–la Sauce Sooju (Histoire générale des voyages. Vol. 11).

1765–le soui, le soi (Denis Diderot).

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1790–la sauce soja (Jean Baptiste de Lamarck).
1796–sauce de soya (Karl Peter Thunberg).
German:
1785–Sooju, Soy (Charles Bryant).
1801–Indianische Soya (Philipp A. Nemnich).
1822–Soya, indische Soya (Joseph Koenig).
Italian:
1907–Il shoyu (Ruata & Testoni).
1912–Shoyu (L. Settimj).
1919–shoyu (G.E. Mattei).
Latin:
1705–Soia (Samuel Dale).
1712–Sooju (Engelbert Kaempfer; he lived in Japan from Sept. 1690 to Nov. 1692)
1730–Soia (Joseph P. de Tournefort).
Portuguese:
1603–Xôyu (Compania de Iesus; earliest Jesuit dictionary of Japanese).
1882–soiia, soja, ketjap (Gustavo d'Utra, Brazil).
1938–Shoju, Soyu, Shiyu, tao-yu (Abreu Velho, Angola).
Spanish:
1910–Salsa de la haba soya (C.F. Langworthy; translation of his American USDA bulletin).
1912–choyou, salsa de soja (Adolfo C. Tonellier, in Argentina). Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1913. Kim, Ah-Ra; Lee, J.J.; Cha, S.S.; Chang, H.C.; Lee, M.Y. 2012. [Effect of soybeans, Chungkukjang, and Doenjang on blood glucose and serum lipid profile in streptozotocin-induced diabetic rats]. *J. of the Korean Society of Food Science and Nutrition* 41(5):621-29. May. [Kor; eng]
• ***Summary:*** "These results indicate that dietary supplements of soybean, chungkukjang and doenjang may improve blood glucose and lipid metabolism and help prevent or attenuate the progression of diabetes in STZ-induced diabetic rats." Address: Dept. of Food and Nutrition, Chosun Univ., Gwangju 501-759, Korea.

1914. *Malnutrition Matters Newsletter* (*Ottawa, Canada*). 2012. Ten new SoyCow 'E' systems for North Korea. May. p. 1.
• ***Summary:*** "A container full of SoyCows has been shipped from the fabricator in Thailand to North Korea for the Canadian NGO, First Steps. The SoyCow and VitaGoat form the backbone of First Steps' nutritional aid program for the past nine years. With the addition of these new systems, First Steps will have over 80 systems operating at about 30 sites, providing a daily cup of protein-rich soymilk to more than 80,000 needy children in orphanages, daycares and kindergartens." A color photo shows the SoyCow 'E' system, with the blue electric boiler at center. Address: 498 Rivershore Crescent, Ottawa, ON K1J 7Y7, Canada. Phone: 1-613-742-6888.

1915. Zhang, Jianjun; Dhakal, I.B.; Zhao, Z.; Li, L. 2012. Trends in mortality from cancers of the breast, colon, prostate, esophagus, and stomach in East Asia: role of nutrition transition. *European J. of Cancer Prevention* 21(5):480-89. Sept. [45 ref]
• ***Summary:*** The "nutrition transition" in East Asia refers to the transition to a Western-style diet, characterized by an increased intake of energy, animal fat, and red meats, which has occurred during the last several decades. Data was gathered from China (1988-2000), Hong Kong (1960-2006), Japan (1950-2006), Korea (1985-2006) and Singapore (1963-2006).

"A remarkable increase in mortality rates of breast, colon, and prostate cancers and a precipitous decrease in those of esophageal and stomach cancers have been observed in selected countries (except breast cancer in Hong Kong) during the study periods."

These striking changes "may be at least in part attributable to the concurrent nutrition transition." Changes in cancer mortality lagged about 10 years behind the beginning of the nutrition transition. Address: Div. of Epidemiology, Dep. of Public Health, Indiana Univ. School of Medicine, Indianapolis, Indiana 46202.

1916. Brown, Lester R. 2012. Full planet, empty plates: The new geopolitics of food scarcity. New York: W.W. Norton & Co. xiii + 144 p. Illust. Index. 21 cm.
• ***Summary:*** Contents: 1. Food: The weak link. 2. The ecology of population growth. 3. Moving up the food chain. 4. Food or fuel? 5. Eroding soils darkening our future. 6. Peak water and food scarcity. 7. Grain yields starting to plateau. 8. Rising temperatures, rising food prices. 9. China and the soybean challenge. 10. The global land rush. 11. Can we prevent a food breakdown?

See especially Chapter 9, "China and the soybean challenge" which begins with an excellent overview of soybean history in the North America: "Some 3,000 years ago, farmers in eastern China domesticated the soybean. In 1765, the first soybeans arrived in North America, but they did not soon catch on as a crop. For 150 years or so the soybean languished as a curiosity in gardens.

"Then in the late 1920s, a market for soybean oil began to develop, moving the soybean from the garden to the field. During the 1930s, soybean production in the United States climbed from 400,000 tons to over 2 million tons. And as growth in the demand for the oil gained momentum, soybean production jumped to over 8 million tons in 1950.

"During the 1940s and early 1950s, the soybean crop was harvested and crushed primarily for the 20 percent of the bean that was oil. Then during the 1950s, the demand for meat, milk, and eggs climbed. With little new grassland

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to support expanding beef and dairy herds, farmers started feeding their animals more grain supplemented with soybean meal in order to produce more beef and milk. Farmers were already relying heavily on grain to produce pork, poultry, and eggs. By 1960 soybean meal had become the primary product of soybean crushing and oil the secondary one. For the first time, the value of the meal exceeded that of the oil, an early sign of things to come in the changing role of the soybean."

Chapter 10, "The global land rush," also contains extensive information about soybeans. For example: "Between 2007 and mid-2008, world grain and soybean prices more than doubled."

"What is new now is the scramble to secure land abroad for more basic food and feed crops-including wheat, rice, corn, and soybeans-and for biofuels. These land acquisitions of the last several years, or 'land grabs' as they are sometimes called, represent a new stage in the emerging geopolitics of food scarcity. They are occurring on a scale and at a pace not seen before."

"South Korea, which imports over 70 percent of its grain, is a major land investor in several countries. In an attempt to acquire 940,000 acres of farmland abroad by 2018 for corn, wheat, and soybean production, the Korean government will reportedly help domestic companies lease farmland or buy stakes in agribusiness firms in countries such as Cambodia, Indonesia, and Ukraine (4)."

"China, faced with aquifer depletion and the heavy loss of cropland to urbanization and industrial development, is also nervous about its future food supply. Although it was essentially self-sufficient in grain from 1995 onward, within the last few years China has become a leading grain importer. It is by far the top importer of soybeans, bringing in more than all other countries combined (5)."

"The state-owned Chinese firm Chongqing Grain Group, for example, has reportedly begun harvesting soybeans on some 500,000 acres in Brazil's Bahia state for export to China. The company announced in early 2011 that as part of a multibillion-dollar investment package in Bahia, it would develop a soybean industrial park with facilities capable of crushing 1.5 million tons of soybeans a year (12)."

"Hostility of local people to land grabs is the rule, not the exception. China, for example, signed an agreement with the Philippine government in 2007 to lease 2.5 million acres of land on which to produce crops that would be shipped home. Once word leaked out, the public outcry-much of it from Filipino farmers-forced the government to suspend the agreement (25)." "In 2009, South Korea's Hyundai Heavy Industries harvested some 4,500 tons of soybeans and 2,000 tons of corn on a 25,000-acre farm it took over from Russian owners, roughly 100 miles north of Vladivostok. Hyundai had planned to expand production rapidly to 100,000 tons of corn and soybeans by 2015. But in 2012 it anticipated producing only 9,000 tons of crops, putting it far behind schedule for reaching its 2015 goal. The advantage for Hyundai was that this was already a functioning farm. The supporting infrastructure was already in place. Yet even if Hyundai reaches its 100,000-ton goal, this will cover just 1 percent of South Korea's consumption of these commodities (32)." Address: President, Earth Policy Inst., 1350 Connecticut Ave., N.W., Suite 403, Washington, DC 20036. Phone: 202-496-9290.

1917. He, Shuilian; Wang, Yungsheng; Volis, S.; Li, D.Z.; Yi, T.S. 2012. Genetic diversity and population structure: implications for conservation of wild soybean (*Glycine soja* Sieb. et Zucc.) based on nuclear and chloroplast microsatellite variation (Open Access). *International J. of Molecular Sciences* 13(10):12608-28. Oct. Special issue. [80 ref]

• ***Summary:*** Abstract: Wild soybean (*Glycine soja* Sieb. et Zucc) is the most important germplasm resource for soybean breeding, and is currently subject to habitat loss, fragmentation and population decline. In order to develop successful conservation strategies, a total of 604 wild soybean accessions from 43 locations sampled across its range in China, Japan and Korea were analyzed using 20 nuclear (nSSRs) and five chloroplast microsatellite markers (cpSSRs) to reveal its genetic diversity and population structure. Relatively high nSSR diversity was found in wild soybean compared with other self-pollinated species, and the region of middle and lower reaches of Yangtze River (MDRY) was revealed to have the highest genetic diversity. However, cpSSRs suggested that Korea is a center of diversity. High genetic differentiation and low gene flow among populations were detected, which is consistent with the predominant self-pollination of wild soybean. Two main clusters were revealed by MCMC structure reconstruction and phylogenetic dendrogram, one formed by a group of populations from northwestern China (NWC) and north China (NC), and the other including northeastern China (NEC), Japan, Korea, MDRY, south China (SC) and southwestern China (SWC). Contrib [sic, a program] analyses showed that southwestern China makes the greatest contribution to the total diversity and allelic richness, and is worthy of being given conservation priority. Address: 1-2, 4-5. China Southwest Germplasm Bank of Wild Species, The Key Lab. of Biodiversity and Biogeography, Kunming Inst. of Botany, Chinese Academy of Sciences, Kunming 650201, China.

1918. Park, Kyoung-Hee. 2012. Re: Soy flour and roasted soy flour in Korea–past and present. Letter (e-mail) to William Shurtleff at Soyinfo Center, Nov. 20–in reply to inquiry. 1 p. [Eng]

• ***Summary:*** 1. What other ways, besides "konggaru" (McCune-Reischauer system of romanization), can the name of roasted soy flour be spelled in Korean? Ans: *Konggaru*

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literally means `bean flour,' but in general it means flour of soybean which is most commonly ground into powder. In Korean, soybean is also called *hûin kong* (white bean) or *paekt'ae*. But Korean people say just *k'onggaru* when they refer to soy flour. In Korean, *k'ong* means "bean" and *garu* and *gomul* (as in *K'onggomul*) mean "powder" or "flour."

2. Was this food first introduced by the Japanese when they colonized Korea? Ans: No. It has been eaten for a long time before Korea was colonized by Japan. For example, *Imwôn Simnyukchi* [Records of Sixteen Aspects Rural Economy] written by a Korean scholar Yu-gu Sô (1764-1845) and published around 1827. This book (which is also called *Imwon Kyongje Simnyukchi*) is a sort of encyclopedia composed of 16 parts including agricultural techniques and practical matters related to farm life. It includes more than 80 kinds of Korean dishes. *K'onggaru* is used in making *Sigobang*, one of rice cakes in the book.

3. How important is this food today in Korea? *Konggaru* is used for various dishes in Korea today. Roasted soy flour is an important ingredient of *misugaru*, a traditional Korean drink of grain powder which is usually served in the summer days. *Konggaru* (without roasting) is also added in many kinds of Korean soups, such as Chinese cabbage soup, radish soup, seaweed soup and mugwort soup. There are very few people who make soy flour at home today because it is easier to buy it at supermarkets or mills. Address: PhD candidate.

1919. Shurtleff, William; Aoyagi, Akiko. comps. 2012. History of roasted whole soy flour (kinako), soy coffee, coffee alternatives, problems with coffee, and soy chocolate (1540-2012): Extensively annotated bibliography and sourcebook. Lafayette, California: Soyinfo Center. 709 p. Subject/geographical index. Printed 25 Nov. 2012. 28 cm. [1420 ref]

• ***Summary:*** This is the most comprehensive book ever published about the history of roasted whole soy flour (kinako), soy coffee, coffee alternatives, problems with coffee, and soy chocolate. It has been compiled, one record at a time over a period of 35 years, in an attempt to document the history of these unique soyfoods. It is also the single most current and useful source of information on this subject.

Contents: Search engine keywords. Explanation of the Chinese and Japanese characters on the copyright page. Dedication and acknowledgments. Introduction: Three beans. Names and popularity of roasted soy flour in East Asia. Brief chronology / timeline of roasted whole soy flour (1540-2012). About this book. Abbreviations used in this book. How to make best use of this digital book–Search it. Seven pages of color photos. Contains 76 photographs and illustrations. http://www.soyinfocenter.com/books/160. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1920. Shin, J.S. 2012. [Case on the business strategy of small and mid-scale soybean food processing company]. *Korea Soybean Digest* 29(1):49-52. Nov. [Kor; eng]*

• ***Summary:*** "The objectives of this report are to provide business strategy model for small and mid scale soy processing companies by sharing the successful business development strategies (material sourcing, production and marketing) of mid scale soymilk company." Address: Yanggu, Korea.

1921. Park, Kyoung-Hee. 2012. Re: Korea Soyfood Society and their periodical *Korea Soybean Digest.* Letter (e-mail) to William Shurtleff at Soyinfo Center, Dec. 12–in reply to inquiry. 1 p. [Eng]

• ***Summary:*** "Today, I found 'Korean Soyfood Society' (http://www.soysos.or.kr/index.htm), which has published an annual academic journal *Korea Soybean Digest* since 1984. I tried to read the journals (they're written in the Korean language), but was not allowed to because I don't have a membership to the society.

"I checked the table of contents and Index of *Kankoku shoku bunkashi: genshi kara gendai made*, the Japanese book about the history of Korean food culture I mentioned the other day. There is a very short chapter dealing with Korean bean paste, but not the soybean itself. I checked the Index of the book, but found neither 'mame' nor 'daizu'" [two Japanese words for "soybean"]. Address: PhD candidate.

1922. Park, Kyoung-Hee. 2012. Re: Roasted soybeans in Korea. Letter (e-mail) to William Shurtleff at Soyinfo Center, Dec. 14–in reply to inquiry. 1 p. [Eng]

• ***Summary:*** 1. In Korean, roasted soybeans are called *pokûn k'ong* (literally "roasted beans")–using the McCune-Reischauer system of romanization.

2. How are they prepared and eaten? For example, there is a side dish which was eaten by noble people during the Choson era (1392-1897) in Korea. After being washed with water, the soybeans are roasted and coated with glutinous rice powder / flour. Then they are deep-fried and cooked in soy sauce with other seasonings.

3. Are roasted soybeans used as part of a festival similar to *setsubun* in Japan or *tsui-na* in China? Or they used in other ways in Korean festivals? Korean people don't use roasted beans on such occasions

4. Are they presently made mostly at home or commercially? They are normally purchased at supermarkets–although it might be possible that some people roast soybeans at home. They are now even sold at one website in Korean on the Web. These roasted beans are washed, dried, roasted at low temperature and eaten as a snack.

5. She does not know (without doing lots of research) how many companies make and sell roasted soybeans or how many tons of roasted soybeans are made each year.

6. One key question: What is the earliest Korean-

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language document in which roasted soybeans are mentioned? Address: PhD candidate.

1923. Jeong, J.K. 2012. Improvement of quality and probiotic effect of meju and doenjang prepared with mixed starter cultures. PhD thesis, Pusan National University. * Address: Busan, South Korea.

1924. Jeong, Jin-Bo; Choi, S.K.; Jeong, D.Y.; Kim, Y.S.; and Kim, Y.S. 2012. [Effects of germination time of soybeans on quality characteristics of Cheonggukjang fermented with an isolated bacterial strain]. *Korean J. of Food Science and Technology* 44(1):69-75. [34 ref. Kor; eng]
• ***Summary:*** "To investigate the effects of soybean germination time on the quality of cheonggukjang, the physicochemical characteristics and enzyme activities of cheonggukjang during fermentation were compared. *B. subtilis* SCD 115035 strain isolated from traditional cheonggukjang was selected for making cheonggukjang. Germinated (12-h) soybean cheonggukjang produced the highest amount of viscous substance (13.22%) after 48 h of fermentation, and the contents were inversely proportional to the germination time of the soybeans." Address: 1-2. Dep. of Food Science & Technology, Chonbuk National University, Korea.

1925. Kim, B.; Byun, B.Y.; Mah, J.H. 2012. Biogenic amine formation and bacterial contribution in Natto products. *Food Chemistry* 135:2005-11. *
• ***Summary:*** Reported high levels of spermine and spermidine in Japanese natto.

1926. Kim, H.K.; Kim, J.N.; Han, S.N.; Nam, J.H.; Na, H.N.; Ha, T.J. 2012. Black soybean anthocyanins inhibit adipocyte differentiation in 3T3-L1 cells. *Nutritional Research* 32(2012):770-77. *
• ***Summary:*** Note: An adipocyte (also known as a lipocyte or fat cell) is a cell specialized for the storage of fat, found in connective tissue.

1927. Kim, Min-Hwa; Han, S.Y.; Ko, J.M.; Kim, Y.S. 2012. [Degradation characteristics of proteins in Cheonggukjang (fermented unsalted soybean paste) prepared with various soybean cultivars]. *Food Science and Biotechnology* 21(1):9-18. [11 ref. Kor; eng]
• ***Summary:*** "In order to select the most ideal soybean cultivars for producing cheonggukjang, the protein degradation characteristics of cheonggukjangs prepared with 30 different soybean cultivars were compared. Cheonggukjang prepared with 'Nampung' (18.00±0.28) and 'Sohwang' (17.91±0.63) soybeans showed the highest contents of viscous substances." Address: Dep. of Food Science and Technology, Chonbuk National Univ., Korea.

1928. Kim, Ok-Rye; Kim, Dong-Han. 2012. [Effects of red-potato on the physicochemical properties of kochujang]. *J. of the Korean Society of Food Science and Nutrition* 41(12):1805-12. [24 ref. Kor; eng]
• ***Summary:*** "The effects of red-potato on the physicochemical properties of kochujang were investigated during fermentation. The number of yeast and aerobic bacteria in kochujang increased up to 4 weeks of fermentation, then the yeast number slowly decreased. Amylase activities also increased after 2 to 4 weeks of fermentation with the addition of red-potato.... Sensory results showed that a final percentage of 2% red-potato in kochujang was optimal for taste and overall acceptability." Address: Dep. of Food & Nutrition, Mokpo National Univ., Jeonnam 534-729, Korea.

1929. Lee, Nam-Hyouck; Jo, Eun-Ji; Oh, Se-Wook; Hong, Sang-Pil 2012. [Study on the hurdle technique for the reduction of *Bacillus cereus* spores in doenjang and gochujang]. *J. of the Korean Society of Food Science and Nutrition* 41(12):1842-46. [15 ref. Kor; eng]
• ***Summary:*** "The effects of hurdle techniques on the reduction of *Bacillus cereus* spores in Doenjang and Gochujang were investigated. In our system, *Bacillus cereus* spores were artificially inoculated into Doenjang and Gochujang. Hurdle techniques used in this study were additives (3% ethyl alcohol-0.03% oregano extract), Joule heating (95ºC for 5 min), and hydrostatic pressure (500 MPa for 5 min at 45ºC)." Address: 1. Div. of Metabolism and Functionality Research, Functional Materials Research Group, Korea Food Research Inst., Gyeonggi 463-900, Korea.

1930. Yoo, J.S. 2012. [Pretreatment of soybean and development of fermentation conditions of Chungkukjang for high contents isoflavone production]. *Food Engineering Progress* 15(4):355-61. [26 ref. Kor]*
• ***Summary:*** "The separation conditions for the enhancement of isoflavone contents in soybean by soaking and germination were developed, and the fermentation conditions of Chungkukjang were optimized by using response surface methodology analysis. The high-yield of isoflavone production was obtained when the conditions of soaking and germination were at 25.6ºC, 7 hr and 29.1ºC, 42.4 hr, respectively... Isoflavone contents in Chungkugjang under the optimum fermentation conditions were 1.3 times higher than the control (1,960 ppm)." Address: Chonbuk National Univ., Jeonju, Republic of Korea.

1931. Ann, Yong-Geun. 2012. [Jang (fermented soybean) in official and royal documents in Chosun Dynasty period]. *Korean J. of Food and Nutrition* 25(2):368-82. [Kor; eng]
• ***Summary:*** "This paper investigated the system that is relevant to Jang (fermented soybean paste or solution), the

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relief of hunger-stricken people by Jang, 33 kinds of Jang, and its consumption in the documents, such as the annals of the Chosun Dynasty, Ihlseong-document, Seungjeongwon daily, Uigwe (record of national ceremony), official documents on the basis of Kyujanggak institute for the Korean studies and database of Korean classics. There are lots of Jang named after the place of particular soybean's production from the ancient times. Jang, soybean, salt and Meju (source of Jang), during the Dynasty, were collected as taxation or tribute. In the 5th year of Hyeonjong (1664), the storage amount of soybean in Hojo (ministry of finance) was 16,200 kl, and its consumption was 7,694 kl a year. In the 32nd year of Yongjo (1756), the 1,800 kl of soybean was distributed to the people at the time of disaster, and in his 36th year (1756), the 15,426 kl of soybean was reduced from the soybean taxation nationwide. The offices managing Jang are Naejashi, Saseonseo, Sadoshi, Yebinshi and Bongsangshi. Chongyoongcheong (Gyeonggi military headquarters) stored the 175.14 kl of Jang, and the 198 kl of Jang in Yebinshi."

Note: There are 7 references that have been romanized (from 1993 to 2011) and 83 references in old Korean characters (from 1309 to 1905). These latter appear to be a great historical importance. Address: Dep. of Food and Nutrition, Chungcheong Univ., Cheongwon 363-890, Korea.

1932. Shurtleff, William; Aoyagi, Akiko. comps. 2013. History of soy sprouts (100 CE to 2013): Extensively annotated bibliography and sourcebook. Lafayette, California: Soyinfo Center. 671 p. Subject/geographical index. Printed 22 Jan. 2013. 28 cm. [1524 ref]

• ***Summary:*** This is the most comprehensive book ever published about the history of soy sprouts. It has been compiled, one record at a time over a period of 35 years, in an attempt to document the history of this ancient and interesting soyfood. It is also the single most current and useful source of information on this subject.

Contents: Search engine keywords. Dedication and acknowledgments. Introduction: What are soy sprouts? Countries where soy sprouts are consumed in Asia. Names of soy sprouts in Asia. Brief chronology / timeline of soy sprouts (1068-2012). About this book. Abbreviations used in this book. How to make best use of this digital book–Search it. Six pages of color photos. Contains 45 photographs and illustrations. http://www.soyinfocenter.com/books/162.

What Are Soy Sprouts? Soy sprouts are whole soybeans that have been washed, soaked in water, then placed in a container with holes in the bottom and allowed to germinate or sprout for 5-7 days until the sprouts are 2-6 inches long. They should be rinsed several times a day while they are sprouting.

Inexpensive, tasty, and easy to grow at home, soy sprouts are a fresh vegetable that can be grown in your kitchen at any time of year. Sprouts require much shorter cooking times that dry seeds. In places where fuel (or water) are in short supply, this can be a major advantage. During the sprouting process, the flatulence-producing carbohydrates largely disappear. Sprouts are a rich source of protein and various vitamins, especially vitamins B and C. The large (usually yellow) seed attached to each sprout distinguishes soybean sprouts from all other sprouts. Both the bean (cotyledons) and the sprout (hypocotyl) should be eaten together. Like all soyfoods, they should not be eaten raw. Cooking (steaming, boiling, sautéing, baking, etc.) for at least 7 minutes is necessary to eliminate their raw, "beany" flavor and to inactivate the trypsin inhibitors they contain.

Countries Where Soy Sprouts are Consumed in Asia: Soy sprouts are used in most countries in East and Southeast Asia which have a large Chinese or Korean population. They are most widely consumed in Korea. In China, Indonesia, the Philippines, Cambodia and Thailand they are fairly widely consumed, but probably not as much as mung bean sprouts. In Japan they are consumed, but not widely.

Names of Soy Sprouts in Asia:

Chinese–Mandarin–pinyin: douya, dou ya, dou-ya, huangdouya; da dou ya or da dou-ya

Chinese–Mandarin–Wade-Giles: touya, huangtouya, huang tou ya or huang tou-ya

Chinese–Cantonese: dai dau nga choi, ngunn nga choi; wong dow ga or wong dow gna; dow ngaah, dow ngah, dow gna; hwang dow ya, hwang dow-ya; ngah choy

Chinese–Fukienese:–tau ke

Filipino: togue, utaw

Indonesian: taugé or tauge or taugeh (of Chinese origin)

Japanese: daizu no moyashi

Khmer / Cambodian: Sondek bondos

Korean: kongnamul or kong namul or k'ong namul

Thai: taun gawk

Vietnamese: gia. In southern Vietnam it is called: gia dau nanh. In northern Vietnam it is called gia do tuong.

A Brief History of Soy Sprouts:

100 CE–Soy sprouts are first grown and used in China during the Han dynasty–but only as a medicine. Soy sprouts are first mentioned in China in the Shennong Bencao Jing [Classical pharmacopoeia of Shennong (Wade-Giles: Shen Nung), the Heavenly Husbandman]. The text refers to dadou huangjuan [four Chinese characters; yellow + curls + big + bean] for use as a medicine, not as a food (Huang 2000, p. 295).

1200 CE (approx.)–The earliest known document that mentions the preparation and use soy sprouts as a food in China is the *Shanjia Qinggong* or *Shanjia gongqing* [Basic Needs for Rustic Living], by Lin Hong. It appeared during the Southern Song dynasty (1127-1279). Bean sprouts were apparently a common article of food during the Song dynasty (960-1279) (Huang 2000, p. 296).

1767–Soy sprouts (probably) are first mentioned in an English-language publication or in the American colonies by Henry Yonge of Savannah, Georgia. Yonge got his

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information from Samuel Bowen, for whom he grew the first soybeans [called Chinese vetches] ever cultivated in North America in 1765. Bowen got his soybeans while traveling in China. Yonge writes:

"They put about two quarts of the vetches into a coarse bag, or hair-cloth bag, that will hold about a peck [2 gallons], and after keeping them in it a little time in warm water, they lay the bag on [a] flat grating, or a wooden lattice, placed about half way down a tub; then every four hours they pour water on them, and in about 36 or 40 hours they will have sprouted about three inches in length; they are then taken out and dressed with oil and vinegar, or boiled as other vegetables... "Mr. Flint and Mr. Bowen having found them an excellent antiscorbutic prepared in this manner, was a principal reason for his introducing them into America, as it would be a most valuable remedy to prevent or cure the scurvy amongst the seamen on board his majesty's ships." Note that in America, as in China, soy sprouts are first recommended for use as a medicine; It is their vitamin C that prevents or cures scurvy.

1830–Soy sprouts are first mentioned in Europe by Philip Franz von Siebold, an early traveler in Japan, in his book on the economic plants of Japan. In a large fold-out table, he states that soybeans (Sooja Japonica, Sieb.) can be artificially germinated to make "Mogasi" [sic, Moyashi]. He includes the word moyashi written in both katakana and Chinese characters.

1871–Frederick Porter Smith, a medical missionary from England living in China, states in his book Contributions toward the Materia Medica and Natural History of China, that soy bean sprouts (Tau-ya) are "artificially raised in large quantities for food in the winter" when green vegetables are scarce in China. This is the second earliest English-language publication that mentions soy sprouts.

1888–Keimlinge von Soja hispida, the German term for soy sprouts, is first used.

1905–Soy sprouts are first produced commercially in the United States by Wing Chung Long (later named Wing Chong Lung), a Chinese food company in Los Angeles, California.

1910 Jan.–Les germes de soja, the French term for soy sprouts, is first used.

1910 Jan.–Soy sprouts (Germes de soja) are first produced commercially in Europe by Li Yu-ying, a Chinese scholar and soybean expert, at his plant Usine de la Caseo-Sojaine at Valles, Colombes, northwest of Paris.

1914 Feb.–D. Bois in France publishes the earliest known illustration of a soy bean sprout.

1915–The term "soy bean sprouts" is first used in English by the USDA Bureau of Plant Industry, Inventory No. 35.

1917-1918–During World War I, interest in soy sprouts in the United States grows. Yamei Kin, a Chinese-American woman with an M.D. degree from an American college, is sent to China in June 1917 to study and report back on soyfoods–including soy sprouts, which she says can be used in a nutritious salad with fermented tofu.

Writing in Country Gentleman (28 Sept. 1918), Sam Jordan of Missouri states: "Another dish which tastes as good as it looks or sounds is soy-bean sprouts. The smaller beans, of some yellow or green variety, are usually used." They are excellent because of "their use in the winter, acting as a green vegetable, and the fact that the vegetable can be had whenever wanted."

William Morse, the USDA's soybean expert, writes in the Yearbook of the U.S. Department of Agriculture (1918), in a special section titled "Soy-bean sprouts," that in China soy beans are widely used for sprouting. "Bean sprouts can be used as a home winter vegetable, for the dried beans are sprouted easily in a short time under proper conditions of heat and moisture. It is quite possible that sprouted soy beans utilized in various vegetable dishes would appeal to the American taste." A full-page photo shows a large basket of sprouted soy beans. Taken by Frank N. Meyer, it is the first photo of soy sprouts ever published.

1918–Chi Yien Shih, in a booklet "Beans and bean products" (p. 7) first describes how to grow soy sprouts on a commercial scale.

1921 May–The modern English term "soy sprouts" is first used by Embrey and Wang in the China Medical Journal.

1921–Dr. John Harvey Kellogg, in his book The New Dietetics, has a special section titled "Soy bean sprouts" in which he is the first to use the word "vitamins" is describing the nutritional benefits of soy sprouts, and the first to note that "Sprouted soy beans is one of the constituents of the famous chop suey."

1923–The term "soybean sprouts" (with "soybean" spelled as one word), is first used in English by Piper & Morse in their classic The Soybean (p. 278)–to introduce eight recipes for these sprouts.

1938 Oct.–Whiteman and Keyt, in USDA Leaflet No. 166, first describe how to grow soy sprouts at home.

1943-1945–During World War II, awareness of soy sprouts again increases. Their champion is Prof. Clive McCay of Cornell University. His first brochure on the subject (April 1943, titled "Sprouted soy beans: Some informal notes") begins: "Our daily paper would surprise us if it carried an ad: 'WANTED: a vegetable that will grow in any climate, rivals meat in nutritive value, matures in 3 to 5 days, may be planted any day in the year, requires neither soil nor sunshine, rivals in vitamin C, has no waste (in preparation), can be cooked with as little fuel and as quickly as park chop.' The Chinese discovered this vegetable centuries ago in sprouted soy beans."

Prof. McCay and his wife, Jeanette, worked closely with the New York State Emergency Food Commission, to publicize soy sprouts and other soyfoods during the war

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years. Governor Thomas E. Dewey hosted a famous "soy bean lunch" at the governor's mansion in Albany, New York, to demonstrate the value of meat substitutes. Soy sprouts were in two of the dishes served to the 67 reporters.

1943 Nov.–"Half a dozen firms in Chinatown [New York City] raise thousands of pounds of soy and mungo sprouts daily for the city's restaurants and markets. Mungo sprouts are preferred." (Trelease & Trelease, J. of the New York Botanical Garden, p. 259).

1952 Feb.–Soy sprouts are first produced in the United States by a Japanese company, Yuta Moyashi Seizo-sho (Utah Beans Sprout Co.) in Salt Lake City, Utah.

1960s-2013–Soy sprouts benefit from the rapid growth of interest in all kinds of sprouts in the USA and Europe, and from the growing number of Asian-American citizens.

1965–William Brandemuhl, in an in-depth study of bean sprouts in Japan, discovers that Black mappe (Vigna mungo) are much more widely consumed than soybean sprouts. He takes some interesting photos in a shop that sprouts soybeans in Kyoto.

1976–Jhason Koo, of Pyung Hwa Food Co. Inc. (Toronto, Ontario, Canada) now makes 4,000 pounds of soybean sprouts weekly and sells them in 50-pound sacks to Oriental restaurants and groceries.

1976–F.G. Winarno et al., in *The Present Status of Soybean in Indonesia*, discover that soybean sprouts are most widely consumed in Lampung, on the southernmost tip of the island of Sumatra–6.5 grams per person per day.

1978 April 30–Masao Mori publishes a good update of Japan's bean sprout industry. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1933. Cha, Y.S.; Kim, S.R.; Yang, J.A.; Back, H.I.; Kim, M.G.; Jung, S.J.; Song, W.O.; Chae, S.W. 2013. Kochujang, fermented soybean-based red pepper paste, decreases visceral fat and improves blood lipid profiles in overweight adults (Open Access). *Nutrition and Metabolism* (*London*) 10(1):24. Feb. 26. [43 ref]

• ***Summary:*** "Conclusion: KCJ supplementation (32 g/day) for 12 weeks in overweight adults showed anti-atherosclerotic and anti-obesogenic effects."

Background:

"The increasing westernized Korean dietary lifestyle, including frequently eating away from home, has favored foods that have not been a part of the traditional Korean diet [1]. The changing consumers' demand for western food products and diminished traditional dietary lifestyle have overlapped with the prevalence of obesity and obesity-related chronic diseases in Korea." Address: 1-4. Dep. of Food Science and Human Nutrition, Chonbuk National Univ., Obesity Research Center, 664-14 Dukjin-Dong 1-Ga, Jeonju, Jeonbuk, 561-756, Republic of Korea.

1934. He, Gene. 2013. Re: Nature Soy, Inc.: Its history and products. Letter to William Shurtleff at Soyinfo Center, Feb. 27. 10 p. + 3 inserts. 28 cm.

• ***Summary:*** In 1990 Sunkee Tofu Food Company (*Xinji Doufu Shipin Gongsi* in pinyin) started in Pennsylvania, located at 448 North 12th St., Philadelphia, a few blocks from their present location. The founder was Wen Yatsun, who was born and raised in China but had been educated in the USA; he previously been an electrician and had owned and operated a restaurant in Philadelphia. Being in the restaurant business, he saw that there was a demand for tofu but no local manufacturers. His business thrived and grew very nicely. Sunkee mostly served customers in Philadelphia, especially restaurant customers.

The company's original products, sold under the Sunkee brand, were basic tofu products–the types popular in the Asian-American market: Soft tofu, firm tofu, silken tofu, extra firm tofu, and five-spice extra firm. Also: Soymilk (plain or sweetened, ½ gallon), soymilk (sweetened, 16 oz = 1 pint). In about 1992 the company introduced soy puffs (deep fried tofu puffs).

In 1998 Mr. Wen decided to establish a new company, Nature Soy, Inc. (*Datian Doupin Chang*, in pinyin) and two new brands: "Nature's Soy" and "Datian" (two Chinese characters meaning "Nature Soy"). Production of tofu was moved into the current location (713 North 10th Street in Philadelphia), with about ten times as much square footage and with a very modern, advanced tofu production line. A space in the new building was constructed for an R&D laboratory; it began operation in late 1998. That laboratory improved the sanitation of the entire production facility.

In 2002 the following specialty flavored products were introduced to the market: (1) Hot & spicy flavored tofu, 8 oz. (2) Curry flavored tofu, 10 oz. (3) Oriental sauce tofu, 10 oz.

In 2003 Gene joined the company as a partner with Mr. Wen. They both own the company and work there every day. Gene developed the company philosophy: "We take soy products seriously!" and "Healthier living, healthier life." At this time the company began to do a little bit of marketing to reach outside the Asian-American community. It was also for this reason that the company began to develop various pre-marinated types of tofu, sliced tofu, 5-minute tofu (a cake of tofu with a packet of seasoning that takes about 5 minutes to cook), etc. Gene joined the company in large part to make sure the company meets all sanitation and modern food processing regulations. Born and raised in China, his educational background is in dairy products in the USA. He was one of the few Chinese cheese makers. He earned his PhD degree from Utah State University, and was especially interested in fermented dairy products. After that, he went into the fermentation industry.

In about 2004 the R&D lab developed tofu that could be sliced as thin as 1/16 of an inch, and from this they developed a new product: organic deli-style pre-sliced tofu (see photo from 2005 company brochure). The product was

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pre-seasoned like a lunch meat. As far as we know, this was the world's first product of this type. They supplied it to Giant (a supermarket chain) and also to Walmart. Gene's original intention was to replace those lunch slices which contain a lot of low-grade materials–as well as cholesterol, saturated fat, etc. One big problem at the time was that the company did not have enough marketing money. Unfortunately, the demand for this product was not very great and it had to be discontinued

Maybe the product was ahead of its time. Gene has developed a related product that is even more interesting than the original thinly sliced tofu. It is like a block of cheese, where a deli or restaurant can put it on their own cheese slicer to make fresh tofu slices to any thinness they desire. The company did a focus group on that product with a group of vegetarians and the loved it, but it is not yet on the market.

Competitors: The biggest are House Tofu (which has a new plant in New Jersey), Vitasoy / Nasoya, and Pulmuone [which has a relatively new plant in Tappan, New York]. Nature Soy's product line is much bigger than that of House, which is various forms of water-packed tofu.

Nature Soy has been growing every year, without one year in which sales decreased, even during the Great Recession that started in 2008 and even during the anti-soy campaign on the Web. Of the latter Gene says simply, "They are crazy."

In about 2004 the wheat gluten based vegetarian meat substitutes were produced for commercial sales. Also in 2004 fried tofu (8 oz was introduced).

Mr. He knows and likes fermented tofu. He says that if you blend it with other ingredients (such as garlic) to make a fermented tofu spread, where it serves as the source of flavor, it makes a great spread–as for crackers. A lot of fermented tofu is sold in the USA at Asian food stores, but essentially all of it is imported. It is almost impossible for a domestic manufacturer to compete with the low imported prices.

Gene believes that Nature Soy has a bright future. Address: 713 North 10th St., Philadelphia, Pennsylvania.

1935. Bramblett, Billy. 2013. More history of Wildwood Natural Foods (Interview). *SoyaScan Notes.* March 16. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Pulmuone Wildwood Inc. now has a plant on the East Coast at 30 Rockland Park Ave., Tappan, New York 10983. Phone: (845) 365-3300.

Pulmuone has purchased the Monterey Pasta plant. John Breen, who had been Wildwood's CFO, is now running the Monterey Pasta plant. Billy has just returned from Expo West, where he worked at the Hodo Soy Booth and where he had a nice talk with John Breen and with various Pulmuone people. They were very nice to him. Y.C. Kang was there; he and Billy play golf together and they are friends. Doug Porter still works for Pulmuone; he was Wildwood's first employee back in the days when they were making sandwiches at the Sleeping Lady. Then Pulmuone sent some beautiful women over to take the origin and early history of how Wildwood. Billy had already written that history and given it to them, but they said they wanted to hear it from him directly. So he told it to them. In the USA, Pulmuone at one time had a factory in the Los Angeles (LA) area (in South Gate). That plant was closed sometime in 2003 or early 2004. The main factory in the LA area is now in Fullerton; it was newly opened in late 2003 or early 2004. Pulmuone no longer owns plants in Watsonville (Tom Lacina and his brother owned the property) or Santa Cruz (California), or Grinnell, Iowa.

The company was first named "Wildwood" under Chris Smith's tutelage. So Paul Duchesne was making sandwiches. He gave the business to Chris Smith then went to Boston. Chris Smith ran into the health department who said "You need to have a name on your label." Chris came to Billy and said, "What do you think I should do? I'm thinking 'Wildwood.' They walked out the back door of the Sleeping Lady and from there they could see redwood trees all the way up to Mount Tamalpais." Billy said, "Wildwood." They looked it up in a dictionary and found: "A wooded area in its natural state." Billy said, "Perfect." So Chris started putting on these little paper labels that he put on his Brown Rice and Tofu Sandwiches–"Wildwood Natural Foods."

Wildwood started making its sandwiches from organic ingredients in 1978 in The Sleeping Lady.

Chris Smith went to Boston. Paul Duchesne returned to Fairfax and started making sandwiches again. One day after work we decided, "Let's make tofu." Before that time, Paul, Chris, and Billy had gotten all the tofu they used from Quong Hop. They found a place at 135 Bolinas Rd. (across from the town hall), about a block away and across the street; The Sleeping Lady was at 58 Bolinas Rd. 135 Bolinas Rd. was a little storefront with a big picture window in the front. They incorporated the company there in April or May 1980, started to make tofu in August 1980. It was a tiny tofu shop, about 15 by 15 feet, with a walled-off kitchen behind it. They made tofu there until about 1993–because by that time they had already built the Santa Cruz plant.

It started when Paul Duchesne was an employee of Good Earth Natural Foods (founded in 1969; Mark Squire is one of the heavy organic hitters, and one of the most gentle, beautiful people in the world) a very early natural food store near The Sleeping Lady (TSL). The Good Earth asked TSL if they could use TSL's kitchen to make sandwiches, squeeze carrot juice, beet juice, and orange juice. So Paul came into TSL to make sandwiches for the Good Earth, then he dreamed up this Fried Rice and Tofu Sandwich (FRTS). He started making them, as well, at The Sleeping Lady, and then going and selling them at other natural food stores–in addition to The Good Earth. That's when he started his enterprise, that later came to be named Wildwood Natural Foods. Address: Pulmuone Wildwood.

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1936. Breen, John. 2013. Re: Some key dates in the history of Pulmuone. Letter (e-mail) to William Shurtleff at Soyinfo Center, March 20. 1 p.
• ***Summary:*** 2002 May–Pulmuone's tofu plant in Tappan, New York starts operations.

2003 Aug.–Pulmuone's tofu plant in Fullerton, California, starts operations. The plant in South Gate closes shortly after Fullerton starts operations. Address: Executive Vice President of Manufacturing, 2315 Moore Ave., Fullerton, California.

1937. Breen, John. 2013. Re: What does the word "Pulmuone" mean? Letter (e-mail) to William Shurtleff at Soyinfo Center, March 21. 1 p.
• ***Summary:*** "It is actually not a word in Korean, it is a combination of two words 'Pulmu' and 'one.' And 'Pulmu' is not actually a word either but is a kind of contraction of the word that means 'the bellows' as used in a forge. The name was constructed by Mr. Won the spiritual founder of Pulmuone. See below web site for more info on Mr. Won and a photograph of him,

http://www.csulb.edu/~jlee6/PMO/html/story.html

"The story is that after the Korean war Mr. Won saw that a lot of the destroyed war materials where being melted down and reforged to be used for reconstruction. He recognized that many of the human beings that had been effected by the war also needed to be 'reforged' into productive members of society. Hence the term 'Pulmu' or 'bellows' and paired with 'one' as in 'we are all one' or forged together as one. It is not easy to translate. As you can see from the website he started a cooperative organic farm to bring together people who had been damaged by the war and help them to become productive members of society once again." Address: Executive Vice President of Manufacturing, 2315 Moore Ave., Fullerton, California.

1938. *SoyaScan Notes.* 2013. Three early students of soyfoods in Japan after World War II: A.K. Smith, William Brandemuhl, and William Shurtleff (Overview). April 15. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** Dr. A.K. Smith, had a strong academic background, having earned MA and PhD degrees from Columbia University. His interest in East Asian soyfoods began in about April 1948 when he began to write questions about fermented soyfoods to Lewis B. Lockwood, PhD and microbiologist. By June 1948 he had departed from the United States on a 3-month study tour that would take him to China, Japan and Korea. He collected samples of 100 microorganisms used in fermenting soyfoods. His articles on "Oriental use of soybeans as food" began appearing in *Soybean Digest* in Feb. 1949. He was mainly interested in fermented soyfoods; his articles about each food were accurate but relatively short.

William Brandemuhl studied soyfoods only in Japan. After graduating from the University of Wisconsin, he arrived in Kyoto, Japan in Jan. 1963 and became a research fellow at the Department of Agricultural Economics, Kyoto University, Kyoto, Japan. Between Feb. 1963 and May 1964 (15 months) he conducted field research on soybean utilization in Japan. In June 1963 (after William had been in Japan for 4 months), Tomoko Arai (his close friend) completed her graduate studies, graduated from the University of Wisconsin, and (since her scholarship was finished), returned to Japan–to be with William and to help him with his research in Japanese, which he spoke only moderately well. She traveled with him throughout Japan and translated for him during the many interviews he conducted. William's monthly check from Honeymead paid for his room and board–but not for his travel and research, so he had to work part time doing English translation for a Japanese company. On trips, he took many photos using his expensive Nikon camera. Tomoko's family lived near Kobe, where she and William were married on 8 Aug. 1964–three months after he finished his field research.

William's primary interests were: (1) To describe in detail, with photos, how each of different Japanese soyfoods were made. He was extremely thorough. (2) The place of each food in Japanese culture. (3) The industry of which each food was a part and its trade associations (if any). (4) The future of that food in Japan. He was not particularly interested in transmitting these foods and their technology to the United States, and he took almost no interest in carefully selecting names for these foods (or the equipment used to make them) which would give them the best chance of catching on in the United States.

William Shurtleff first visited Japan for 3 months in the summer of 1967 while a student at Stanford University; he lived in a Zen temple in Kyoto, practiced meditation each evening, and studied Japanese language and culture. After graduating from Stanford and living for 2½ years at Tassajara Zen Mountain Center, he arrived in Japan on 16 Jan. 1971 with the intent of becoming fluent in Japanese so he could translate the writings of Dogen Zenji, an early Soto Zen master. For the first year he lived with a Japanese family in Kyoto and became a full-time student at the *Nihongo Gakko*, a Japanese language school in Kyoto. At the end of that year he moved to Kyoto, where he entered a university to continue his Japanese language studies. While in Tokyo, he became close friends with Akiko Aoyagi, a Japanese artist and cook. In Oct. 1972 he first visited and met Mr. Toshio Arai, a Japanese tofu master under whose guidance Shurtleff would later become an apprentice. In Dec. 1972 he started to write a booklet for Americans about tofu; he believed that tofu could be a very positive addition to the American diet and that young Americans would enjoy making tofu as a new occupation. On 13 Jan. 1973 he signed a contract with Autumn Press, a small publishing company in Japan owned

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by Americans Nahum and Beverly Stiskin. For the next 2½ Shurtleff and Aoyagi researched and wrote *The Book of Tofu*, which was published in Dec. 1975. Shurtleff made enough money to live in Japan by working as an interpreter, translator and researcher for his father's tool company. The story of this adventure is told in the Preface to *The Book of Tofu* (see 2001 or subsequent editions). Shurtleff's interests and work were different from those of William Brandemuhl in several important ways: (1) He spoke very good Japanese. (2) His initial focus was almost entirely on tofu, although he later wrote a book about miso. (3) He was just as interested as Brandemuhl in describing accurately how tofu (and other soyfoods) were made in Japan, but primarily with the intent of transferring this technology to the United States and other parts of the world. To this end he was deeply interested in choosing names for soyfoods and equipment that would help them take root in their hew homes. On 13 June 1978 Shurtleff and Aoyagi, after being married, moved from Japan to live in the United States. For the rest of his life Shurtleff did research on and wrote books about soyfoods, and simultaneously worked to introduce them to the United States. By late 1999 soyfoods had become important foods in the USA; soy sauce, soymilk and tofu had become mainstream foods.

1939. Hye, Jeong Kang; Yoo, J.A.; Park, J-M.; Kim, S.H.; et al. 2013. [Quality characteristics of black soybean paste (daemacjang) with mixture ratio of black soybean, barley and salt concentration]. *Korean J. of Food and Nutrition* 26(2):266-72. June. [29 ref. Kor; eng]
• ***Summary:*** "This study investigated the quality characteristics of black soybean paste (*daemacjang*) with black soybean content and salt concentration. The total acidity increased as the pH decreased during the fermentation period. The amino-type nitrogen content of all samples increased significantly during the fermentation time. Total cell counts were not significantly different during fermentation, and mold counts decreased at 3 log cycles. The cell counts of lactic acid bacteria decreased approximately 2 to 3 log cycles in 10% salt concentration (treatment B and C), and were not detected in treatment A and D. Total polyphenol contents of treatment A, B, and C were 42.77%, 52.99% and 52.95% during fermentation up to 70 days, respectively, which was higher than D (39.86%). In a sensory evaluation, treatment B showed the highest scores for overall acceptability." Address: 1. Chungcheongbukdo Agricultural Research and Extension Services, Cheongwan, 363-883, Korea.

1940. Yang, Ming; Kwak, Jung Soon; Jang, Seri; Jia, Yuan; Park, Inshik. 2013. [Antioxidant activity of soybean yogurt added tomato extract by *Bacillus subtilis* and *Lactobacillus plantarum*]. *Korean J. of Food and Nutrition* 26(2):280-86. June. [29 ref. Kor; eng]
• ***Summary:*** "This study was performed to investigate the effect of types of microorganisms on the antioxidant activity of soybean yogurt by a single or mixed culture of *Bacillus subtilis* and *Lactobacillus plantarum* isolated from chunggukjang and kimchi." Address: Dep. of Food Science and Nutrition, Dong-A Univ., Busan 604-714, Korea.

1941. Yang, Ming; Kwak, Jung Soon; Jang, Seri; Jia, Yuan; Park, Inshik. 2013. [Fermentation characteristics of soybean yogurt by mixed cultures of *Bacillus* sp. and lactic acid bacteria]. *Korean J. of Food and Nutrition* 26(2):273-79. June. [23 ref. Kor; eng]
• ***Summary:*** "The microorganisms producing high protease activity and acid producing ability were isolated from Chunggukjang and kimchi, which were identified as *Bacillus subtilis* and *Lactobacillus plantarum* by morphological, biochemical and nutrient requirement. The attempt was made to produce soybean milk yoghurt by using the isolated microorganisms. The mixed culture of *Bacillus subtilis* and *Lactobacillus plantarum* exhibited the lowest pH value of 4.23 and highest titratable acidity of 0.88% compared to those of single cultures at 37ºC for 32 hrs..." Address: Dep. of Food Science and Nutrition, Dong-A Univ., Busan 604-714, Korea.

1942. Koo, Sung Cheol; Seo, J.S.; Park, M.J.; Cho, H.M.; Park, M.S. 2013. Identification of molecular mechanism controlling P34 gene expression in soybean. *Plant Biotechnology Reports* 7(3):331-338. July. [21 ref]
• ***Summary:*** It was demonstrated that the insertion mutation in the P34 promoter region is causing a down-regulation of P34 translation while mRNA levels are similar in low-P34 and normal genotypes, and there is no sequence variation in the coding region of the P34 gene between mutant and normal genotypes. Address: Dep. of Functional Crop, National Inst. of Crop Science, Rural Development Administration, Miryang 627-803, Korea.

1943. Lee, Seog-Won; Han, Sung-Hee. 2013. [Quality properties of gelling product prepared from soybean curd residue with addition of gums]. *Korean J. of Food and Nutrition* 26(3):428-37. Oct. [22 ref. Kor; eng]
• ***Summary:*** "The physical properties of jellified soybean curd residue (*biji*) with the addition of various gums were investigated to optimize the direct availability of a by-product of the tofu production process. The lightness (L value) of the jellified Biji prepared with various gums was approximately 77 to 80, regardless of the concentration of gum used. Especially at the concentration of 0.1% and 0.3%, a pectin showed a significantly higher value compared with other gelling agents (carrageenan and agar). The strength of samples prepared on the basis of carrageenan showed the value of 335 to 569 g/cm2 and 234 to 335 g/cm2 according to the addition of locust bean gum and xanthan

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gum, respectively. On the other hand, the samples made with pectin and agar were 134 to 272 g/cm2 and 50 to 215 g/cm2, respectively. Where locust bean gum was used as a viscous agent, the adhesiveness of sample prepared by adding carrageenan was greater than those made with pectin or agar. The values were -6.0-11.0 g, -2.7-10.2 g and -3.7-7.0 g, respectively. Overall, the strength and adhesiveness of samples according to increase of the added amount of Biji showed constantly increasing trend regardless of the type of gelling agent used. In the sample containing carrageenan this trend was most noticeable." Address: 1. Dep. of Food & Nutrition, Yuhan Univ., Bucheon 422-749, Korea.

1944. Jeong, Kwang-Ho; Choi, M.-S.; Lee, S.-K.; Seo, M.-J.; Hwang, T.-Y.; Yun, H.-T.; Kim, H.-S.; Kim, J.-T.; Kwon, Y.-U.; Kim, Y.-H. 2013. Development of low Gly m Bd 30K (P34) allergen breeding lines using molecular marker in soybean [Glycine max (L.) Merr.]. *Plant Breeding and Biotechnology* 1(3):298-306. Sept. [24 ref]
• ***Summary:*** Genetic markers have been described for identification of low-P34 genotypes in breeding programs. The advantage of gene silencing is in the complete elimination of an allergen, whereas in "null"-alleles gene expression in frame shift mutations may be reduced beyond a threshold level, while small amounts of the respective protein or some peptides thereof can still be synthesized.

Although an increasing number of soyfoods are being produced, their consumption is limited for individuals allergic to soy. Address: 1-3. National Inst. of Crop Science, Rural Development Administration, Suwon 441-857, Korea.

1945. Kim, Y.J.; Lee, S-J.; Lee, H.M.; et al. 2013. Comparative proteomics analysis of seed coat from two black colored soybean cultivars during seed development. *Plant Omics Journal* 6(6):456-63. Sept. *
• ***Summary:*** "The seed coat plays an important role in the life cycle of soybean by controlling embryo development and determining seed dormancy and germination. In the present study, comparative proteomics analysis of the seed-coat from two black-colored soybean cultivars, Seonheuk and Geomjeong 2 which have different anthocyanin and isoflavone contents, was conducted."

Note: "The branches of science known informally as omics are various disciplines in biology whose names end in the suffix -omics, such as genomics, proteomics, metabolomics, metagenomics and transcriptomics. Omics aims at the collective characterization and quantification of pools of biological molecules that translate into the structure, function, and dynamics of an organism or organisms" (Source: Wikipedia May 2020).

1946. Lee, Haeng-Shin; Cho, Y.H.; Park, J.; Shin, H.R.; Sung, M.K. 2013. Dietary intake of phytonutrients in relation to fruit and vegetable consumption in Korea. *J. of the Academy of Nutrition and Dietetics* 113(9):1194-99. Sept.
• ***Summary:*** "Flavonoids were mainly obtained from persimmons, mandarins, apples, grapes, onions, soybeans, and chestnuts. However, one or two food items contributed to nearly all intake of each phytonutrient, suggesting a lack of variety." Estimated adolescent soyfood and isoflavone intake: 512 boys and girls ages 2-18. Intake of soyfoods not reported. Isoflavone intake 30.3±4.8 mg/day did meet fruit and vegetable recommendations. 1,716 boys and girls ages 2-18. Intake of soyfoods not reported. Isoflavone intake 4.90±0.6 mg/day did not meet fruit and vegetable recommendations. Address: 1..

1947. Chang, Youngeun; Choue, R. 2013. Plasma pharmacokinetics and urinary excretion of isoflavones after ingestion of soy products with different aglycone/glucoside ratios in South Korean women. *Nutrition Research and Practice* (*Korea*) 7(5):393-99. Oct. [37 ref]
• ***Summary:*** "Twenty-six healthy female volunteers (20-30 y old) consumed three different soy products (i.e., isogen, soymilk, and fermented soybeans) with different aglycone/glucoside ratios... The urinary recovery rates of daidzein and genistein were 42% and 17% for the isogen group, 46% and 23% for the fermented soybean group, and 33% and 22% for the soymilk group." The results indicate that soy products containing high levels of isoflavone aglycone are more effective for maintaining plasma isoflavone concentrations. Address: 1. Dep. of Agrofood Resources, National Academy of Agricultural Science, Rural Development Administration, Gyeonggi 441-853, Korea.

1948. Kim, Sounghun; Lee, Kyei-im; Choi, Ji-Hyeon. 2013. [The analysis on the production of bean curd industry in Korea]. *Korean J. of Agricultural Science* 40(4):411-16. Dec. 31. [Kor; eng]
• ***Summary:*** "In Korea, bean curd is one of most important foods and bean curd industry keeps growing. Korean bean curd industry has complicated structure with a few large-scale manufacturers and many small-size manufacturers, which causes difficulty in figuring the strategy for the promotion of bean curd industry. In order to solve this problem, more specific studies are required. The purpose of this paper is to analyze the production sector of Korean bean curd and to present the implications for the promotion of Korean bean curd industry. Survey analyses to producers was conducted for this research. The results of studies present a few findings: First, the solution for the easier purchase of raw material (soybean) should be prepared. Second, the support for marketing as well as R&D to small-size manufacturers is required. Third, the monitoring and controlling of unfair trading in bean curd market should be strengthened. Forth, the certification programs for the bean curd products should be managed." Address: Dep. of Agricultural Economics, Chungnam National Univ. [Korea].

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1949. Lee, Na-Ri; Go, Tae-Hun; Lee, Sang-Mee; Hong, Chang-Oh; Park, Kyu-Min; Park, Geun-Tae; Hwang, Dae-Youn; Son, Hong-Joo. 2013. [Characteristics of chungkookjang prepared by *Bacillus amyloliquefaciens* with different soybeans and fermentation temperatures]. *Korean J. of Microbiology* 49(1):71-77. [16 ref. Kor; eng]
• ***Summary:*** "This study was carried out to investigate the characteristics of Chungkookjang depending on different soybeans and fermentation temperatures using *Bacillus amyloliquefaciens* C2 isolated from homemade Chungkookjang. The highest protease activity was 854 U/g in yellow soybean Chungkookjang and 847 U/g in black soybean Chungkookjang at 35ºC." Address: 1-4. College of Natural Resources and Life Science, Pusan National Univ., Miryang 627-706, Republic of Korea.

1950. Lee, Cherl-Ho. comp. 2013. Food war 2030. Translated by Colin A. Mouat. Seoul, Korea: Sikanyeon Publishing. [xiv] + 241 p. Illust. 21 cm. [600+ ref. Kor]
• ***Summary:*** This novel makes bold predictions about world food security during the next few decades. Sikanyeon is the publishing house of Korea Food Security Research Foundation.

1951. Yum, Taewoo; Lee, S.; Kim, Y. 2013. Association between precocious puberty and some endocrine disruptors in human plasma. *J. of Environmental Science and Health, Part A: Toxic/Hazardous Substances and Environmental Engineering* 48(8):912-17. [21 ref]
• ***Summary:*** "Endocrine disruptors [EDCs] that mimic natural hormones and inhibit the action of hormones have recently attracted attention as one of the main cause of precocious puberty"–premature growth and the display of secondary sex characteristics.

"EDCs examined in this study were bisphenol-A (BPA), di(2-ethylhexyl) phthalate (DEHP), dibutyl phthalate (DBP), mono(2-ethylhexyl) phthalate (MEHP), monobutyl phthalate (MBP), n-nonyl phenol (n-NP), and t-octylphenol (t-OP), and whereas the isoflavones were equol, genistein, and daidzein." The latter three substances are found in soybeans.

The "levels of the daidzein, equol and genistein were 1.37, 1.3 and 2.67 times higher than those of the control group, and genistein showed a statistically meaningful result (P = 0.0008)." Therefore these three, and especially genistein, may have an effect on early onset of puberty. Address: 1. Korea Inst. of Science and Technology, Seongbuk-gu, Seoul, Republic of Korea [South Korea].

1952. Shurtleff, William; Aoyagi, Akiko. comps. 2014. History of soybeans and soyfoods in Korea, and in Korean cookbooks and restaurants outside Korea (544 CE to 2014): Extensively annotated bibliography and sourcebook. Lafayette, California: Soyinfo Center. 759 p. Subject/geographical index. Printed 17 March 2014. 28 cm. [1524 ref]
• ***Summary:*** This is the most comprehensive book ever published about the history of soy in Korea. It has been compiled, one record at a time over a period of 35 years, in an attempt to document the history of this ancient and interesting subject. It is also the single most current and useful source of information on this subject.

Contents: Search engine keywords. Dedication and acknowledgments. Introduction: Brief chronology / timeline of soy in Korea. About this book. Abbreviations used in this book. How to make best use of this digital book–Three keys. Contains 80 photographs and illustrations. http://www.soyinfocenter.com/pdf/174/Kore.pdf. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1953. Choi, Seon-Jeong; Ko, Hyeong-Min; Choi, Won-Seok; Lee, Nan-Hee; Choi, Ung-Kyu. 2014. [Changes in sensory characteristics of *cheonggukjang* made with smoked soybeans]. *Korean J. of Food and Nutrition* 27(2):280-86. April. [16 ref. Kor; eng]
• ***Summary:*** Cheonggukjang (also spelled cheongkukjang) is Korean-style natto.

"This study investigated the changes in the sensory characteristics of cheonggukjang made with smoked soybean. The total organic acid content of cheonggukjang made with smoked soybeans (CSS) increased to about two times in comparison with cheonggukjang made with non-smoked soybeans (CNS). Among the organic acids, the amount of succinic acid was highest for both CSS and CNS. The total free sugar content of CSS (228.6±8.8 mg%) was significantly reduced compared to that of CNS (350.1±13.7 mg%). Further, the total free amino acid content of CSS (10,123.3±301.4 mg%) was significantly increased compared to that of CNS (8,912.5±286.5 mg%). The contents of sweet, savory and bitter taste compounds were significantly elevated in CSS when compared to that of CNS. However, there were no significant differences in the total content of fatty acids in CNS and CSS. The sensory evaluation of aroma, taste and overall quality of CSS were significantly increased compared to that of CNS. Taken together, it was expected that a smoking process is useful for the development of new fermented foods." Address: 1. Dep. of Food Science & Technology, Korea National Univ. of Transportation, Jeungpyeong 368-701, Korea.

1954. Ko, Hyeong-Min; Choi, Seon-Jeong; Choi, Won-Seok; Lee, Nan-Hee; Choi, Ung-Kyu. 2014. [Quality characteristics of *cheonggukjang* made with smoked soybeans]. *Korean J. of Food and Nutrition* 27(2):274-79. April. [30 ref. Kor; eng]
• ***Summary:*** "The objective of this study was to investigate the fermentation characteristics of cheonggukjang [Korean-

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style natto] made with smoked soybeans. The study found that the amino nitrogen content and pH of cheonggukjang made with smoked soybean (CSS) were significantly elevated compared to that of cheonggukjang made with non-smoked soybeans (CNS). On the other hand, the moisture content of CSS was significantly lower when compared to that of CNS. Moreover, there were no significant differences in the viscous substance content between CNS (5.8±0.2%) and CSS (5.6±0.3%). In terms of colour, the L and b values of CSS were higher than that of CNS, whereas the a value of CNS was higher than that of CSS. Hence, it was confirmed that the total isoflavone contents in CSS (1,624.6±53.2 μg/g) were higher than that in CNS (1,590.6±59.3 μg/g). In both CSS and CNS, the content of genistin was highest followed by glacitin and daidzein. Also, the number of aerobic bacteria in CNS (8.1±0.4 log cfu/g) was higher than that in CSS (7.3±0.3 log cfu/g). Taken together, a smoking process can useful for the development of new cheonggukjang products." Address: 1. Dep. of Food Science & Technology, Korea National Univ. of Transportation, Jeungpyeong 368-701, Korea.

1955. Lee, Sun Mee; Hwang, Ja Young. 2014. [Physicochemical characteristics of soybeans grown in different origins and cultivation methods accompanying tofu properties]. *Korean J. of Food and Nutrition* 27(2):302-09. April. [16 ref. Kor; eng]

• ***Summary:*** "In this study, the characteristics of soybeans with different cultivation methods depending on their origins and the properties of tofu made from these soybeans were studied. The isoflavone content was higher in the general Korean soybeans compared to the organic American soybeans. There were no significant differences among the Chinese soybean samples, so the cultivar method was considered to have a greater effect on the isoflavone contents rather than the cultivation method. The protein contents were higher in the tofu made from the general Chinese soybeans and the organic Korean soybeans. Furthermore, the tofu made from the organic Chinese soybeans contained the least amount of proteins. Isoflavone contents were not significantly different among the samples. Texture profile analyses consisting of hardness, cohesiveness, adhesiveness, springiness, and gumminess were all shown to be higher in the organic tofu than in general tofu, with the exception of adhesiveness. In sensory evaluation, color and texture were significantly different according to the samples, and the differences were found to be affected more by the origin of soybeans rather than the cultivation methods. According to this study, the physicochemical properties of the soybeans and tofu seemed to be influenced by the cultivation region rather than the methods." Address: 1. Div. of Food Science, Kyungil Univ., Gyeonsan 712-701, Korea.

1956. Jeong, Do-Won; Kim, H.R.; Jung, G.; Han, S.; Kim, C.T.; Lee, J.H. 2014. Bacterial community migration in the ripening of Doenjang, a traditional Korean fermented soybean food. *J. of Microbiology and Biotechnology* 24(5):648-60. May 28. [43 ref]

• ***Summary:*** "*Doenjang*, a traditional Korean fermented soybean paste, is made by mixing and ripening *meju* with high salt brine (approximately 18%). Meju is a naturally fermented soybean block prepared by soaking, steaming, and molding soybean. To understand living bacterial community migration and the roles of bacteria in the manufacturing process of doenjang, the diversity of culturable bacteria in meju and doenjang was examined using media supplemented with NaCl, and some physiological activities of predominant isolates were determined." Address: 1-4. Dep. of Food Science and Biotechnlogy, Kyonggi Univ., Suwon 443-760, Republic of Korea.

1957. AVRDC–The World Vegetable Center (Website printout–part). 2014. www.avrdc.org Retrieved June 6.

• ***Summary:*** Under "About us" is a page of Quick Facts:

"Mission: The alleviation of poverty and malnutrition in the developing world through the increased production and consumption of nutritious and health-promoting vegetables.

"Founding: The Asian Vegetable Research and Development Center was founded on 22 May 1971 by the Asian Development Bank, Japan, Korea, Philippines, Thailand, USA, Vietnam, and the Republic of China (Taiwan) with a mandate to work in tropical Asia. The headquarters campus in Taiwan was dedicated on 17 October 1973."

"Our name: As the Center gained expertise and capacity, it expanded into sub-Saharan Africa, Central Asia, and South Asia. In 2008, the organization adopted a new name–AVRDC–The World Vegetable Center–to reflect its global scope."

"Annual budget: Approximately US$18 million, with the majority of funding from national governments and major private foundations. Donors include the Asia & Pacific Seed Association, Australian Centre for International Agricultural Research, Germany's GIZ/BMZ, Republic of China, United Kingdom's Department for International Development, United States Agency for International Development, UK Department for International Development.

"Management & Structure: Independent, non-governmental, not-for profit international agricultural research institute run by a management team that reports to an international Board of Directors. The organizational structure accommodates regional project management and efficient global coordination.

"Staff: Approximately 300 staff with around 50 internationally recruited scientists and professionals

"Headquarters: Shanhua, Taiwan. The Center is the only international agricultural research center headquartered in a Chinese-speaking country.

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"Regional offices: East and Southeast Asia–Bangkok, Thailand (1992). Eastern and Southern Africa–Arusha, Tanzania (1992). South Asia–Hyderabad, India (2006). West and Central Africa–Bamako, Mali (2007).

"Sub-regional offices: Central & West Asia and North Africa–Tashkent, Uzbekistan. National Horticultural Research Institute–Suwon, Korea.

"Liaison offices: Yaounde, Cameroon

"Training station: East and Southeast Asia Research and Training Station–Kamphaeng Saen, Thailand.

"Outreach project offices: Maroua, Cameroon. Sikasso, Mali. Java, Indonesia. Malang, Indonesia. Sigatoka, Fiji. Honiaria, Solomon Islands. Dhaka, Bangladesh. Islamabad, Pakistan. Ranchi, Ludhiana, Bhubabeswar, Chickmagalur, and Raichur, India.

"Principal partners: National agricultural research and extension systems and nongovernment organizations in developing countries; the private seed sector; research universities.

The headquarters in southern Taiwan is located on a 117-hectare campus. AVRDC also has regional offices in Arusha, Tanzania (192); Bamako, Mali (2007); Tashkent, Uzbekistan; Bangkok, Thailand (1992); Hyderabad, Andhra Pradesh, India (2006); and Fiji. Address: P.O. Box 42, Shanhua, Tainan 74199, Taiwan.

1958. Choi, Duk-Kyung. 2014. [On review of Renshu and Rongshu: with regard to the origin of the Chinese soybean]. *Dongyang Sahak Yougu* (*The Society for Asian Historical Studies: Seoul*) No. 128. p. 1-45. June. ISSN: 1226 1270. [36 ref. Kor; chi]

• ***Summary:*** This article has a Chinese summary but no English summary.

Concerning the words "Renshu" and "Ronshu" in the title; these are Chinese words that meant the same thing or almost the same thing as the word *Shu*, meaning soybean. These two words first appear in the *Erya* (Literary Compositor, compiled in about 150 BCE). In Chapter 13, "Explanation of Grass" (*Shicao*) the *Erya* states that *"rongshu* is the same as *renshu."* This means that the beans of the *rong* (Wade-Giles: Jung) tribe are the same as soybeans. (Translated by H.T. Huang, PhD, Aug. 2001).

A later example, in the *Qimin Yaoshu* (written in 544 CE by Jia Sixie) he states in Chapter 6, when talking about the *Erya*, "ronshu is the same as renshu." Sun Yan's commentary on the *Erya* explains that *rongshu* is the name for soybean (*dadou*).

Another later example: In the *Erya Xinyi* [New explanations of the *Erya* (ancient dictionary)], by Lu Tian: The section titled *Rongshu* and *renshu* discusses different words applied to *shu* (the soybean). *Rong* and *Ren* refer to two different tribes that live in different parts in northern China.

Concerning this Prof. Choi comments (23 Feb. 2021, email): The above is the primary point of view, but in the thesis, a more detailed and comprehensive analysis was conducted. The Chinese analysis is a rudimentary step. Of course, all raw materials were found and analyzed. Address: Prof., Dep. of History, Pusan National Univ. [Pusan, Korea].

1959. Lee, Ggot-Im; Lee, Cherl-Ho. 2014. Safety aspects of alkaline-fermented foods. In: Prabir K. Sarkar & M.J. Robert Nout, eds. 2014. Handbook of Indigenous Foods Involving Alkaline Fermentation. Boca Raton, Florida: CRC Press, Taylor & Francis Group. xxviii + 601 p. See p. 399-423. [69 ref]

• ***Summary:*** Contents: 6.1 Alkaline-fermented foods (AFFs) are generally safe (Korean chongkukjang and doenjang, Japanese natto, Chinese douchi, Thai thua nao, and Nepalese and Indian kinema, which are all made from soybean, belong to this class of fermented foods. *Bacillus subtilis* and related bacilli are the essential and main microorganisms responsible for making AFFs). 6.1.1 Initial thermal treatment.

6.1.2. Growth of *Bacillus subtilis* (It's optimal growth temperature is around 40ºC. Several researchers have reported that *Bacillus subtilis* and *Bacillus pumilus* can produce metabolites that inhibit the growth of pathogenic bacteria. The *Bacillus* species, especially *B. subtilis*, not only have an antibiotic effect, they also produce strong proteolytic enzymes that hydrolyze that protein in the beans and seeds into peptides and amino acids, and finally into ammonia. The combination of high pH and high concentration of free ammonia, along with rapid growth of *B. subtilis* at the high temperature of 40ºC makes it very difficult to grow).

6.1.3 pH change (The pH of AFFs typically rise from 6.0 to 7.0 at the start to 7.9 to 9.0 at the end. Many of the pathogenic and spoilage microorganisms are inhibited by a pH over 8.0). 6.1.4 Cooking process.

6.2 Hazards in alkaline-fermented foods (microbiological and chemical). 6.2.1 Microbiological hazards (*Bacillus cereus* is the main culprit). 6.2.1.2 Other potential pathogens. 6.2.1.3 Mycotoxins (incl. aflatoxins). 6.2.2 Chemical hazards: Biogenic amines (Biogenic amines have been reported in AFFs such as natto, chongkukjang, and doenjang. Miso is reported to have had high levels of histamine, putrescine, cadaverine, and tyramine).

6.3 Control of hazards (by applying good agricultural practices {GAP} and hazard analysis and critical control points (HACCP)). 6.3.1 GAP. 6.3.2 HACCP (The critical control points are placed in the flowchart of operational steps). 6.4 Conclusion.

Soy-related tables: 6.3 Approximate pH tolerance of some microorganisms (shows maximum and minimum for each).

6.6 Main biogenic amines and their precursors. This table has 4 columns: Compound name, precursor structure (2), and molecular weight. It also has 9 rows: Agmatine, Tryptamine, 2-Phenylethyl amine, Putrescine, Cadaverine,

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Histamine, Tyramine, Spermidine, and Spermine.

6.7 Contents of biogenic amines in different fermented soybean products (mg/kg). This table has 10 columns: Tyramine, Tryptamine, Histamine, Putrescine, Cadaverine, Phenylethylamine, Spermine, Spermidine and Reference. It also has 9 rows: Miso, Doenjang (Korean traditional type), Doenjang (Korean modern type), Miso Chongkukjang, Chongkukjang powder, natto (Japanese), natto (Taiwan), natto (Japanese). The foods with the highest Spermidine content are (1) natto (Japanese) 339.7. (2) chongkukjang powder 54.6 (3) chongkukjang 52.0.

Soy-related figures: 6.1 (graph) The pH change of several alkaline-fermented foods (Chongkukjang, Thua nao, and Ogiri), Address: Korea Food Security Research Foundation, Korea University, Seoul, South Korea.

1960. Lee, Jang-Eun; Lee, Ggot-Im; Lee, Cherl-Ho. 2014. Chongkukjang. In: Prabir K. Sarkar & M.J. Robert Nout, eds. 2014. Handbook of Indigenous Foods Involving Alkaline Fermentation. Boca Raton, Florida: CRC Press, Taylor & Francis Group. xxviii + 601 p. See p. 63-71. [11 ref]

• ***Summary:*** Chongkukjang is similar to Japan's natto.

Contents: Origin of chongkukjang (first written record is from 1765). Methods of preparation. Biochemical composition. usage and function. Safety aspects.

Figures: (2.26) Diagram. The position of chongkukjang in Korean fermented soybean products (Modified from Lee, C.H., *Fermentation Technology in Korea*, Korea University Press, Seoul, 2001). Shows that chongkukjang is related to Japan's natto.

(2.27) Photo. Chongkukjang with mucous strings–when lifted up with chopsticks.

(2.28) Diagram. Process for making chongkukjang (From Lee, C.H. *Fermentation Technology in Korea*, Korea University Press, Seoul, 2001).

(2.29) Photos. Chongkukjang packages. Traditional earthen jars (a) and modern package (b).

(2.30) Graph. Changes in pH during chongkukjang preparation using 3 different strains of *Bacillus* for 72 h at 40ºC. (From Baek, L.M. et al., *Korean Journal of Food Science and Technology,* 40, 400405, 2008).

Tables: (2.7) Chemical composition of soybean and chongkukjang. Source: Rural Development Administration 2011.

(2.8) List of biogenic amines in commercial chongkukjang in Korea. 10 samples, 11 amines.

(2.9) Possible hazardous components in chongkukjang. The 3 types are (a) pathogenic microorganisms, (b) aflatoxin or pesticide residues, and (c) extraneous material (weed, seed, stem, etc). Address: 1. Korea Food Research Inst., Seongnam, South Korea; 2-3. Korea Food Security Research Foundation, Korea Univ., Seoul, South Korea.

1961. Nagai, Toshirou. 2014. Natto. In: Prabir K. Sarkar & M.J. Robert Nout, eds. 2014. Handbook of Indigenous Foods Involving Alkaline Fermentation. Boca Raton, Florida: CRC Press, Taylor & Francis Group. xxviii + 601 p. See p. 8-18. [25 ref]

• ***Summary:*** Contents: Introduction. History. Starter culture. Fermentation. Nutritional and chemical components. Consumption. Conclusion.

Figures: (2.1) Photos. Some kinds of natto. (a) Tsubu-natto (typical whole natto); (b) hikiwari-natto (fermented split soybeans); (c) hoshi-natto (dried natto); (d) soboro-natto (natto with pieces of dried Japanese radish indicated by arrows).

(2.2) Natto. Photos. (a) Inside of a package of natto. Sachets of sauce based on soysauce and mustard put on a sheet covering natto. (b) Natto under the sheet of panel A. (c) Picking up natto with chopsticks. Strings between natto and the package are a viscous polymer, poly-gamma-glutamate. (d) An ancient-type natto in appearance. This natto is made as a souvenir, and the rice straw has been sterilized for hygienic reasons.

(2.3) Diagram. Natto triangle (proposed by S. Nakao). Yunnan province in China is depicted as an open circle at the center of the triangle with solid lines. Natto (produced in Japan), kinema (Nepal), chongkukjang (Korea), pepok (Myanmar), thua nao (Thailand), sieng (Cambodia) are non-salted fermented soybeans produced by *Bacillus subtilis*, and tempeh (Indonesia) produced by *Rhizopus oligosporus* (a mold) also is included. The KNT (kinema-natto-thua nao) triangle proposed by Tamang (2010) is also shown as a dotted triangle. (Modified from Nagai, T., and Tamang, J.P., Fermented legumes: Soybean and non-soybean products, in *Fermented Foods and Beverages of the World*, eds. J.P. Tamang, and K. Kailasapathy, pp. 191-224, CRC Press, Boca Raton, Florida, 2010.)

(2.4) Diagram. Production process.

(2.5) Photo. Natto on cooked rice after mixing with soy sauce and chopped raw leek, the most popular way to eat natto in Japan.

Table: (2.1) Nutritional composition of raw soybean, boiled soybean, natto (full page). These data (per 100 g dry matter) were converted from the data in Food Composition Database. Data from Ministry of Education-Culture-Sports-Science and Technology, Standard Tables of Food Composition in Japan: Food Composition Database, http://fooddb.mext.go.jp, 2010. Address: Genebank, National Inst., of Agrobiological Sciences, Tsukuba, Japan.

1962. Park, Kun-Young; Jeong, Ji-Kang. 2014. Doenjang. In: Prabir K. Sarkar & M.J. Robert Nout, eds. 2014. Handbook of Indigenous Foods Involving Alkaline Fermentation. Boca Raton, Florida: CRC Press, Taylor & Francis Group. xxviii + 601 p. See p. 53-63. [32 ref]

• ***Summary:*** Contents: Introduction. Manufacturing procedures. Microorganisms in doenjang. Functional

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properties. Conclusion.

Figures: (2.19) Photos. Appearance of traditional doenjang (a) and meju (b).

(2.20) Diagram. Traditional manufacturing method for meju and doenjang.

(2.21) Diagram. Effect of methanol extract of various fermented soybean foods on the mutagenesis of aflatoxin B1 in *Salmonella typhimurium* TA100.

(2.22) Western blot analysis of cyclins from MCF-7 cells after increasing period of exposure to hexane fraction.

(2.23) Induction of Cdk inhibitor p21 (a) and association of p21 with Cdk2 (b) by doenjang hexane fraction in MCF-7 cells.

(2.24) Two bar charts. Effects of doenjang treatment on serum pro-inflammatory cytokines in AOM and DDS-induced colitis associated cancer (CAC) mice. Normal, group received PBS without AOM and DDS; control group received PBS and induced CAC by AOM and DSS; CG-d, group received commercial doenjang and induced CAC by AOM and DSS; ABL-d, group received mixed starter used doenjang and induced CAC by AOM and DSS; a-c, means with the different letters on bars representing SD [standard deviation] are significantly different ($p < 0.05$) by Duncan's multiple range test.

(2.25) Diagram. Effects of doenjang treatment on mRNA expressions of iNOS, COX-2, Bax, Bcl-2, p21, and p53 in the colon tissue of AOM- and DSS-induced CAC mice. Normal group received PBS without AOM and DSS; control, group received PBS and induced CAC by AOM and DSS; CG-d, group received commercial doenjang and induced CAC by AOM and DSS; ABL-d group received mixed starter used doenjang and induced CAC by AOM and DSS.

(2.26) Diagram. The position of doenjang in Korean fermented soybean products (Modified from Lee, C.H., *Fermentation Technology in Korea*, Korea University Press, Seoul, 2001). Shows that doenjang is related to Japan's tamari-shoyu.

Tables: (2.6) Effect of various of various active compounds (1.25 mg/plate) on the mutagenicity induced by aflatoxin B1 in *Salmonella typhimurium* TA100. Address: Dep. of Food Science and Nutrition, Pusan National Univ., Busan, South Korea.

1963. Sarkar, Prabir K.; Nout, M.J. Robert. eds. 2014. Handbook of indigenous foods involving alkaline fermentation. Boca Raton, Florida: CRC Press, Taylor & Francis Group. xxviii + 601 p. Illust. Index. 24 cm. [500+ ref]

• ***Summary:*** See next page. This is a unique and outstanding book. Contents (through Chapter 2): Series preface. Preface. Editors. Contributors. 1. Introduction. 2. Diversity of plant-based food products involving alkaline fermentation. Chapter 2 is divided into "2.1 Legume products" and "2.2 Non-legume products." "2.1 Legume products" is divided into "2.1.1 Soybean products" and "2.1.2 Non-soybean products." The soybean products are:

Natto, by Toshirou Nagai (p. 8-18).

Douchi, by Li-Te Li and Yan-Li Ma (p. 18-33).

Kinema and similar products, by Pabir K. Sarkar and M.J. Robert Nout (p. 33-53).

Doenjang, by Kun-Young Park Ji-Kang Jeong (p. 33-63).

Chongkukjang, by Jang-Eun Lee, Ggot-Im Lee, and Cherl-Ho Lee (p. 63-71).

Douchi, by Li-Te Li and Yan-Li Ma (p. 18-33).

Thua Nao, by Ekachai and Chukeatirote (p. 71-76).

Meitauza, by Li-Te Li and Yan-Li Ma (p. 76-87).

Yandou, by Hongjiang Yang (p. 87-92).

For other soy-related material: Soybean, p. 4-5. Cultivation, p. 8. Protein, p. 8. Tempe bongkrek, p. 150. Yeasts, p. 282-89. Soy dawadawa, p. 285. Meju yeasts, p. 287-88. Nutritional value, p. 323-24. TI [trypsin inhibitor] reduction, p. 336 Antioxidative activity, p. 342-43. Okara; See also Meitauza. Okara, antioxidative activity, p. 343-44. Miso, biogenic amine levels in, p. 411, 413t. Spermidine, contents in different fermented soybean products, p. 413t, 414.

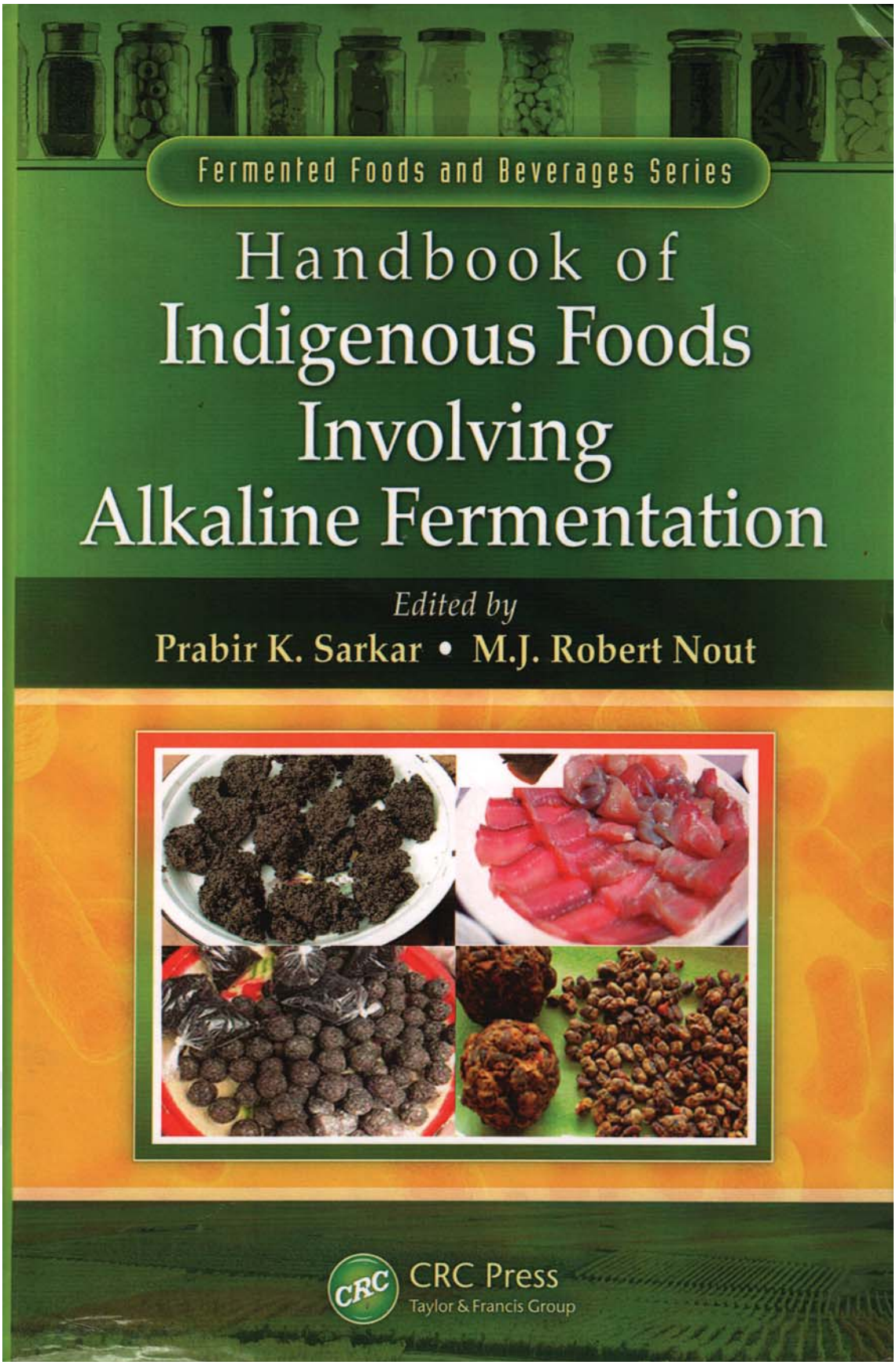
Note: Biogenic amines include (table 6.7, p. 413): tyramine, tryptamine, histamine, putrescine, cadaverine, phenylethylamine, spermine, and spermidine. Spermine, precursor of, p. 412t. Spermidine, precursor of, p. 412t Spermidine, contents in differented fermented soybean products, p. 413t, 414. Soybean meal, alkaline protease production, p. 480-81. Soy sauce, p. 490.

From the publisher (back cover): *"Handbook of Indigenous Foods Involving Alkaline Fermentation* details the basic approaches of alkaline fermentation, provides a brief history, and offers an overview of the subject. Devoted exclusively to alkaline-fermented foods (AFFs), this text includes contributions from experts from around the globe. It discusses the diversity of indigenous fermented foods involving an alkaline reaction, as well as the taxonomy, ecology, physiology, and genetics of predominant microorganisms occurring in AFFs.

"Presented in 10 chapters, the book explains how microorganisms or enzymes transform raw ingredients into AFFs. It discusses the quality and safety aspects of AFFs, and considers the challenges associated with the technological aspects in modernizing AFFs. It stresses the significance of the microbiological and biochemical processes in the fermentations, as well as the factors that influence the development of the characteristic microbiota, and the biochemical and organoleptic changes induced by them. It also proposes solutions, discusses the value of AFFs and related dominant microorganisms, and assesses the future of AFFs.

"The authors highlight commonly known foods

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and beverages of plant and animal origin. They provide insight into the manufacture, chemical and microbiological composition, processing, and compositional and functional modifications taking place as a result of microbial and enzyme effects. The text examines safety, legislation, traditional and industrialized processes, as well as new product development, and opportunities for developing commodities from Africa, Asia, Europe, USA, and the Middle East. In addition, it also assesses the value of food processing by-products, biotechnology, and engineering of solid-state processes, modern chemical and biological analytical approaches to safety, and health and consumer perception."

This book contains a wealth of new and detailed information about several fermented foods, including Meitauza (by Li-Tee Li and Yan-Li Ma) which is made from okara (p. 76-87) and Yandou (by Hongjiang Yang), which is a fermented salted soybean food, widely consumed in eastern China, especially in Jiangsu province and surrounding areas (p. 87-92).

Note: Cherl-Ho Lee (PhD of Korea Univ., Seoul), wrote 2.1.1.5 Chongkukjang (p. 63-71), Hongeohoe (p. 224-28), and 6. Safety aspects of alkaline fermented foods (p. 399-423). Address: 1. Dep. of Botany, Univ. of North Bengal, Siliguri, India; 2. Lab. of Food Microbiology, Wageningen Univ., Wageningen, the Netherlands.

1964. Baek, Ji Eun; Choi, Y.H.; Song, J.; Yun, H.T.; Choi, H.S.; Park, S.Y. 2014. [Physicochemical properties of cheonggukjang with fermentation period for a variety of soybean cultivars]. *Korean J. of Food and Nutrition* 27(4):742-50. Aug. [28 ref. Kor; eng]

• ***Summary:*** Cheonggukjang (also spelled cheongkukjang) is Korean-style natto.

"This study was done in order to investigate the changes in quality of Cheonggukjang for soybean cultivars during fermentation. Cheonggukjang of 14 cultivars that were inoculated with *Bacillus subtilis* 15893 was produced, and, then, it was measured for hardness, proximate composition, amino nitrogen, enzyme activity, and total aerobic bacteria counts. In a raw bean, the highest hardness value was 16,975 g from Sunyu. In a steaming bean, Jangwon had the highest hardness value and the lowest aerobic bacteria counts of forty-eight hours fermented Cheonggukjang. Saedanbaek, whose protein content was highest in raw bean, was also highest in Cheonggukjang. The amino nitrogen content of twenty-four hours fermented Cheonggukjang was highest in Saeol and Sunyu while forty-eight hours fermented Cheonggukjang was highest in Singi, Daol, and Milyang 231. In the protease activity, Saedanbaek had the highest and total aerobic bacteria count that were either increased or held as time went on; twenty-four hours fermented Cheonggukjang was highest in Milyang 231 and Keunol while forty-eight hours fermented Cheonggukjang was highest in Chunsang." Address: 1. Dep. of Agrofood Resources, National Academy of Agricultural Science, RDA, Suwon 441-853, Korea.

1965. Choi, Jae-Ho; Chung, M.J.; Jeong, D.Y.; Oh, D.H. 2014. Immunostimulatory activity of isoflavone-glycosides and ethanol extract from a fermented soybean product in human primary immune cells. *J. of Medicinal Food* 17(10):1113-21. Oct. *

• ***Summary:*** "Sasang constitutional medicine is a major branch of Korean traditional oriental medicine. Constitutions of Sasang medicine are classified into Taeyangin, Taeumin, Soyangin, and Soumin."

"Daidzin, glycitin, and genistin were used to treat primary immune cells in the same condition, the cell proliferation; iNOS mRNA expression and nitrite concentration of daidzin, glycitin, or genistin-treated immune cells isolated from the blood of Soyangin volunteers was higher than that of Taeumin and Soeumin volunteers. The effect of DJ and isoflavone glycosides on immunostimulatory activities showed similar trends."

The fermented soybean product was probably Chongkukjang (Korean-style natto). Address: 1. Dep. of Food Science and Biotechnology, College of Agriculture and Life Sciences, Kangwon National Univ., Chuncheon, Korea.

1966. Kwon, Dae Young; Jang, Dai-Ja; Yang, Hye Jeong; Chung, Kyung Rhan. 2014. History of Korean *gochu*, *gochujang*, and kimchi (Open Access). *J. of Ethnic Foods* 1(1):3-7. Dec. [6 ref. Eng]

• ***Summary:*** "The gochu (Korean red pepper) that goes into Korean traditional fermented foods such as kimchi (fermented cabbage) and gochujang (spicy red pepper paste) should have a mild spiciness and its Scoville heat unit (the unit that measures spiciness) is <1,000."

Note: This is the first article in this open access journal. Address: 1-3. Korea Food Research Institute, Seongnam, South Korea.

1967. Hu, Xiao Juan; Song, W.R.; Gao, L.Y.; et al. 2014. Assessment of dietary phytoestrogen intake via plant-derived foods in China. *Food Additives & Contaminants. Part A, Chemistry, Analysis, Control, Exposure & Risk Assessment* 31:1325-35. *

• ***Summary:*** Based on the overall population sampled, the average total phytoestrogen intake was estimated at 232 mcg per kg per day. Genistein contributed to about 66%, secoisolariciresinol and glycitein to about 10% each, and daidzein to about 7% of the overall intake.

With 87 boys and 87 girls enrolled, ages 1-14, soyfoods intake per day was not reported. Isoflavones intake was 531.7±343.8 mcg/kg body weight in 75th percentile, and 726 mcg/kg body weight average. Address: 1. State Key Laboratory of Food Science and Technology , Nanchang

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Univ., Nanchang, China.

1968. Jung, J.Y.; Lee, S.H.; Jeon, C.O. 2014. Microbial community dynamics during fermentation of doenjang-meju, traditional Korean fermented soybean. *International J. of Food Microbiology* 185:112-120. *

1969. Kim, Yong-Ho; Yun, H.; Chung, W.K.; Park, K.Y. 2014. Investigation of biological effect in black colored soybean. *Regional Institute* (*The*) 1-4. *
• ***Summary:*** "The black colored soybean has been considered as having a medicinal effect since ancient times in Korea. Six genotypes of black colored soybean and a normal variety were investigated for their biological effect. While the isoflavone content of black colored soybean was higher than the normal soybean, saponin content of the seeds was not different among varieties." Address: 1. Dep. of Life Sciences, Soonchunhyang Univ., Asan-si, Chungnam 336-745, Korea.

1970. Kim, Y,S. 2014. [Isolation of microbes for industrial fermentation from traditionally fermented soybean products and their characterization]. PhD Dissertation, Chonbuk National University, Jeonbuk, Korea. [Kor; eng]*

1971. Lee, Seul; Yoo, Seon Mi; Park, Bo Ram; Han, Hye Min; Kim, Ha Yun. 2014. [Analysis of quality state for gochujang produced by regional rural families]. *J. of the Korean Society of Food Science and Nutrition* 43(7):1088-94. [21 ref. Kor; eng]
• ***Summary:*** "This study investigated the quality properties of glutinous rice Gochujang produced by regional rural families in order to determine the present state of quality of traditional Gochujang. A total of 80 Gochujang samples were collected from nationwide rural families and their physicochemical characteristics were analyzed." Moisture, pH, acidity, crude protein, salinity, viscosity, color, amino nitrogen, reducing sugars, and capsaicinoids, were measured and varied widely, especially between the Gangwon-do and Gyeonggi-do regions.

Note: Capsaicin is the ingredient found in different types of peppers, such as cayenne peppers, that makes the peppers hot. Capsaicin is the main capsaicinoid in chili peppers. It is used to relieve a certain type of pain known as neuralgia. It is used as a fungicide in soy sauce and soybean paste in Korea. Address: Dep. of Agro-food Resources, National Academy of Agricultural Science, Rural Development Administration.

1972. Murekatete. N.; Hua, Y.; Chamba, M.V.M.; DJakpo, O.; Zhang, C. 2014. [Gelation behavior and rheological properties of salt or acid-induced soy proteins soft tofu-type gels]. *J. of Texture Studies* 45:62-73 [Kor; eng]

1973. Uchida, Jun. 2014. Brokers of Empire: Japanese settler colonialism in Korea, 1876-1945. Cambridge, Massachusetts: Harvard University Press. xi + 481 p. See Chap. 7. Illust. Maps. 23 cm. Series: Harvard East Asian Monographs, No. 337 *
• ***Summary:*** From the publisher: "Between 1876 and 1945, thousands of Japanese civilians–merchants, traders, prostitutes, journalists, teachers, and adventurers–left their homeland for a new life on the Korean peninsula. Although most migrants were guided primarily by personal profit and only secondarily by national interest, their mundane lives and the states ambitions were inextricably entwined in the rise of imperial Japan. Despite having formed one of the largest colonial communities in the twentieth century, these settlers and their empire-building activities have all but vanished from the public memory of Japans presence in Korea. Drawing on previously unused materials in multi-language archives, Jun Uchida looks behind the official organs of state and military control to focus on the obscured history of these settlers, especially the first generation of pioneers between the 1910s and 1930s who actively mediated the colonial management of Korea as its grassroots movers and shakers. By uncovering the downplayed but dynamic role played by settler leaders who operated among multiple parties-between the settler community and the Government-General, between Japanese colonizer and Korean colonized, between colony and metropole-this study examines how these brokers of empire advanced their commercial and political interests while contributing to the expansionist project of imperial Japan."

Contents:
Emergence. The world of settlers.
Settlers and the state: uneasy partners.
In action. Building an empire of harmony.
The discourse on Korea and Koreans.
Industrializing the peninsula.
In search of a political voice.
Organs of the state. The Manchurian impact.
Citizens and subjects under total war.

1974. Lee, Cecilia Hae-Jin 2015. Wealth of *banchan* on the side: food & dining. *Los Angeles Times* (*California*). Jan. 10. p. E2.
• ***Summary:*** The restaurant Soban is "known among Koreans for its *ganjang gaejang* (soy-seasoned raw blue crab).

Mapo Kkak Doo Gee is known for its weekday lunch specials, which are such bargains. "The selection may also include soy-stewed potatoes, seasoned seaweed, steamed cabbage leaves with a side of seasoned *dwenjang* (fermented soybean sauce [paste])..."

At U2: "The giant vat of *dwenjang* (fermented soybean paste) is dwarfed only by the larger container of kimchi."

1975. Jang, Seri; Yang, Ming; Ahn, Su Mi; Park, Inshik. 2015. [Antioxidative activity and texture characteristics of

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*wanja-jeon* with soybean powder]. *Korean J. of Food and Nutrition* 28(1):9-15. Feb. [27 ref. Kor; eng]
• ***Summary:*** "Wanja-jeon is pan-fried meat and tofu patties. It is served as a side dish. Combine ground beef, tofu, onion, garlic, green onion, carrot, 1 teaspoon salt, soy sauce, ground black pepper, sesame oil and 1 egg in a bowl. Mix well until the mixture gets a little sticky.

"Divide the mixture into 16 equal pieces. Roll each piece into a ball between your palms, then flatten into 2 inch disk and ¼ inch thick. Put the flour into a shallow bowl. Coat each patty with flour. Transfer to a platter. Repeat it with the rest of patties. Pan fry: Beat 1 egg, 1 egg yolk, and a pinch of salt in a bowl.

"2. Heat a large nonstick pan over medium heat. Add some oil and tilt the pan to spread it around.

"3. Working in batches, dip each patty in the beaten egg and place in the pan, one by one.

"4. Cook for about 1 minute until the bottom part turns light golden brown. Flip it over and cook for a few more minutes until the bottom part turns a little crunchy and light golden brown. Add more oil to the pan as needed.

"5. Turn and cook for another 30 seconds and transfer to a serving platter. Serve the patties hot or at room temperature.

"This study was conducted to improve the quality of Wanja-jeon, a Korean traditional food utilizing beef. Antioxidative evaluation of the ingredients in Wanja-jeon showed that soybean powder was highest in DPPH, ABTS radical scavenging activities and in reducing power among the food ingredients tested. Since soybean powder demonstrated high antioxidative activity, beef was replaced with soybean powder in Wanja-jeon to increase the antioxidative activity. All antioxidative activities such as DPPH and ABTS radical scavenging activities as well as reducing power increased with increases in the amount of soybean powder replacing beef. In texture analysis, the hardness, chewiness and brittleness of Wanja-jeon were highest when beef was replaced with 20% soybean powder, whereas the springiness and cohesiveness of the Wanja-jeon were highest with 50% of the beef replaced with soybean powder. The Hunter's color L and b values were highest in Wanja-jeon with 50% soybean powder replacing beef, while the a value of the color was highest in Wanja-jeon with 30% soybean replacing beef."

Note 1. What is "soybean powder"? Is it ground whole mature soybeans? Soy protein concentrate?

Note 2. DPPH free radical scavenging is an accepted mechanism for screening the antioxidant activity of plant extracts. In the DPPH assay, violet color DPPH solution is reduced to yellow colored product, diphenylpicryl hydrazine, by the addition of the extract in a concentration dependent manner. Note 3. "In biochemistry, ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)) is a chemical compound used to observe the reaction kinetics of specific enzymes and for radical scavenging." Address: Dep. of Food Science and Nutrition, Dong-A Univ., Busan 604-714, Korea.

1976. Kwon, Dae Young; Chung, Kyung Rhan; Yang, Hye-Jeong; Jang, Dai-Ja. 2015. Gochujang (Korean red pepper paste): a Korean ethnic sauce, its role and history (Open Access). *J. of Ethnic Foods* 2(1):29-35. March. [28 ref. Eng]
• ***Summary:*** "Gochujang (Korean fermented red pepper sauce, also written in Kochujang), along with kimchi, is an age-old ethnic food made with Korea's representative ingredient, red pepper. A typical Korean meal (Bapsang) is composed of rice (Bap), from which calories are derived, soup (Kuk), which helps in the chewing and digesting of the rice, and side dishes (Banchan), which provide additional nutrition and flavor. To add even more variety to the taste, seasoning (Jang, Yangnyum) is added. Gochujang has become the most fundamental of these kinds of food in Korea over thousands of years, functioning to make add flavor to rice taste better while aiding the digestive system. Gochujang also serves as a simple seasoning when making dishes such as braised spicy chicken, and provide additional nutrients. According to age-old documents, the development process used to manufacture Gochujang requires the basic ingredients of Meju (block made with cooked soy bean) powder, rice or glutinous rice flour, and red pepper powder. Sunchang Gochujang is one variety known for its great taste that was often consumed by kings during the Chosun dynasty." Address: 1&3. Korea Food Research Institute, Korea, Songnam, Kyongki-do, South Korea.

1977. Shin, Donghwa; Jeong, Doyoun. 2015. Korean traditional fermented soybean products: Jang (Open Access). *J. of Ethnic Foods* 2(1):2-7. March. [37 ref. Eng]
• ***Summary:*** "Fermented products are going beyond the boundaries of their use as mere side dishes, and are seeing significant increases in their use as a functional food. Kanjang (fermented soy sauce), Doenjang (fermented soybean paste), and Gochujang (fermented red pepper paste) are the most well-known fermented products in Korea... These products occupy an important place in people's daily lives as seasonings and are used in many side dishes. It has been proven through clinical studies that these products have many health benefits, such as their ability to fight cancer and diabetes, and to prevent obesity and constipation."

"Korea has a few other kinds of complex fermented dishes. A few of those that use soy sauce are listed below (7).

"Eoyukjang: The haunch of cow, chicken, gray mullet, and sea bream are dried and then put into Meju along with abalone, mussel, shrimp, egg, ginger, green onion, and tofu. Using these ingredients, the same steps for making Kanjang is followed.

"Fermented dried pollack: Hwangtae soybean is steamed, and the Meju is shaped like a hilt with bean leaves

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floating on the top. With this Meju, a fermented product is produced.

"Chongyukjang: Fried soybean is boiled and from this a solution is produced. Next, soybean is added to the solution it is boiled with beef, white radish, and red pepper for three to four days.

"Juebjang: Meju is made with wheat bran and fried soybeans. Is it then shaped into walnut-sized pieces and steamed with mulberry leaves that float. Cucumbers and eggplants may be added and then fermented together." Address: 1. Shindonghwa Food Research Institute, Jeonju, Jeollabuk-do, South Korea; 2. Inst. of Sunchang Fermented Soybean Products, Sunchang, Jeollabuk-do, South Korea.

1978. Xanthos, Julia. 2015. Slices of life: mother & daughter share secrets of family's bulgogi. *Daily News* (*New York, New York*). April 12. p. 16.
• ***Summary:*** The recipe ingredients for bulgogi include: 4 tablespoons soy sauce, Soybean paste, and Red chili paste.

"It is best to eat bulgogi by wrapping it in a lettuce leaf with Ssamjang (a combination of soybean paste (*dewnjang*) and red pepper paste (*gochujang*), and a spoonful of rice)." Address: New York Daily News.

1979. Choi, Won-Seok; Park, Hwa-Young; Choi, Ung-Kyu. 2015. [Quality characteristics of *cheonggukjang* prepared with germinated soybeans by the addition of smoking process]. *Korean J. of Food and Nutrition* 28(3):493-498. June. [27 ref. Kor; eng]
• ***Summary:*** "The aim of this study is to investigate the changes in the quality characteristics of *cheonggukjang* [Korean-style natto] made with germinated soybeans, which is produced by the addition of a smoking process. The L value of smoked cheonggukjang made with germinated soybeans (SCGS) was higher than that of non-smoked cheonggukjang made with non-germinated soybeans (NCNS) and non-smoked cheonggukjang made with germinated soybeans (NCGS). The a value of NCNS was the highest, followed by NCGS and SCGS. The b and delta T values had a similar tendency compared with the L value. The amino acids in NCGS were significantly decreased compared with NCNS, whereas no remarkable difference in amino acid content was observed between NCGS and SCGS. The moisture content of NCGS (61.9±0.9%) was increased by more than 8% compared with that of NCNS (53.3±0.7%). The moisture content of SCGS was significantly decreased compared with NCGS, whereas the moisture content of SCGS was higher than that of NCNS. The pH of SCGS was significantly the highest, followed by NCGS and NCNS. The viscous substance content of NCGS was significantly increased compared with that of NCNS. No remarkable difference in viscous substance content was observed between NCGS and SCGS. The number of aerobic bacteria in SCGS was significantly decreased compared with NCGS. The levels of total isoflavone in NCNS, NCGS, and SCGS were 1,573.9±62.5, 1,759.1±65.8, 1,738.0±68.1 mg%, respectively." Address: Dep. of Food Science & Technology, Korea National Univ. of Transportation, Jeungpyeong 368-701, Korea.

1980. Lim, J.H.; Jung, E.S.; Choi, E.K.; Jeong, D.Y.; Jo, S.W.; Jin, J.H.; Lee, J.M.; Park, B.H.; Chae, S.W. 2015. Supplementation with *Aspergillus oryzae*-fermented kochujang lowers serum cholesterol in subjects with hyperlipidemia. *Clinical Nutrition* 34(3):383-87. June.
• ***Summary:*** "Background & aims: Kochujang, a traditional fermented red pepper paste, is known for its hypocholesterolemic effect; however, these studies used non-commercial preparations of kochujang. In this study, we examined whether commercially-made kochujang in which Aspergillus oryzae (also known as koji) was used as a microorganism for fermentation has the same cholesterol-lowering effects."

"Conclusions: These results indicate that A. oryzae-fermented kochujang elicits a significant hypocholesterolemic effect and might be useful for improving blood cholesterol levels in subjects at high risk for cardiovascular disease."

1981. Nam, Y.R.; Won, S.B.; Chung, Y.S.; Kwak, C.S.; Kwon, Y.H. 2015. Inhibitory effects of Doenjang, Korean traditional fermented soybean paste, on oxidative stress and inflammation in adipose tissue of mice fed a high-fat diet. *Nutrition Research and Practice* 9(3):235-41. June.
• ***Summary:*** "Background/objectives: Doenjang, Korean traditional fermented soybean paste has been reported to have an anti-obesity effect. Because adipose tissue is considered a major source of inflammatory signals, we investigated the protective effects of Doenjang and steamed soybean on oxidative stress and inflammation in adipose tissue of diet-induced obese mice."

"Conclusions: Doenjang alleviated oxidative stress and restored the dysregulated expression of adipokine genes caused by excess adiposity. Therefore, Doenjang may ameliorate systemic inflammation and oxidative stress in obesity via inhibition of inflammatory signals of adipose tissue." Address: 1-2. Dep. of Food and Nutrition, Seoul National Univ., Seoul 151-742, Korea.

1982. Park, Hwa-Young; Choi, Won-Seok; Choi, Ung-Kyu. 2015. [Changes in taste component of cheonggukjang prepared with germinated soybeans by the addition of smoking process]. *Korean J. of Food and Nutrition* 28(3):499-508. June. [24 ref. Kor; eng]
• ***Summary:*** The aim of this study was to investigate the changes in the taste components of cheonggukjang [Korean-style natto] made with germinated soybeans, which is produced by the addition of a smoking process. The total

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organic acid content of smoked cheonggukjang made with germinated soybeans (SCGS) was four times higher than that of non-smoked cheonggukjang made with non-germinated soybeans (NCNS). The total organic acid content of SCGS was lower than that of non-smoked cheonggukjang made with germinated soybeans (NCGS). The total free sugar content of NCGS and SCGS was approximately three times higher than that of NCNS. The total free amino acid content of NCGS was significantly decreased compared with that of NCNS, whereas the total free amino acid content of SCGS was 1.2 times higher than that of NCGS. The essential amino acid content of SCGS was significantly increased compared with that of NCGS. The ratio of glutamic acid to the total free amino acid in NCNS and SCGS was 19.6%. Similarly, the ratio of glutamic acid to the total free amino acid in NCGS was 19.1%. There were no significant differences in the total fatty acid content of NCNS, NCGS, and SCGS. The sensory evaluation of appearance, aroma, taste, and overall quality of SCGS was significantly increased compared with that of NCNS and NCGS. These results suggest that smoked cheonggukjang made with germinated soybeans could be utilized for the development of a novel fermented food. Address: Dep. of Food Science & Technology, Korea National Univ. of Transportation, Jeungpyeong 368-701, Korea.

1983. Wei, B.; Cha, S.-Y.; Kang, M.; Kim, Y.J.; Cho, C.W.; Rhee, Y.K.; et al. 2015. Antiviral activity of Chongkukjang extracts against influenza A virus in vitro and in vivo (Open Access). *J. of Ethnic Foods* 2(2):47-51. June. [26 ref]
• ***Summary:*** "Results: All 10 compounds extracted from Chongkukjang showed neuraminidase inhibitory activity. Extracts A3 and A8, with high neuraminidase content, had the best inhibitory activities. The in vivo antiinfluenza virus activities of the ethyl acetate, A3, and A8 extracts as well as commercially available genistein were evaluated using H1N1 (A/NWS/33) to test mice survivability after virus challenge. The Chongkukjang extracts did not reduce mortality, but the A3 and A8 extracts delayed the median time to death after influenza A virus infection of mice.

"Conclusion: Our results suggest that the Chongkukjang extracts may have potential as a therapeutic agent to treat influenza virus infection." Address: 1-3. Departments of Infectious Diseases and Avian Diseases, College of Veterinary Medicine and Korea Zoonosis Research Institute, Chonbuk National University, Iksan, Jeollabuk-do, South Korea.

1984. Lipoid GmbH. 2015. Lipoid–History (Website printout–part). www.lipoid.com 1 p. Retrieved July 7. [Eng]
• ***Summary:*** "1977–Foundation of Lipoid based on the aim to manufacture dietetics for special nutritional requirements as well as lecithin and phospholipids for pharmaceutical products on an industrial scale.

"1981–Expansion and investment at the site in Ludwigshafen am Rhein [in Rhineland-Palatinate, Germany].

"1996–Establishment of Lipoid AG in Cham/ Switzerland.

"2001–Acquisition of A. Nattermann & Cie. GmbH's tincture and plant extract business and foundation of R&R Extrakte GmbH in Köln.

"2002 Expansion of Lipoid's natural lecithin and phospholipids business by acquiring Nattermann Phospholipid GmbH in Köln which is renamed Phospholipid GmbH.

"2004–Operational roll-out of a second cGMP-compliant production site for the manufacturing of natural lecithins and phospholipids. Incorporation of Lipoid LLC in Newark, New Jersey, USA.

"2007–Merger of the sales activities of Lipoid and Phospholipid GmbH. Expansion of the additives and actives business to the cosmetics industry by acquisition of Cosmetochem AG.

"2010–Foundation of Lipoid Korea.

"2013–Lipoid and Cosmetochem AG merge their cosmetic activities to form Lipoid Kosmetik AG." Address: Cham, Switzerland.

1985. Kayal, Michelle. 2015. Fueled by heat-seeking Americans, Korean cuisine is now hot. *St. Joseph News-Press* (*St. Joseph, Missouri*). July 26. p. E3.
• ***Summary:*** Korean food has many characteristics that recommend it to contemporary American diners. "The cuisine's foundation ingredients include doenjang, a fermented soybean paste, and gochujang, a fermented chili paste. These are often used in combination with other ingredients and aromatics to produce a unified experience of salt, sweet, sour, spice, and that elusive earthy, savory satisfaction called umami."

In the Atlanta area, menu items include "various tofu preparations, pork, chicken and ribs marinated in gochujang and rubbed with classic barbecue spices,..."

Skeptics are won over by the Korean way of preparing classic crispy tofu.

America, a "country that moons over Sriracha also is primed for the smoky, tangy heat of gochujang. The word gochujang gets only a few mentions on chain menus... But the spicy paste appears to be leading the migration of Korean ingredients from ethnic groceries to supermarket shelves. And some companies are determined to make it as familiar as ketchup." Address: Associated Press.

1986. Nordquist, Ted. 2015. Re: Summary of work with soyfoods in Sweden. Letter (e-mail) to William Shurtleff at Soyinfo Center, Aug. 20. 1 p.
• ***Summary:*** 1976–Ted Nordquist, soyfoods pioneer of Swedish ancestry now living in California, begins his work with soy by making and selling a tofu kit. By late Nov. 1979

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he is in Örsundsbro, Sweden, working with Tim Ohlund, a businessman named Gunnar, and a Korean Professor named Kim to start a new company to make soyfoods.

1980 Feb.–Aros Sojaprodukter KB in Örsundsbro, Sweden (near Uppsala), launches its first commercial soy product–tofu. This is the earliest known company in Scandinavia to make tofu. "Anne-Marie's dad and Ted took over a old soft drink factory in Örsundsbro, renovated it and installed Takai tofu equipment. Tim agreed to be plant manager and they started operations in Jan. 1980. The owner's mother lived in the flat upstairs but died in the spring. Again with the help of Anne-Marie's father, Tim's father (there visiting during the summer of 1980) and friends they renovated the upstairs apartment and moved from their student apartment to this flat in May 1980. They were making tofu all of this time. In the fall of 1980 they really started making tofu and delivering it to Stockholm and Uppsala twice a week.

1981–*Tofu-Boken* [The Tofu Book], by Ted Nordquist and Tim Ohlund is published in Örsundsbro, Sweden by Aros Sojaprodukter. It is Sweden's first book about tofu.

"1982–Alfa Laval, a Swedish food processing equipment company asks Ted to join their Soy Research & Development Team in Lund, Sweden. They install ultrafiltration equipment in Ted's tofu factory in Örsundsbro to experiment with a new type of tofu. Ted helps with the installation of a soybase line in Lund.

"1984–Alfa Laval Soy Research and Development is moved from Lund to Singapore (where it remains today). A co-worker drives Ted to Trensums Musteri in Tingsryd, Sweden, where the CEO Mark Ljungström and Ted agree to build a 'soybase' plant to produce Scandinavia's first 'soybase,' a water extract from whole soybeans. Nearby, at Winner ice cream factory in Karlshamn, Ted and Lola Skog begin developing what was later to be Tofu-Line Glass. Ted test markets this soy frozen desert (vanilla flavor) by taking samples of the product to the classrooms of his three children. By 1990 the children rush to get these samples and Ted knows that the flavor and consistency is good enough to sell to the public."

1984 Oct.–Aros Tempeh is first made and sold commercially by Tim Ohlund of Aros Sojaprodukter. This is the first commercial tempeh ever sold in Scandinavia.

"1987 March–Aros Sojaprodukter launches the first of its "Tofu Line" range of products, a series of 8 tofu entrees. They developed firm tofu, marinated tofu, tofu burgers, curry tofu burgers, tofu burgers with red beets, and a chili con tofu. In addition, they produced soft tofu in bulk for restaurants (Korean, Japanese and Chinese). Eventually they had five employees including Tim.

1990 May–Aros Sojaprodukter launches Tofu Line Glass (Vanilj, Choklad) [Tofu Line Soymilk Ice Cream (Vanilla, or Chocolate)]. This is Scandinavia's first commercial soy ice cream and the most delicious soy ice cream we have ever tasted. The key is the bland soybase Ted has developed. In the spring of 1990, when the Tofu Line Glass was launched, a Swedish national newspaper *Aftonbladet* published their yearly vanilla ice cream tests for the summer. Someone managed to get the Tofu Line Vanilla Glass entered into this contest and of the six major ice cream companies submitting their best vanilla premium ice creams, Tofu Line Glass came in second, behind Movenpick. It was a sensation for a soybean based frozen dessert and Aros' sales that summer took off!

"1990 Dec. 31–Ted Nordquist sells Aros Sojaprodukter KB (tofu manufacturing) to Blekinge Invest (owners of Trensums Musteri where Ted and co-workers built the soybase plant). Ted now owns 25% of a new corporation named Aros Sojaprodukter AB, of which he is also CEO. He can now work full time developing dairy alternatives made from the 'soybase' he and Mark Ljungström developed. He is trying to find companies to license his new technology and process for making soybase. Erik Kenhead, a businessman retired from Volvo Penta Marine Motors in England formed Aros Sojaprodukter AB with Ted. Soon after this, Blekinge Invest is included in the company resulting in 25% ownership for Ted, 25% for Erik and 50% for Blekinge Invest."

1991 July–Ted Nordquist establishes TAN Industries, Inc., in California. In Aug. 1994 his family joins him in Sonoma, California. In January of 1995, TAN Industries starts packaging and selling soymilk in extended shelf-life refrigerated packaging in the United States.

"1992 May–Ted Nordquist sells all of his shares in Aros Sojaprodukter AB, his second company in Sweden, since he now lives in the USA."

Note: Portions of the above not in quotation marks were written initially by Wm. Shurtleff. Address: TAN Industries, Inc., 353 Sacramento St., Suite 1120, San Francisco, California 94111.

1987. Shukla, Shruti; Lee, J.S.; Park, H.K.; Yoo, J.A.; Hong, S.Y.; Kim, J.K.; Kim, M. 2015. Effect of novel starter culture on reduction of biogenic amines, quality improvement, and sensory properties of doenjang, a traditional Korean soybean fermented sauce variety. *J. of Food Science* 80(8):M1794-803. Aug. doi: 10.1111/1750-3841.12942. Epub 2015 July 3. *

1988. Chukeatirote, Ekachai. 2015. Thua nao: Thai fermented soybean (Open Access). *J. of Ethnic Foods* 2(3):115-18. Sept. [37 ref. Eng]

• ***Summary:*** "Thua nao is a traditionally fermented food in Thailand. It is manufactured by fermenting cooked soybeans with naturally occurring microbes. There are also similar products including natto in Japan, kinema in India, and chongkukjang in Korea. In Thailand, thua nao is widely consumed, especially by people in the northern part. The

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product is generally regarded as a protein supplement and widely used as a condiment. Two major types of thua nao can be distinguished; fresh and dried forms. To date, scientific information on thua nao is scarce and thus this article aims to document the updated knowledge of Thai thua nao." Address: School of Science, Mae Fah Luang Univ., Chiang Rai, Thailand.

1989. Young, Jackie M. 2015. The art of creating tofu: Mao-Chi Tzeng approaches tofu making as an art (Web article). *HawaiiBusiness.* Oct. 28.
• ***Summary:*** Mao-Chi Tzeng (age 66) and his wife Mei-Liang own Mrs. Cheng's Soybean Products, 233 Kalihi St., in Kalihi, Honolulu, Hawaii. A large color photo shows Mr. Tzeng standing in his tofu company. Originally from Taiwan, he and his wife immigrated to Hawaii in 1984 hoping to find "better health and educational opportunities for their two children. They had been pharmacists in Taiwan, and both came from families with medical and business backgrounds. So, a few months after arriving, Tzeng seized the opportunity when he heard Hui C. Cheng planned to retire and sell her tofu factory in Palolo.

He had big plans for the new company, but he noticed the market was too small to make a profit. So he upgraded her equipment because it was too small and outdated for the kind of company he envisioned. His new, state-of-the-art tofu-making equipment was custom made in Japan. That included a special cooker for the soybean slurry "that has three heating zones and four temperature monitors to make sure the soymilk slurry from crushed soybeans is heated gradually and evenly cooked, but not overcooked." And he raised the quality of the ingredients to pharmacy grade (from food grade) when possible and later started using non-GMO soybeans. Nevertheless, he lost money for the first three years.

"When Tzeng took over Mrs. Cheng's, the product line was plain soymilk, nigari tofu (firmer than hard tofu), hard tofu and soycheese, a brown-colored baked tofu that imitates cheese.

"Tzeng added soft tofu, or 'silken tofu,' after he found that upscale Japanese and Korean restaurants had no local supplier."

"He now also does custom orders [daily] of 'soong tofu' for Korean restaurants, similar in style to silken tofu."

In 1992, when a larger location became available, he moved the factory to its present location on Kalihi Street (Phone: 841-2571).

"About 40 percent of Mrs. Cheng's customers are high-end restaurants, and the rest are supermarkets, health food stores, wholesalers and individuals who buy direct from the factory." Address: Honolulu, Hawaii.

1990. Yoo, Taebum; Yoon, In-Jin. 2015. Becoming a vegetarian in Korea: the sociocultural implications of vegetarian diets in Korean society. *Korea Journal* 55(4):111-35. Dec. [50 ref]*
• ***Summary:*** "This essay is a social psychological analysis of the meaning of and social pressures against vegetarianism in a highly collective cultural context. It postulates potential difficulties in social relationships as the real challenge in becoming a vegetarian in Korea. The research is based on data collected from participant observations and in-depth interviews conducted with 38 vegetarians in the Seoul metropolitan area in 2010 2011. Given the social importance placed on ordering and sharing similar meals together in order to foster intimate relationships and emotional bonds in Korea, vegetarianism can be considered deviant social behavior discordant with the nonvegetarian norm. In highly collective Korean society, it is regarded as a bad practice that disturbs harmony within the group, and vegetarians/vegans, especially those who are younger and occupy lower social positions, face enormous social pressures to yield to a conventional omnivorous diet, especially on occasions, such as a family gathering and a company dinner. While some people fail to maintain their vegetarian diet, many vegetarians/vegans try to cope with such social pressures by using various bargaining strategies, such as avoiding meal time, hiding their identity, giving an excuse, and doing routine chores for everyone else at the dinner table." Address: 1. The New School, Dep. of Sociology; 2. Korea Univ., Dep. of Sociology.

1991. Lee, Seul Ki; Kim, A. Young; Hong, Sang Pil; Lee, Seung Je; Lee, Min A. 2015. [Development of sauces made from gochujang using the quality function deployment method: Focused on U.S. and Chinese markets]. *J. of the Korean Society of Food Science and Nutrition* 44(9):1388-98. [33 ref. Kor; eng]
• ***Summary:*** "Quality Function Deployment (QFD) is the most complete and comprehensive method for translating what customers need from a product. This study utilized QFD to develop sauces made from Gochujang and to determine how to fulfill international customers' requirements. A customer survey and expert opinion survey were conducted from May 13 to August 22, 2014 and targeted 220 consumers and 20 experts in the U.S. and China." Address: Dep. of Food and Nutrition, Kookmin Univ., Korea.

1992. Kim, You Jin; Park, M.Y.; Chang, N.; Kwon, O. 2015. Intake and major sources of dietary flavonoid in Korean adults: Korean National Health and Nutrition Examination Survey 2010-2012. *Asia Pacific J. of Clinical Nutrition* 24(3):456-63. [21 ref. Eng; Kor; chi]
• ***Summary:*** "With an effort to investigate possible relationship between flavonoids and health, an accurate estimation of flavonoid intake is valuable. We estimated dietary flavonoid intake and identified the major food

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sources. Subjects were healthy adults aged >=19 y (n=11,474) who completed the 24-h dietary recall of the Korean National Health and Nutritional Examination Survey (2010-2012). The US Department of Agriculture and newly estimated or published values for typical Korean foods were combined into a Korean-targeted flavonoid database. The mean intake of total flavonoid was 107±1.47 mg/d, with a higher intake in women than in men after energy-adjustment. Quercetin, cyanidin, genistein, daidzein, epigallocatechin 3-gallate, epicatechin, hesperetin, and luteolin were identified as major flavonoid compounds. Across the age range studied, flavonols and flavones showed a reversed U-shape curve; flavan-3-ol and flavanones showed a decreasing pattern; and anthocyanidins and isoflavones showed an increasing pattern. Forty-five food items were identified as contributing >2% of at least one flavonoid compound's intake. Kimchi was the major food source of total flavonoids, followed by green tea, persimmons, and soybeans. Single food items accounting for more than 50% of the intake of a specific flavonoid included persimmons (cyanidin), green tea (epigallocatechin, epicatechin-3-gallate, and epigallocatechin 3-gallate), black tea (thearubigin), tangerines (hesperetin and naringenin), and onions (isorhamnetin). This study provides information on Korean flavonoid intake to enable international comparisons, along with insight into how the sources and intake of various flavonoids vary according to age and gender. This work should facilitate future investigations of the association between flavonoid intake and health." Address: Dep. of Nutritional Science and Food Management, Ewha Womans Univ., Republic of Korea.

1993. Lee, Cherl-Ho. comp. 2015. Kong Se Kye Gwa Hak Gwan [Soyworld Science Museum]. Seoul, Korea: Sikanyeon Publishing. 212 p. Illust. (many color photos). 26 x 20 cm. [Kor]
• ***Summary:*** This beautiful book is a catalogue of the soybean museum at Yeongju City, Kyungsangbukdo. Korea. On the cover is a color photo of one end of the museum against a green background. On pages 2-3 is a color aerial illustration of the entire expansive site with 9 places numbered and named in both Korean and English: 1. Parking area. 2. Soyworld Science Museum. 3. Soyworld Activity Hall. 4. Farming experience center (large outdoor farm). 5. Picnic square. 6. Eaoullim Madang. 7. Farm products market. 8. Public restroom. 9. Yeongju apple exhibition hall.

1994. Tamang, Jyoti Prakash. 2015. Naturally fermented ethnic soybean foods of India (Open Access). *J. of Ethnic Foods* 2:8-17. [38 ref. Eng]
• ***Summary:*** Abstract: *"Kinema, hawaijar, tungrymbai, bekang, aakhone,* and *peruyaan* are naturally fermented ethnic soybean foods of India; they are popular among the Mongolian-origin races in the Eastern Himalayas. *Bacillus subtilis* is the dominant functional bacterium in all naturally fermented soybean foods of these regions. Although there is a good demand for ethnic fermented soybean foods among local consumers in north-east India, the production is limited to household level. A ready-to-use pulverized starter culture for kinema production can be introduced to kinema-makers or similar sticky fermented soybean foods of north-east India and adapted to local conditions for additional income generation. Ethnic fermented soybeans are one of the major food resources in the Eastern Himalayas; they supplement inexpensive, high-digested plant protein in the local diet with low fat/cholesterol content and high nutritive value as well as antioxidant and other health-promoting properties."

"Kinema is similar to other Asian Bacillus-fermented sticky soybean foods such as natto of Japan [28], chungkukjang of Korea [29], and thua nao of northern Thailand [30] (Fig. 11), pepok of northern Myanmar [31], and sieng of Cambodia and Laos [32]. The preparation of kinema is very similar to that of natto," Address: Dep. of Microbiology, School of Life Sciences, Sikkim Univ., 6th Mile, Tadong 737102, Sikkim, India.

1995. Ahn, Seonghee; Lee, S.; Lee, J.; Kim, B. 2016. Accurate determination of ochratoxin A in Korean fermented soybean paste by isotope dilution-liquid chromatography tandem mass spectrometry. *Food Chemistry* 190:368-73. * Address: Graduate School of Biotechnology, Korea Univ., Seoul 136-701, Korea.

1996. Hong, Deuki; Rodbard, Matt. 2016. Koreatown: a cookbook. New York, NY: Clarkson Potter. 272 p. Illust. (photos by Sam Horine). Index. 26 x 21 cm.
• ***Summary:*** This a very original and creative Korean cookbook.

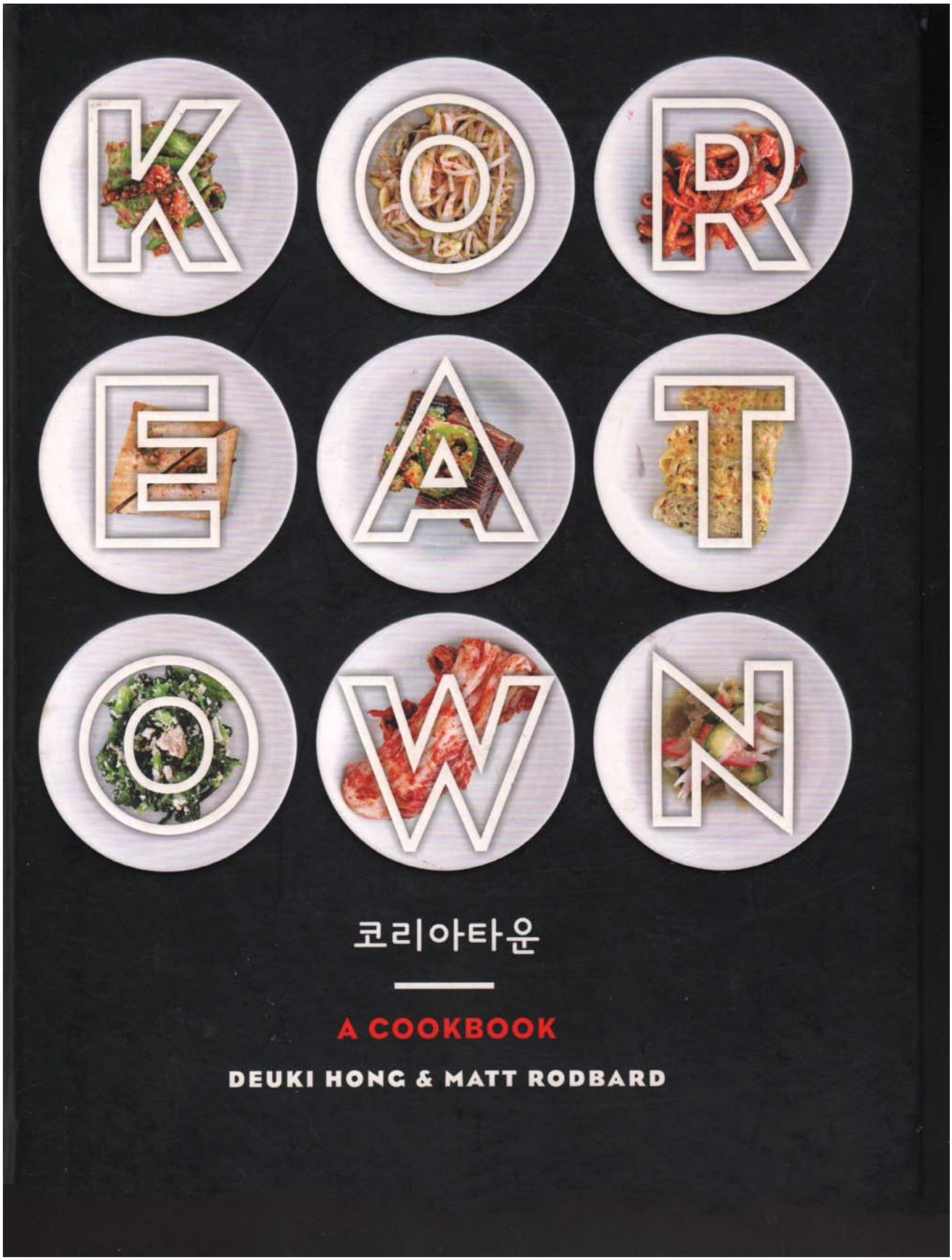
The chapter titled "Ingredients and Equipment" (p. 22+) starts with "Korean Mother Sauces: Gochujang, Doenjang, and Ganjang," noting that "Much of Korean cooking is based around three essential, easy-to-find foundations called jangs."

(1) Gochujang (Spicy Fermented Pepper Paste), pronounced go-CHOO-jong, is sold in a bright red container with a number system, on the package, rating its hotness. The lower the number, the milder the taste.

To make gochujang, meju, a type of fermented soybean koji, is mixed with hot red pepper [chili] flakes, barley, sweet rice flour, salt and water. The mixture is placed into large earthenware crocks and left out in the sun to ferment for 30 to 90 days. The taste of gochujang is too intense to be used by itself, so it is always mixed with ingredients such as "sesame oil, rice vinegar, garlic, ginger and soy sauce."

(2) Doenjang (Fermented Soybean paste), pronounced DEN-jong, is much milder, less hot and intense, than gochujang. "Meju is rehydrated with salted water," placed into earthenware crocks, and left out in the sun to ferment for many months. When it has roughly the consistency of

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applesauce, a basked is pushed down into it, and the soy sauce (ganjang) which accumulates in the basket is drawn off. The thick, salty paste left in the crock is ganjang. It is widely used in Korean cooking, and best known as the backbone of Ssamjang.

(3) Ganjang (Korean Soy Sauce [also spelled kanjang]), pronounced GAN-jong, is the liquefied co-product just discussed. In Korean cooking, two main types are available: regular and that used for soups. The regular is very similar to the soy sauce found in China. "The soup variety of soy sauce in unique to Korea. It is much lighter in color and has a lower sodium content. "It is also key when preparing namul (marinated vegetables)." Two photos (p. 23) show: (a) Making doenjang. (2) A courtyard filled with large earthenware containers of fermenting jang.

Page 25: Chunjang (black soybean paste) is similar to Chinese black soybean sauce. "It's made from roasted soybeans and thus is nuttier and less salty than the Chinese version. Chunjang is the main ingredient use in Jajangmyeon (p. 97), a popular Korean-Chinese noodle dish."

p. 31: Tofu (Dubu). Korea has regular and silken tofu types.

Soy sauce is used in a great many recipes in the book; we will mention only the most important–starting with:

p. 48: Soy sand sesame spinach.

p. 49. Quick soy sauce pickles.

p. 52. Soy-marinated eggplant.

p. 57. Soy-braised tofu (Dubu jorim).

Soy milk noodle soup (Kongguksu).

Black bean noodles (Jjajangmyeon, with chunjang {black bean paste}). Ssamjang (the great Korean barbecue condiment, with doenjang).

p. 118. Soy-marinated grilled rib eye (Bulgogi).

Spicy pork spare ribs (Daeji kalbi, with gochujang).

p. 142: Soy garlic glaze.

p. 151. Soy-braised pig's feet (Jokbal).

p. 153. Soy-marinated beef tartare (Yukhoe).

p. 170. Bean paste stew (Doenjang jjigae).

p. 173. Soft tofu stew (Soondubu jjigae).

p. 185. Sweet soy-braised chicken.

p. 193. Ground soybean soup (Dongbibi jjigae).

p. 208. Spicy kimchi yuba "noodles" with poached egg.

p. 216. Doenjang-braised pork belly with ddeokbokki.

p. 219. Crispy tofu sandwiches with munchim pickles and grape-jelly doenjang dressing.

p. 233. Doenjang and kimchi-braised kale.

For more see the excellent index. But don't look for "sprouts" or "soybean sprouts." Address: USA.

1997. Shin, H.W.; Jang, E.S.; Moon, B.S.; Lee, J.J.; Lee, D.E.; Lee, C.H.; Shin, C.S. 2016. Anti-obesity effects of gochujang products prepared using rice koji and soybean meju in rats. *J. of Food Science and Technology* 53(2):1004-13. Feb. [24 ref]

• ***Summary:*** "The Korean traditional hot sauce gochujang has been reported to have biological activities. Different kinds of gochujang products were prepared based on combinations of a fungal rice koji with two kinds of bacterial soybean mejus... High levels of capsaicin and genistein in gochujang products are considered to contribute to anti-obesity effects." Address: 1. Dep. of Biotechnology, Yonsei Univ., Seoul, 120-749 South Korea.

1998. Rodriguez, Robert. 2016. Clovis sets the table in good taste. *Fresno Bee* (*The*) (*Fresno, California*). April 13. p. C1-C2.

• ***Summary:*** Robert Schram is diversifying the school lunch offerings at Clovis East High School. One of these is "baby back ribs with a gochujang glaze.

"Haven't heard of gochujang? Don't be surprised, neither have most people. Gochujan [sic] is a savory and spicy Korean sauce that some in the food world believe will be the next sriracha."

1999. Pulmuone Foods Co. Ltd. 2016. Pulmuone closes asset purchase agreement with Vitasoy USA (Web article). www.prnewswire.com/news-release/ 1 p.

• ***Summary:*** Fullerton, California, May 12, 2016.–Pulmuone Foods Co., Ltd. announced on May 9th it has completed the acquisition of substantially all of the assets of Vitasoy USA Inc., which includes the Nasoya®, Azumaya® and San Sui® brands in North America. This acquisition solidifies Pulmuone's position as the world's leading tofu company while strengthening its operations in South Korea, U.S., Japan and China. Pulmuone had previously announced it had entered into an asset purchase agreement to acquire Vitasoy USA Inc. on March 24th.

"'This acquisition provides bi-coastal production and logistics capabilities as well as a national sales and distribution platform,' said Mr. H. Y. Lee, CEO of Pulmuone Foods Co., Ltd. 'We are especially excited about expanding the brand beyond the tofu category through our innovative product development and with our multi-channel business base. We look forward to bringing our customers and consumers more healthy and tasty products.'

"The acquired business, now known as Nasoya Food USA LLC., joins the Pulmuone family of healthy and nutritious brands and will be a part of our significant expansion in the U.S. M&A will continue to drive future growth for Pulmuone in North America and globally.

"Ross Gatta has been appointed to lead the Nasoya Food USA business as CEO. The acquired operations will remain in Ayer, Massachusetts with significant investments planned to grow the business." Address: Fullerton, California.

2000. Park, Eui-Seong; Heo, Ju-Hee; Ju, Jaehyun; Park, Kun-Young 2016. [Changes in quality characteristics of gochujang prepared with different ingredients and meju

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starters]. *J. of the Korean Society of Food Science and Nutrition* 45(6):880-88. June. [40 ref. Kor; eng]
• ***Summary:*** "Changes in quality characteristics of gochujang prepared with different ingredients (white rice, barley, sorghum and millet, bamboo salt) and meju starters were studied. The gochujang samples were fermented for 6 weeks at 40ºC and analyzed for changes in their physicochemical properties and sensory characteristics." Address: 1. Dep. of Food and Nutrition, College of Human Ecology, Yonsei University.

2001. Lee, Cherl Ho; Kim, Moonsil Lee. 2016. History of fermented foods in northeast Asia. In: Jyoti P. Tamang, ed. 2016. Ethnic Fermented Foods and Alcoholic Beverages in Asia. New Delhi, India: Springer Verlag. xiii + 409 p. See p. 1-16. [24 ref. Eng]
• ***Summary:*** Contents: 1.1 Introduction: where and who? 1.2 Pottery and dietary culture in northeast Asia. The *Hou Hanshu* [History of the Later Han dynasty (25 to 220 CE), written in the mid-5th century CE] mentions the "eastern archers" (*dongyi*). The word *dongyi* was originally written with two words meaning "big" + "bow." *The Hou Hanshu* also states that the dongyi were good at riding horses and archery, and that they had "established several proto-states in Manchuria, the Korean Peninsula, and the Japanese Archipelago such as Puyo, Dongye, Okcho, Koguryo Samhan and Wa." This suggests that as early as the 3rd century BCE the Dongyi has already established a unique culture that differed from the Chinese civilization to the north. Moreover, an oracle bone inscription from the Shang dynasty, dating to about 1200-1046 BCE, states "... the king orders to campaign against the Yi." This statement implies that, since around 1000 BCE the Dongyi had occupied part of northeast Asia and competed against the Chinese. And archaeological evidence indicates that they used fermented soybean products.

1.2 Pottery and dietary culture of Northeast Asia. Late Paleolithic (40,000 to 10,000 BP) sites have been found on the Korean Peninsula, South Manchuria, and the Japanese Archipelago. The meat-centered diet of the early hominin gradually changed to an omnivorous one. The Korean Peninsula served as a land bridge connecting the seasonal movements of Paleolithic hunters from the north of Manchuria to the south of the Japanese archipelago; the Korea strait is about 200 km (120 miles) wide, with Tsushima island in the middle. Evidence of this migration is the many pieces of primitive pottery found on both sides of the strait. A map (Fig. 1.2) shows where such pottery has been found. An earthen vessel excavated from Paldang in Korea has traces of soybeans on the surface; this supports the theory that these people used pottery for cooking soybeans in Central Korea beginning in the Bronze Age.

1.3 Origin and development of fermentation technology in Northeast Asia. 1.3.4 Origin of soybean fermentation. In the West, it is generally understood that soybeans were first domesticated, cultivated and consumed in China [Hymowitz 1970].

1.4 Fermented soybean products in Northeast Asia. 1.4.1 Korean Kanjang and Doenjang. The *meju* used as soybean koji for both these products is made from cooked soybeans. It is generally covered with *Aspergillus oryzae* mold and the inside is laden with bacteria, typically *Bacillus subtilis.* The result is liquid soy sauce (*kanjang*) and Korean-style soybean paste (*doenjang*). The flavor of soy sauce improves with increasing storage time, just as the flavor of wine becomes smoother as it ages. 1.4.2 Japanese shoyu and miso. The flavor of these two seasonings is mild and sweet compared to their Korean counterparts.

1.4.3. Korean *Chongkukjang* (like Japanese natto but salted). Cook soybeans and cover with a straw mat or cloth. Place on a warm stone floor, *ondol*, for 3-4 days until mucous strings (peptido-saccharides) formed. Then mix in chopped ginger, chopped garlic, and salt. Pound slightly until the soybeans are separated into halves. Store in an earthen jar. Natto is not generally liked by Koreans. In the so-called urbanized, apartment culture of today, Korean elders miss the stimulating savory smell of *chongkukjang* wafting from their kitchen; Korean young people generally dislike this smell.

1.4.4 Korean Kochujang uses meju (soybean koji) as a main ingredient, but mixed with strong, pungent red peppers. The most distinctive difference between Korean food that of neighboring Japan and China is the fiery taste of red peppers in most Korean dishes.

1.5 Role of fermented food in Northeast Asia. Fermented soybean products plays a major part. Korean koji is called *nuruk.*

1.6 Conclusion.

An excellent map (p. 2) shows the area described by the term "Northeast Asia."

Note: M.L. Kim is the daughter of C.H. Lee. Address: 1. Korea Univ., Seoul, South Korea; 2. Rhode Island College, Providence, Rhode Island.

2002. Shin, Dong-Hwa; Kim, Young-Moung; Park, Wan Soo; Kim, Jae-Ho. 2016. Ethnic fermented foods and beverages of Korea. In: Jyoti P. Tamang, ed. 2016. Ethnic Fermented Foods and Alcoholic Beverages in Asia. New Delhi, India: Springer Verlag. xiii + 409 p. See p. 263-308. [137 ref]
• ***Summary:*** Section 11.2 contains detailed information on Fermented soybean products in Korea. These are Doenjang (Korean-style miso). Meju (Korean soybean koji). Gochujang (Soybean paste mixed with fiery red peppers; it requires a special type of Gochujang meju which is a mixture of soybeans and starch). Cheonggukjang (Korean-style natto but with salt). Ganjang (Korean-style soy sauce). Address: 1. Shindonghwa Food Research Inst., Eunma Apt. 12-802, 212 Samsung Ro, Kangnam-ku, Seoul, Republic of Korea.

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2003. Boyer, Trisha. 2016. Vivek Surti smashes myth of the perfect party. *Tennessean* (*The*) (*Nashville, Tennessee*). Sept. 28. p. E6.
• ***Summary:*** "What's the last meal you ate?... I was at a friend's house... We made Thai style grilled chicken legs, ribs with gochu-chang barbecue sauce, ginger and fish sauce marinated tri tip, nachos,..." Address: Writer for The Tennessean.

2004. Kim, Soon-Hee; Chung, Kyung Rhan; Yang, Hye-Jeong; Kwon, Dae Young. 2016. Sunchang *gochujang* (Korean red chili paste): The unfolding of authenticity (Open Access). *J. of Ethnic Foods* 3(3):201-08. Sept. [54 ref]
• ***Summary:*** "Abstract: Background: Gochujang is one of the most frequently consumed foods by Koreans and can be used as a seasoning in *kuk, banchan,* or also used as a condiment itself. In this paper, we discuss the historical, literary, and geographical aspects of Sunchang gochujang, which has been acknowledged as the best quality.

"Methods: The history, origin, and tradition of gochujang and Sunchang gochujang were examined through literature review. Sunchang's climate and geographical characteristics were examined in order to determine their effects on the ingredients and its fermentation condition.

"Results: Sunchang is located in the southwest region of Korea. Its geography, with characteristic mountainous basins, provides high temperatures and humidity that is suitable for the fermentation of gochujang. In addition, distinctive seasons and temperature variance between day and night helps with growing high-quality red peppers with moderate levels of spiciness. The first reference to gochujang is found in the *Hyangyak-jipsongbang* (5 Cc = Chinese characters, 1433). Sunchang gochujang was enjoyed in the royal court, as described in the Ojuyeonmun-jangjeonsanko (8 Cc) and Somunsaseol (4 Cc). Sunchang gochujang was introduced as a medicinal food in the medicinal newspaper, and its recipes were recorded by royal physicians during the Chosun Dynasty. This demonstrates that Sunchang gochujang gained popularity not only for its flavor but also for its medicinal effects.

"Conclusion: The outstanding flavor and functional effects of Sunchang gochujang are due to the geographical characteristics that provide a congenial climate for fermentation and a great environment for growing high-quality red peppers."

"The majority of Korean foods are seasoned with jang rather than salt, as jang, being made from fermented beans, contains rich amino acids and volatile aromatic compounds that enhance the smell and flavors of food [2]. As jang is used in most kuk and banchan, many have stated that jang decides the flavor of a food. The Hurbaekjeongjip (4 Cc), a book written in the 15th century by Gwidal Hong (3 Cc, 1438-1504), stated that 'the quality of gochujang decides the farming success of that year.' This statement demonstrates the importance of jang in Korean food beyond its nutritional value [5].

"Gochujang is a fermented and aged bean product made from soybean powder, red pepper powder, and rice flour [2]. It has been indispensably used in dishes such as bibimbap [6], chicken, pheasant, and fish stews [7]. As with other types of jang, gochujang can be used as a seasoning in kuk, tang, and banchan, or as a condiment [4]. Chogochujang, a combination of vinegar and gochujang, is enjoyed with grilled meat or sashimi. According to the 2015 National Nutrition Survey conducted by the Korea Health Industry Development Institute, gochujang was ranked as the 14th most frequently consumed food in Korea [8]. The reported average daily intake of gochujang was 6.11 g and it was the second-most consumed seasoning after kanjang [8].

"Although many regions have traditionally made gochujang, the most famous region for gochujang is Sunchang. Generally, gochujang produced in Sunchang is the highest-selling product. In this paper, the historical, literary, and geographical aspects of Sunchang gochujang will be discussed."

"2. The history and tradition of gochujang: References to the cultivation of red peppers (*gochu*) in Korea can be found in the Chronicles of the Three States (4 Cc, 1145) and Mankiyoram (4 Cc) written by Busik Kim [9], [10] (Fig. 1). In addition, the Nonggawolryeongga (5 Cc, 1816) introduced red peppers as an important crop [11]. The Gijaejapgi (4 Cc, 16th century) mentioned bibimbap, a rice and vegetable dish, that was usually consumed with gochujang [12]. Taking these references and the long history of jang into consideration, it would be safe to presume that gochujang has been consumed by Koreans for thousands of years. The oldest written reference to gochujang is found in the Hyangyak-jipsongbang (5 Cc), published in 1433 during the 15th year of the reign of King Sejong in the Chosun Dynasty [Fig. 2; This book refers to gochujang or gochojang as chojang (2 Cc) and gochu as gocho or gochu (1 Cc)] [13]. However, the early references to gochujang are primarily focused on its medicinal properties rather than its role as a food additive. For example, gochujang was often used to promote digestive issues caused by weaknesses in the spleen and stomach [7], [14]."

"4. Gochujang production methods: One of the major ingredients of gochujang is gochujang meju. Meju is made from cooked soybeans and nonglutinous rice with a ratio of 6:4. This mixture is then woven with straw and then dried for 2-3 months. Gochujang is made from meju powder mixed with malt, salt, rice flour, and red pepper powder [2]. The typical recipe for gochujang is 25% red pepper powder, 22.2% glutinous rice, 5.5% meju powder, 12.8% salt, 5% malt, and 29% water. Once these ingredients are mixed and placed in a crock, it takes approximately 6 months to 1 year for fermentation to occur [2]. The two main groups of microorganisms in gochujang are *Bacillus licheniformis*

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(33%) and *Bacillus subtilis* (32%)." Address: Div. of Nutrition and Metabolism Research, Korea Food Research Inst., Songnam, South Korea.

2005. Patra, Jayanta Kumar; Das, Gitishree; Paramithiotis, Spiros; Shin, Han-Seung. 2016. Kimchi and other widely consumed traditional fermented foods of Korea: a review (Open Access). *Frontiers in Microbiology* 7:1493. Sept. [164 ref]

• ***Summary:*** "Different types of fermented foods such as chongkukjang, doenjang, ganjang, gochujang, and kimchi are plentifully available and widely consumed in north eastern Asian countries including Korea." However these are the Korean names for these foods.

"Chongkukjang [Korean-style natto paste] is a fermented product manufactured by short term fermentation of boiled soybean seeds using *Bacillus subtilis* in rice straw. It is one of the favorite traditional foods in Korea (Su et al., 2007; Kwon et al., 2011; Shin and Jeong, 2015). It contains a number of useful microorganisms and bioactive compounds that are absent from unfermented soybean products. Chongkukjang has the shortest fermentation period of 2-4 days and is fermented at a high temperature (40-43ºC). The soybean proteins are degraded during fermentation process by the protein degrading enzymes of *B. subtilis*, and flavonoid glycosides are converted into aglycones by hydrolysis during fermentation, resulting in production of free amino acids along with related peptides (Nakajima et al., 2005; Kim N. Y. et al., 2008; Wei et al., 2015). The Koreans have been consuming Chongkukjang for hundreds of years. Significant amount of data suggests that Chongkukjang contains a number of proteins and minerals that can stimulate the generation and growth of human cells and strengthen the immune system (Choi et al., 2014; Shin and Jeong, 2015). Moreover, there are several reports on the bioactive potential of Chongkukjang such as antidiabetic, antiinflammatory, antimicrobial, antioxidant, blood pressure lowering activities, and neuroprotective effects (Kang et al., 1998; Cho et al., 2000; Yang et al., 2003; Kim et al., 2004; Kim N. Y. et al., 2008; Wei et al., 2015). Compounds like isoflavones (daidzein and genistein) are found at high concentrations in Chongkukjang and they were reported to possess the protective effect against oxidative damage related with atherosclerosis and cancer (Barnes et al., 1996; Anthony et al., 1998).

"Doenjang is traditionally used in Korea as a basic seasoning (Kim et al., 2009; Nam et al., 2015). It is produced by the fermentation of cooked and crushed soybean seeds or blocks, Meju, by naturally occurring bacteria and fungi with brine in a container such as a porcelain pot and has been consumed for centuries as a source of protein and flavoring ingredient in Korea (Kim et al., 2009; Kwon et al., 2010). During recent times, the doenjang has been prepared commercially by various local firms around the Korean peninsula using a slightly modified procedure that varies in the quality as affected by the fermentation process, microbiota involved, and by the basic ingredients used, such as soybeans or a combination of soybeans and grains (Yoo et al., 2000; Park et al., 2002). Doenjang has attracted much attention due to its health-related beneficial properties such as anticancer, anti-mutagenicity, antioxidative, and fibrinolytic activity (Lim et al., 1999, 2004; Ra et al., 2004). Various types of microorganisms are involved in the fermentation of doenjang; the unique flavors and tastes are due to the decomposed products of soybean proteins from the soybean seed by the action of microorganisms during the fermentation process. A number of reports have stated that *B. subtilis* and *B. licheniformis* are the dominant microorganisms in doenjang along with *Aspergillus, Mucor,* and *Rhizopus* species (Kang et al., 2000; Nam et al., 2015). During the fermentation process, cleavage of β-glycosyl bond of isoflavone glucoside increases the content of isoflavone aglycones, including daidzein and genistein due to the rapid microbial growth (Nam et al., 2015). Daily intake of doenjang has been reported to suppress the body weight gain, cytokine levels, and serum oxidative stress in high-fat-fed mice (Nam et al., 2015). Similarly, the anti-inflammatory and anti-oxidative stress effects of doenjang have also been reported in the adipose tissue (Nam et al., 2015).

"Ganjang is a kind of Korean soybean sauce made from fermented soybeans (Hong-beum, 2004). It contains approximately 15-20% salt, 50-70% water, free sugars, isoflavones, peptides, and organic acids that are produced from the soybeans during the fermentation process (Jeon et al., 2002; Shim et al., 2008). The sauce has a characteristic black color due to the presence of melanoidins, which are formed when carbonyl compounds and amino compounds combine together (Kim et al., 2011). The melanoidins present in soybean sauce are responsible for its antioxidant potential (Choi et al., 1990). Ganjang is prepared from the soybeans blocks, meju, which is dried for about 1 week and then tied with straw and dried for another 40 days. After the meju have dried, they are then fermented in a specially made clay pot mixed with salt and water. When the fermentation is complete, dark liquid separates, which is called ganjang (soy sauce or soya sauce) (Hong-beum, 2004).

"Gochujang is a fermented paste made of red chili powder, glutinous rice powder, pureed soybeans and salt, seasonings like garlic and onion, sweetened with a little sugar syrup and fermented for long period in specially designed earthen vessels (Choi, 2012). It is an essential part of the Korean cuisine and is used in almost all the Korean foods like bibimbap, noodles etc. It is a basic ingredient for other sauces and pastes, it is mixed with the doenjang to make samjang, it is used to prepare the chogochujang, salad dressing etc. (Choi, 2012)" Address: 1. Research Inst. of Biotechnology and Medical Converged Science, Dongguk University-Seoul Goyang, South Korea.

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2006. Ann, Yong-Geun. 2016. [A study on making *meju* (molded soybean) for traditional jang]. *Korean J. of Food and Nutrition* 29(5):670-76. Oct. [48 ref. Kor; eng]
• ***Summary:*** "In this study, we analyzed the utensils, covers and mats that were used for making meju, the shape of meju, and the heating method used for making meju from the 225 ways of preparing jang mentioned in the 32 volumes of the ancient cook books from 530 AD to 1950. The heating method of traditional meju bean and starch included 57 kinds of steaming, 59 of boiling, 21 of roasting + boiling, and 2 of cooking. The shape of meju included 41 kinds of egg, 27 of ball, 22 of lump, a kind of doughnut, 8 kinds of hilt, 6 of flat, 4 of chip, and a kind of square. Among the 72 gochoojang meju, the heating method of bean included 9 kinds of boiling, and 6 kinds of steaming; whereas the heating method of starch included 19 kinds of steaming of dough, 11 of rice cooking, and 5 of boiling of dough. The utensils for molding of bean meju were 49 kinds of straw sack, 14 of round straw container, 11 of heating bed, 7 of large straw bowl or Japanese snailseed, 5 of jar, 4 of ditch, 3 of straw bowls, 2 of pottery steamer of dough, 2 of gourd, and a kind of long round bamboo bowl and sack of straw. The cover and the mat used for molding of meju included 36 kinds of straw, 17 kinds of paper mulberry leaf, 15 of wide straw seat, 14 of mugwort, 11 of pine tree leaf, 10 of soybean leaf, 6 of cocklebur leaf, 6 of sumac leaf, 6 of barley straw, 6 of mulberry leaf, 5 of fallen leaf, 5 of cogon grass, 4 of reed seat, 3 of scrap of cloth, 2 of Indian bean tree leaf, a kind of reed. There were only 5 kinds of hanging." Address: Dep. of Food and Nutrition, Chungcheong Univ., Cheongju 28171, Korea.

2007. Ghani, Mirwais; Kulkarni, K.P.; Song, J.T.; Shannon, G.; Lee, J.-D. 2016. Soybean sprouts: a review of nutrient composition, health benefits and genetic variation (Open Access). *Plant Breeding and Biotechnology* 4:398-412. Epub Nov. 30. [121 ref]*
• ***Summary:*** "Soybean... sprouts [*kongnamul* in Korean] are highly digestible and a year around vegetable suitable for human consumption. Sprouting process causes a number of biochemical changes inside the seed, resulting in the accumulation of various primary and secondary metabolites. Due to such changes, sprouts contain high levels of health-promoting phytochemicals as compared to other vegetables. Sprouts are an excellent source of protein, amino acids, and vitamins, which provide numerous health benefits. Due to such advantages, soybean sprouts have been preferred as a part of daily diets in Korea and quality soybean sprouts are in high demand in the edible food market. To produce high quality soybean sprouts, several factors, including the choice of the variety, health benefits from sprout phytonutrients and inherent genetic variation for the sprout-related traits of the variety need to be considered. In this review, we have summarized literature on soybean sprout components, the health benefits, changes in nutritional factors during the sprouting process and the genetic variation among the cultivars developed for sprout usage. We have also reviewed procedures and factors like seed characteristics, temperature, chemical applications that influence the sprouting process. The information collectively presented here will be useful for understanding the progress of soybean cultivars developed for soybean sprout development and use." Address: 1. School of Applied Biosciences, Kyungpook National University, Daegu 41566, Korea.

2008. *Medical Magazine.* 2016. Traditional fermented food in Korea. Nov.
• ***Summary:*** "While kimchi is certainly known for its taste and quality around the world, many outside of Korea still lack knowledge of jang, or the traditional fermented pastes. This is unfortunate because jang forms the bedrock of traditional Korean cuisine. Doenjang, gochujang, ganjang, and cheonggukjang are used to make almost all delicious and nutritious Korean dishes." One paragraph plus a photo are devoted to each of the following:

Doenjang [Korean-style soybean paste]. "Doenjang is one of the most basic and essential ingredients in Korean cuisine, which is used to make jjigae (stew), dressings for namul (boiled leafy vegetables), and bibimbap (steamed rice mixed with vegetables)." "Jang... forms the fundamental basis of Korean cuisine, as it makes its way into a great number of Korean dishes loved around the world, including bulgogi and bibimbap."

Gochujang [Soybean + Red pepper paste].

Ganjang [Korean soy sauce]

Cheonggukjang [also spelled Chongkukjang; Korean-style natto paste] "Cheonggukjang is another type of fermented soybean paste. Unlike doenjang, however, cheonggukjang is fermented for only a couple of days. As such, it offers greater amounts of protein and other substances natural to soybeans. The diverse vitamins, calcium, potassium, and other minerals richly contained in cheonggukjang boost metabolism and prevent obesity.

"Lecithin, a chemical compound natural to cheonggukjang, has proven to help reduce the cholesterol level and purify the blood, thus preventing cardiovascular diseases, including arteriosclerosis and strokes. Cheonggukjang is also rich in vitamin K, known to prevent osteoporosis. Vitamins B2 and B6, as well as unsaturated fatty acids like linoleic acid, all found in abundance in this pungent bean paste are also great beauty agents, capable of significantly improving the skin's condition."

2009. *SoyaScan Notes.* 2016. Chronology of major soy-related events and trends during 2016 (Overview). Dec. 31. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** Jan. 9–The Georgia Historical Society dedicates

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a historical marker commemorating the 250-year anniversary of the introduction of the soybean to North America by Samuel Bowen. A standing marker was place by the road on Skidaway Island near Savannah, near the spot where Samuel Bowen's first soybeans were first grown. Because Bowen's recently purchase property, Greenwich, was not yet ready for a crop, he asked his friend Henry Yonge to plant the first soybeans in the spring of 1765 at his Orangedale Plantation, located on Skidaway Island.

May 9. Pulmuone Foods Co., Ltd. (Fullerton, California) completes the acquisition of substantially all of the assets of Vitasoy USA Inc., which includes the Nasoya®, Azumaya® and San Sui® brands in North America. This acquisition solidifies Pulmuone's position as the world's leading tofu company while strengthening its operations in South Korea, USA, Japan and China.

Sept. 14–Bayer to buy Monsanto for $66 billion cash. Bayer had to sweeten its price several times during the long negotiations. But the deal still has to get regulatory approval in both Germany and the USA (*USA Today.* Sept. 14. *Organic and Non-GMO Report* (The) (Fairfield, Iowa). Oct. p. 8-9).

2016–The last *Soya & Oilseed Bluebook* is published by HighQuest Partners; it has been published once a year since 1947. They find they can make more money organizing and sponsoring conferences, so they lost interest in it.

2010. Choi, S.; Han, S.; Sung, M.; Chung, J.I. 2016. Breeding of black soybean line with *ti* and *le* allele. *Plant Breeding and Biotechnology* 4(2):170-75. *

2011. Jung, W.Y.; Jung, J.Y.; Lee, H.J.; Jeon, C.O. 2016. Functional characterization of bacterial communities responsible for fermentation of doenjang: A traditional Korean fermented soybean paste. *Frontiers in Microbiology* 7:827. *
• ***Summary:*** Doenjang is one of the Asian fermented soyfoods that have been studied using high-throughput sequencing analysis.

2012. **Product Name:** White Rose Miso.
**Manufacturer's Name:** Keepwell Vinegar.
**Manufacturer's Address:** Dover, Pennsylvania.
**Date of Introduction:** 2016.
**Ingredients:** Incl. koji, soybeans.
**How Stored:** Shelf stable.
**New Product–Documentation:** Letter from Sarah Conezio and Isaiah Billington. 2021. April 21. We began selling miso to chefs and restaurants in 2016, and only recently have made it available in retail format.

"2. We use rice koji to make our white miso, our rice wine vinegar, and our shio koji. For most of our misos, we use a koji of emmer farro grain. This is a grain that grows well in Pennsylvania and Maryland. Our gochujang is made with meju bricks that are composed of soy and rice.

"3. We made our initial batches of koji in 2015 using knowledge from The Book of Miso and instructions from Gem Cultures included with the spore they sell. Since then, we have rounded out our knowledge by watching a lot of videos on Youtube and we continue to pick up new information from the books that have come out in recent years, such as Koji Alchemy and the Noma Guide to Fermentation. We have never had the pleasure of receiving instruction directly from a primary source.

"4. Our misos are sold in 9 oz glass jars. We use organic emmer farro, organic wheat, organic soybeans, organic sweet potatoes, organic sunchokes. Some of the rice we use is organic and some is not. The benne seeds, runner peanuts, black walnuts, and malted barley that we use are not organic. In each case, the product is not available locally to us (or at all) as an organic crop. We don't bother to claim that the miso is organic, even when composed of only organic ingredients, because we don't know how to navigate the documentation and record-keeping that is (theoretically) required.

"5. We are indeed surviving financially as a small business. Demand for fermented foods is very high right now, and we've been fortunate to connect with many restaurants and retailers, in addition to selling our food directly through our website.

"Thank you again for considering us, it is an immense pleasure, and please let us know if we can send you any miso to try! We're sure you have a lot."

2013. Kim, M.J.; Kwak, H.S.; Jung, H.Y.; Kim, S.S. 2016. Microbial communities related to sensory attributes in Korean fermented soybean paste (doenjang). *Food Research International* 89:724-32. [90 ref]*
• ***Summary:*** *Firmicutes* was the abundant phylum found in doenjang.

2014. Kim, Soon Hee; Kim, Myung Sunny; Lee, M.S.; Park, Y.S.; Lee, H.J.; et al. 2016. Korean diet: Characteristics and historical background (Open Access). *J. of Ethnic Foods* 3:26-31.
• ***Summary:*** "Historically Koreans have made various *jang* (fermented soy products) [2], including *kanjang* (soy sauce), doenjang (soybean paste) and gochujang (red pepper paste),..." Address: 1. Korea Food Research Inst., Songnam, South Korea.

2015. Lee, Cherl-Ho. 2016. Background and vision of Soyworld Science Museum [in Yeongju, Korea]. https://mail.google.com/mail/u/0/?pli=1#inbox/KtbxLzGSwSXKXLPLwTwPqvcmgchwCSXGxV?projector=1&messagePartId=0.1 13 p. [Eng]
• ***Summary:*** Contents: 1. Title page.
2. "Why Soyworld Museum in Korea?

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"The origin of soybean–South Manchuria and Korean Peninsula.

"First user of soybean as food–DongYi, the ancestor of Korean people."

3. "Why Soyworld Museum in Korea?

"The Primitive Pottery Age (BC 6000) started at Korea Strait Region–Beginning of fermentation technology in Northeast Asia

"Beginning of soybean fermentation technology in this region."

4. "Origin of soybean and its propagation.

"Botanically most abundant wild species are found in South Manchuria and Korean Peninsula.

"Carbonated seeds of late Neolithic (BC 2000) and early Bronze (BC 1500) Ages are excavated in Korea."

5. "Origin of soybean and its propagation." A Chinese book Guanzi (2 Cc, BC 7th century) describes soybean was introduced into China from south Manchuria (2 Cc).

"Soybean appears to be introduced into Japan in AD 3rd century. from Korea, and into southeastern Asian countries in AD 4-7 centuries from China.

"Soybean was introduced to Europe and to North America in the 18th-19th centuries.

6. "History of Soyworld Museum establishment" Based on a paper titled "The feasibility study on the establishment of a world soybean center," by Tai-Wan Kwon, Shin-Han Kwon, Cherl-Ho Lee, and Eun-Hi Hong, published in *Korea Soybean Digest* 18(1):1-25 (2001).

7-8. "History of Soyworld Museum establishment."

"Jan. 2001–Formation of Soyworld Museum Promotion Committee (SMPC), initiated by Prof. Tai-Wan Kwon, Founding Chairman, searching for the museum site and fund raising.

"Oct. 2005–Publication of the book "Soybean" by SMPC at Korea University Press (15 ch., 794 p.)

"Dec. 2006–Dr. Seok-Dong Kim, the 2nd Chairman of SMPC

"April 2008–Cyber Soyworld Museum and Home-page open (www.soyworld.org)."

"Dec. 2008–MOU [memorandum of understanding] with Yeongju City for the construction of Soyworld Science Museum

"May 2009–Project for the Basic Plan for the construction of Soyworld Science Museum (Dr. Jong-Hwan Hwang)

"March 2011–Project for the Soy-world story telling (Ms. Mi-Kyung Yu)

"Jan. 2013–Prof. Cherl-Ho Lee, 3rd Chairman of SMPC

"Feb. 2013–Completion of Basic design of Soyworld Science Museum in Yeongju

"March 2013–Ground-breaking for the start of Museum construction

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"March 2014–Donation of Soybean Growth Chamber by Dr. Chung's Food

"Sep. 2014–Completion of Exhibition Hall, Activity Hall and Soybean Growth Chamber

"April 30, 2015–Opening of Soyworld Science Museum."

9. "Why Soyworld Science Museum in Yeongju?

"Home of a native soybean variety *Buseoktae*

"Strong will of the city to host the museum

"Support of the Korean government to open a science museum in Yeoungju

"Most elegant landscape around Buseoksa Temple and Sobaeksan National Park"

10. "Vision of Soyworld Science Museum

"Construction of Soybean Theme Town

"Soyworld Information Center with both domestic and world-wide information network

"Hosting an International Soybean Research Center in Yeongju"

11. "A proposal to United Nations to establish UN International Soybean Research Institute in Yeongju

"(A public promise of the Mayor Wook-Hyeon Jang)

"Implementing organization: Ministry of Agriculture, Food and Rural Affairs (MAFRA), Republic of Korea (ROK)

"Party of concerned: Yeongju City, Kyungsangbuk-Do

"Set up a Task Force for hosting UN ISRI to Korea under MAFRA

"Feasibility study, National and local government budgets, Institute site, etc.

"Contact to UN FAO"

"12. Members of Soyworld Museum Promotion Committee" (table in Korean / Hangul)

13. "Thank you!" A photo shows one view of the completed museum across a reflecting pond. Address: Emeritus Prof., Korea Univ., Seoul, South Korea.

2016. Palmer, R.G.; Hymowitz, T. 2016. Soybean: germplasm, breeding and genetics. In: C.W. Wrigley, H. Corke, et al, eds. 2016. Encyclopedia of Food Grains. 2nd ed. Kidlington, Oxford, UK & Waltham, Massachusetts: Academic Press (an imprint of Elsevier).

• ***Summary:*** Contents: Topic highlights. Learning objective. Introduction. Origin. Germplasm collections. Gene pools. Germplasm diversity. Germplasm utilization. Germplasm utilization, perennials. Germplasm utilization: G. soja. Germplasm utilization (North American): G. max. Breeding. Breeding objectives. Seed composition. Specialty cultivars. Breeding methodology. Marker-assisted selection. Hybrid soybean. Genetics. Cytogenetics. Qualitative genetics. Molecular genetics. Bioinformatics and data resources. Transformation. Future prospects. Exercises for revision. Exercises for readers to explore the topic further. Further reading. Relevant websites.

Tables: (1) World soybean production (2013): The top five countries are Brazil, USA, Argentina, China, and India. (2) The major *Glycine max* germplasm collections–listed in order of number of accessions. For each entry is given the name of the institution, its country, and the number of accessions. The institution with by far the largest number of accessions is the Institute of Crop Sciences, Chinese Academy of Agricultural Sciences (CAAS), with 25,377 accessions. The next 4 are in the USA, Republic of Korea, Taiwan, and China (at Nanjing Agricultural University). (3) The major *Glycine soja* germplasm collections–listed in order of number of accessions. For each entry is given the name of the institution, its country, and the number of accessions. The top 5 countries are China, Japan, Taiwan, and USA, and China (Nanjing). (4) The genus Glycine, 3-letter code, 2n number, genome, and distribution. 26 species are listed. (5) Some websites with tools and data for soybean research.

Figures: (1) Graph–Soybean production of the United States, Brazil, and Argentina from 1975 to 2011 (FAOSTAT). (2) Diagram–The origin of the genus *Glycine*. (3) Illustration: The gene pools of the soybean (primary, secondary, and tertiary). (4) Example of a single-seed descent method of breeding. Variations include harvesting one pod or only one seed to advance to the next generation. Harvesting one plant ensures that all F2 plants are represented in the final selection process.

2017. Kam, Nadine. 2017. Lots of sizzle for your buck at mall's new yakiniku spot. *Honolulu Star-Advertiser* (*Hawaii*). March 22. p. F8, F9.

• ***Summary:*** At the new restaurant named Gen: "I caused a little stir when I read the menu too quickly and incorrectly tried to order vegetable dumplings, causing two managers to rush to the table out of fear of a typo on the menu. What it actually said was 'veggie dwenjang,' a soybean stew. Otherwise the only non-meat entry is the glass-noodle dish chap chae."

"For variation on sesame, miso and soy sauce marinade flavors, garlic chicken comes with a jalapeno sauce,..." Address: Restaurant reviewer, Star Advertiser.

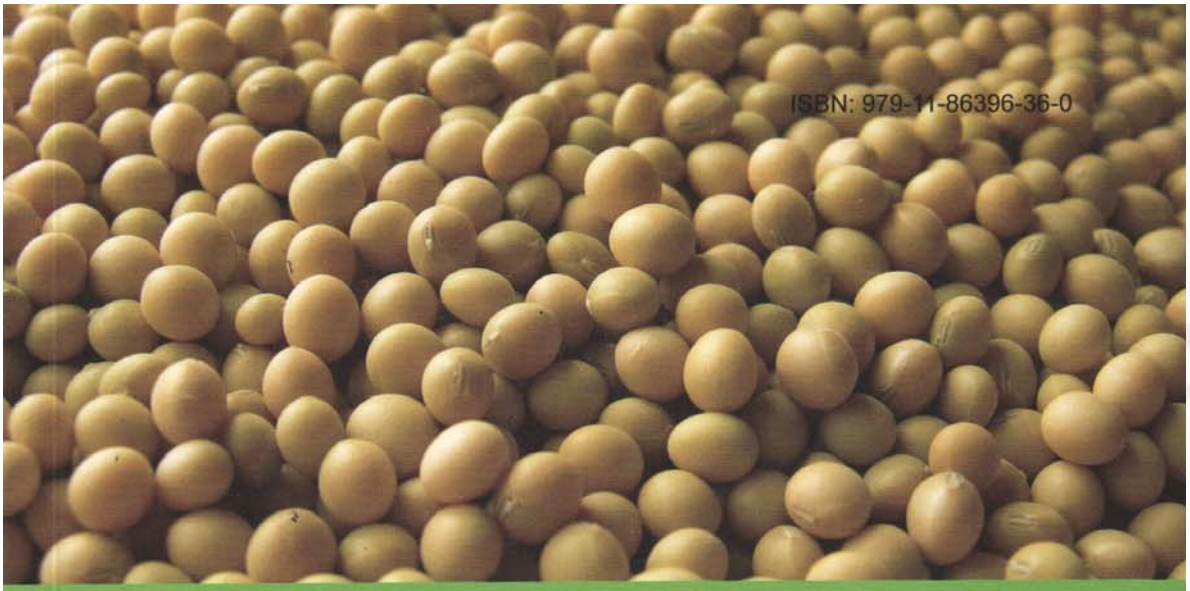
2018. Committee for the Establishment of a Korean Soybean Museum. 2017. Soybean storytelling. Translated from Korean by Diana Evans. Seoul, Korea: Lee Cherl-Ho (Korea Food Security Research Foundation); Publishing house: Sikanyeon. 187 + 156 p. April 5. Illust. No index. 23 cm. [50+ ref. Eng; Kor]

• ***Summary:*** This is the earliest known English-language book that describes Korean research into the origin of cultivated soybeans.

This book is divided into two parts. One half is in English (187 p.). Turn the book over and the other half is in Korean (156 p).

The Foreword begins by asserting that the cultivation of

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# Soybean Storytelling

Translated by Diana Evans

Committee for the Establishment
of a Korean Soybean Museum



KFSRF Sikanyeon

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soybeans began in Korea, not in China. In 2001 Dr. Kwon Tai-wan, the founding director of the Korea Food Research Institute, formed the Committee for the establishment of a Korean Soybean Museum, which would inform visitors of the true history and use of soybeans.

The letter of intent to establish the museum states that "Koreans were the first to plant soybeans and to use them for food. Soybeans were used as food in Northeast Asia more than 2,000 years ago."

In 2014 the Soyworld Science Museum was established in the city of Yeongju, North Gyeongsang Province. "Soybean Storytelling" was vital to the exhibits and included in the museum catalogue.

Contents: 1. The Origin of Soybeans: When Did We Begin to Eat Soybeans? Where Did Soybeans Originate? The Image of Soybeans Over Time, The Story of Soybeans through Historical Figures.

2. The Culture of Soybeans and Sauce: The Origin of Soybean Food Products, Traditionally Processed Soybean Products, Korea's Culture of Sauces, Varieties of Soybean Foods,

3. The Growth and Ecology of Soybeans: Korean Soybean Varieties and Varietal Explanations, The Life Cycle of Soybeans, Variety Classification by Use, Farming and Cultivation Methods.

4. Processing & Utilization of Soybeans: Utilizing Soybeans, The Soybean's Great Transformation, Soybeans, Food for the Citizens of the World.

5. Nutrition and Functionality of Soybeans: Structure and Composition of Soybeans, Soybean Nutrition and Bioactive Substances, Functionality of Soybean Products, Efficacy of Soy Foods on Various Diseases.

6. The Future of Soybeans: Legumes and Nitrogen Fixation, Soybean Products Saving the Environment, Hope Seen in Afghanistan, Wild Soybeans vs. Genetically Modified (GM Soybeans, Production and Trade of Soybeans, The Future of Korean Soybeans.

Pages 16-17: "Charred remains of about 20 examples of rice grains and soybeans have been excavated from Neolithic lots in the village of Daecheon in Okcheon, North Chungcheong Province. Through radioactive carbon dating it has become clear that these date from the Late Neolithic, between about 3000-3500 BC, making them the oldest example of soybeans found on the Korean Peninsula." The Korean nation originated 5000 years ago.

Note: 2017 Sept. 24: Wm. Shurtleff asks Dr. Cheryl Ho Lee for the source of the information in the last paragraph above. Dr. Lee replies: "Concerning the Neolithic evidence of soybean cultivation in Korea, please see the book *Kong* (2005) page 46-48. There are two Neolithic remains metioned, (1) Okchoen Daejeonri, and (2) Jinju Sangchonri. The evidence for the carbonized beans found in Okchoen was not clear, but those in Jinju was more clear as shown in the photographs on page 48. From page 49 to 58, numerous Bronze Age soybean remains are described. This chapter (Chapter 2) was written by Dr. Cho Hyeon-jong of National Museum of Korea, as I mentioned earlier, and he must have the original paper bags on the excavations."

Page 18: "The opinion that soybeans originated on the Korean Peninsula and in Manchuria is founded on Japan's Dr. Fukuda's [1933] assertion that the division of wild soybeans led to many areas of origin.) The scholar most representative of the China origin theory is the United States' Dr. Hymowitz, and his assertions are based on the 11th century BC text *Yi Zhou Shu* (The Lost Book of Zhou). In this Zhou dynasty history, mention is made of a bean called yungsuk ('warrior plant,' or wild beans). In the 11th century BC China's northeastern region supported not just one tribe, but several Eastern Yi tribes. In the past the whole of Manchuria, China's northeast region and stage of the Korean people's activities, was known worldwide as the soybean's place of origin. However, Koreans now make their base on the Korean Peninsula and find that wild soybeans grow naturally there, and the cultivated genetic variation is so high that Korea is also considered one of the places of origin of the soybean."

Note: Dr. Hymowitz's assertions are based on the *Shijing* [The Book of Odes / The Classic of Poetry], not on the *Yi Zhou Shu* [The Lost Book of Zhou]. This key paper is: Hymowitz, T. 1970. "On the Domestication of the Soybean." *Economic Botany* 24(4):408-21. Oct/Dec. (131 refs). Unfortunately it is not even cited in this Korean *Soybean Storytelling* book.

Letter of 2 Aug. 2017 from Dr. Cheryl H. Lee:

"I would like to add following record to your soybean chronology, as stated in Soybean Storytelling page 19:

"623 BCE–Duke Huan of QI brought back the warrior beans (Yungsuk) from Sanyung when he defeated the Northeastern Yi tribes (The Lost Book of Zhou, 6th century BCE; Sima Qian's *Shiji*). Guanzi reads, "Duke Huan of the state of Qi pushed the warring nomads north and brought back winter onions and warrior beans (Yungsuk), which now cover the land."

"It implies that Yungsuk was a superior variety of cultivated soybean compared to the beans found in China at that time. We read Chinese letter Su as Suk in Korean.

"Several remains of soybean from the Late Neolithic Age (before 1500 BCE) and Early Bronze Age have been excavated in Korean peninsula (*Soybean Storytelling*, pages 24-26; Cho, H.-J. in Kong, 2005 (Korean))."

2019. dMakulbekova, Akbota; Iskakov, Ayup; Kulkarni, Krishnand P.; Dong, Jong Tae; Lee, Jeong-Dong. 2017. Current status and future prospects of soybean production in Kazakhstan (Open Access). *Plant Breeding and Biotechnology* 5(2):55-66. June 1. [56 ref]

• ***Summary:*** Abstract: "Demand for soybean as an oil crop and animal feed is steadily growing in Kazakhstan and

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hence soybeans can be a great attribute for food security in this region. Currently, over 90% of all soybean production is concentrated in one region (Almaty [in the southeast]) because the crop is highly sensitive to photoperiod and temperature."

"In Kazakhstan, farmers began to cultivate soybeans in the 1930s; however, because of the lack of varieties and proper cultivation practices, further cultivation was abandoned. In the mid-1960s, several soybean cultivars from other countries were introduced. Statistical data on soybean production registered since 1992 by FAO revealed a gross production of 11,800 [metric] tons (Shurtleff and Aoyagi 2008).

"The soybean cultivation area has been growing steadily in Kazakhstan in the recent years. In the 2000s, soybeans occupied 3,500 ha, in 2013 approximately 103,000 ha, and in 2014 around 116,000 ha of fields in Kazakhstan. Soybean production grew from 3,900 t [metric tons] in 2000 to 217,900 t in 2014 (Fig. 2). Its yield per hectare was 1.3 t/ha in 2000, which increased to 2.06 t/ha in 2014 (FAO 2014)."

Fig. 2 shows Soybean cultivation area and production in Kazakhstan from 2000 to 2014 (FAO).

"None of the soy food, such as tofu, natto, soymilk, or sprouts is widely used in Kazakhstan. Historically, domesticated animals have been the major source of food, clothing, and transportation for households in Kazakhstan. For Kazakh people, meat and milk are the first sources of protein in their diets. The superior animal domestication in Kazakhstan can be explained by the country's climatic properties. Animal proteins are necessary for areas with freezing temperatures, because they aid in warming the human body. Soybean is an alternative forage crop that can be utilized as animal feed and several soybean genotypes have been reported to potential to produce quality forage."

"Additionally, there are large soybean processing factories with a production of 150,000 tons per year. The factories produce soybean milk, tofu, soybean flour, soybean yogurt, and compound feeds. However, these production units still under-produce because of the shortage of soybeans to process (Dautkanov 2015)."

Table 2 shows "Twenty soybean varieties released by Kazakh Research Institute of Agriculture and Crop production, Almaty, Kazakhstan" (Didorenko and Kudaibergenov 2014b). Address: 1, 3-5: School of Applied Biosciences, Kyungpook National Univ., Daegu 41566, Korea; 2. North Kazakhstan Research Inst. of Livestock and Crop Production, Petropavlovsk 150700, Kazakhstan.

2020. Britannica.com. 2017. The Anglo-Japanese Alliance. Retrieved 16 Aug. 2017. [10 ref]
• ***Summary:*** "Anglo-Japanese Alliance, (1902-23), was an alliance that bound Britain and Japan to assist one another in safeguarding their respective interests in China and Korea. Directed against Russian expansionism in the Far East, it was a cornerstone of British and Japanese policy in Asia until after World War I.

"The alliance served Japan in the Russo-Japanese War (1904-05) by discouraging France, Russia's European ally, from entering the war on the Russian side. It was renewed in 1905 and again in 1911 after Japan's annexation of Korea. On the basis of its tie with Britain, Japan participated in World War I on the side of the Allies.

"After the war the British no longer feared Russian encroachment in China and wished to maintain close ties with the United States, which tended to view Japan as its rival in the Pacific. Following an unsuccessful attempt to bring the U.S. into the alliance at the Washington Conference of 1921-22, Britain allowed it to lapse. It was specifically terminated by the Four-Power Pacific Treaty (1921), a vaguely worded agreement that left the Japanese without allies until the conclusion of their Tripartite Pact with Germany and Italy in September 1940."

Note: This alliance also paved the way for the soybean's ascendance in the European market–starting with England.

2021. Moore, Kathy; Wyss, Roxanne. 2017. Bowled over by ramen noodles. *Kansas City Star* (*The*) (*Kansas City, Missouri*). Sept. 27. p. D1, D4.
• ***Summary:*** "Learn the lingo:

"Gochujan–Spicy red pepper paste from Korea."

2022. Zaltenbach, Claudia. 2017. Miso: Rezepte, Kultur, Menschen [Miso: Recipes, culture, people]. Haedecke Verlag GmbH. 216 p. Illust. (many color photos). Index. 25 cm. [33 ref. Ger]
• ***Summary:*** This is a beautiful, very creative and original book–carefully researched and written, with many full-page color photos. The author clearly enjoys her subject.

Contents: Foreword by Thomas Vigilis. Introduction (by Claudia): The influence of macrobiotics in the 1970s. What is miso? The different types of miso. Recipes: Quick ideas with miso. What is umami anyway? Miso production in Japan. Soup kitchen. Miso production in South Korea. Salads. Powdered miso. Interview with Tanja Grandits (German-born Swiss chef). In the mood for veggies. Hatcho miso and the weight of the stones. Black Forest (*Schwarzwald*) miso. Interview with Lucki Maurer. Land, see, and rivers. Interview with Kudo Chori. Interview with Tohru Nakamura. Streetfood. Why miso is so healthy. Sweets with miso. About shopping for miso. Make koji yourself. Make miso yourself. Sources of supply. Glossary. Bibliography. Index. Notes of thanks. Imprint.

2023. Goodnick, Karoline Boehm. 2017. Seasonal recipes: what to cook this week. *Boston Globe* (*The*) (*Boston, Massachusetts*). Oct. 4. p. G4.
• ***Summary:*** The first recipe, "Beet salad with spicy ranch dressing," begins:

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"Korean gochujan is a paste made from chile peppers and fermented soy beans (akin to spicy miso). In this mash-up recipe, the spicy paste lends a sweet heat to traditional ranch dressing,..."

2024. Woo, Koan Sik; Kim, M.J.; Sim, E-Y; et al. 2017. [Quality characteristics of commercially available soybean and mung-bean flours in Korea]. *Korean J. of Food and Nutrition* 30(5):1119-26. Oct. [23 ref. Kor; eng]
• ***Summary:*** "Quality characteristics of commercially available soybean and mung-bean flours in Korea were evaluated relative to product information such as bean content, price, chromaticity, proximate composition, water binding capacity, swelling power and solubility. Origin of raw materials was 23 in domestic products and 19 in imported products. The price of the product was 3.48 times more for raw soybean flour, 3.34 times more for fried soybean flour, and 3.47 times more for mung bean flour compared to imported soybean. In the domestic products, the lightness of raw soybean flour was higher than roasted soybean flour. The redness and yellowness of roasted soybean flour were higher than raw soybean flour. Moisture content of raw soybean flour was higher than roasted soybean flour, and crude fat, crude protein and carbohydrate content were higher in imported soybean flour. Ash and crude protein contents of mung bean were slightly higher than imported products. Water binding capacity of roasted soybean flour in domestic products was higher than raw soy flour, and there was no significant difference in solubility and swelling power. Correlation between quality characteristics of commercially available soybean and mung-bean flours products was found to be highly significant among measured items, except for solubility." Address: Dep. of Central Area Crop Science, National Inst. of Crop Science, Rural Development Administration, Suwon 16613, Korea.

2025. Zhao, Xin; Ju, Jaehyun; Park, Kun-Young. 2017. [Comparisons of properties, in vitro anti-mutagenicity, and anti-cancer effects of short-term fermented soybean foods (chungkukjang, shuidouchi, and natto)]. *J. of the Korean Society of Food Science and Nutrition* 46(10):1253-57. Oct. [24 ref. Kor; eng]
• ***Summary:*** "Representative brands of the three types of soybean-based short-term-fermented foods were chosen and evaluated. Chungkukjang showed the highest amino and ammonia type nitrogen contents, although Natto exhibited lower levels, and Shuidouchi showed the lowest pH and high acidity... These results might be due to differences in duration of fermentation, processing method, and quality of raw materials, but further research on the basis of ethnic culture and administration method of each nation should follow." Address: 1. Chongqing Collaborative Innovation Center of Functional Food, Chongqing Univ. of Education, Korea.

2026. Lee, Jun Ho; Jung, Han San. 2017. Physicochemical and consumer acceptance of tofu supplemented with licorice powder. *Preventive Nutrition and Food Science* 22(4):359-64. Dec. [60 ref]*
• ***Summary:*** Licorice has been used in traditional herbal medicine for at least 4,000 years (12) due to its emollient, anti-inflammatory, antiviral, anti-allergic, antioxidant, and anti-cancerous properties (13). Adding more than 4% of licorice powder (LP) to tofu had an adverse effect on general consumer acceptance.

"On the basis of the overall observations, tofu samples supplemented with 0.2% (w/w) LP were found to benefit from the functional properties of LP, without compromising consumer acceptance." Address: 1. Dep. of Food Engineering, Daegu Univ., Gyeongbuk 38453, Korea.

2027. Lee, Cherl Ho. 2017. History and characteristics of Korean fermented foods (PowerPoint presentation). Korea. 36 slides. [Eng]
• ***Summary:*** Slides: (2) Map of Northeast Asia, with Korean Strait highlighted. (3) Prehistoric culture in Northeast Asia (Korea, China, Manchuria, Siberia). (4) Colored map showing "Bones excavated from the paleolithic remains in Korean peninsula." All are animal bones; no human bones are included. (5-7) Foodstuffs of the Paleolithic men in Korean peninsula and Northeast Asia. The foods are divided into Early Paleolithic, Middle Paleolithic and Late Paleolithic, and into animals and plants. Wild beans are first consumed in the Late Paleolithic. See also Lee 1998. (8) Prehistoric culture in Northeast. Homo sapiens sapiens, Primitive pottery. Appearance of tribal states. (9) Chronology of prehistoric era of Korean Peninsula and Northeast Asia. (10) Techno-historical consideration of primitive earthenware. (11) Average temperature and sea level of the globe during the alluvial epoch (Barnes 1993). (12) Geography of Northeast Asia in 16,000 B.P. (Barnes 1993). (13) The depth of sea around Korean peninsula. (14) Paleolithic remains found in Northeast Asia (Lee 2001). (15) Primitive pottery age remains excavated in Korea Strait Region. (16) 8,000 to 3,000 B.C. Primitive pottery age. Fermentation technology began during this period. (17-18) Table 1-1. The estimated ages of primitive pottery remains of the Paleolithic era in Korean Peninsula and Northeast Asia (Lee 1999). (19) Beautiful color photo of early Korea pottery, showing different shapes, sizes, colors, and wall thicknesses.

(20-21) Table 2-3. Chronology and manufacturing characteristics of potteries excavated from *Sangnodaedo* remains (Lee 1999). (22) Direction of technological progress of primitive pottery in Korea Strait Region. Harder, lower water absorbency, durable in fire, bigger. A color photo shows an early pottery bowl. (23) Classification according to usage: Cooking vessel. Fermentation crock (middle

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## Origin of Fermented Soybean Foods

- Primitive Pottery and Fermentation Technology in Korea Strait Region (6000 BC)
- Arrival of Northern Nomads and the Need for Protein Source
- Invention of Soybean Use for Food by Boiling Technology (ca. 2000 BC)
- Invention of Soybean Fermentation by Adopting Cereal Alcoholic Fermentation Technology
- Fermented Soybean Paste and Soybean Sauce Making (Before 200 BC.)
- Marinating Meat with Soysauce – Bulgogi(Roasted Beef of Korea)

## Social developments during Primitive Pottery Age

- Improvement of food storage technology
  - Fermentation
- Improvement of nutrition and food hygiene
  - *Chigae* culture
- Population increase
- Formation of tribal states (BC. 3-4000)
- Megalithic culture, Eastern tribe (*Dong Yi*)



size jar, 4-17 liter). Storage jar (large size jar; 17-56 liter), high absorbency, round/flat bottom. (24) Dietary culture of littoral (related to the shore of the sea or a lake) foragers. Cooking vessel & Chigae culture. Storage jar & fermentation technology. (25) Origin of fermentation technology. Nuruk (alcoholic fermentation starter). Kimchi fermentation. Jeotkal fermentation. (26) Beginning of Nuruk making and alcoholic fermentation of cereals. (27) Kimchi fermentation. (28) Joetkal fermentation.

(29) Origin of soybean fermented foods: Primitive Pottery and Fermentation Technology in Korea Strait Region (6000 BC). Arrival of Northern Nomads and the Need for Protein Source. Invention of Soybean Use for Food by Boiling Technology (ca. 2000 BC). Invention of Soybean Fermentation by Adopting Cereal Alcoholic Fermentation Technology. Fermented Soybean Paste and Soybean Sauce Making (Before 200 BC). Marinating Meat with Soy Sauce Bulgogi (Roasted Beef of Korea).

(30) The origin and interchange of Dujang (fermented soybean products) in East Asia (Lee 1990, 2009). (31). Early records on fermented foods. *Shijing* (B.C. 1000). *Zhouli* (B.C. 200).

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(32) Social developments during the Primitive Pottery Age: Improvement of food storage technology–Fermentation. Improvement of nutrition and food hygiene–*Chigae* culture. Population increase. Formation of tribal states (B.C. 3000-4000). Megalithic culture, Eastern tribe (*Dong Yi*).

(33) *Sundubu-Chigae. Cheuotang-Chigae. Deulggae-Chigae.* (34) References: Lee, C.H. 2001. Fermentation Technology in Korea. Seoul: Korea University Press. Lee, H.H. and M.L. Kim. 2016 "History of fermented foods in Northeast Asia. In: Ethnic Fermented Foods and Alcoholic Beverages of Asia. (Ed. J.P. Tamang). New Delhi: Springer. (35) Key Takeaways: 8,000 to 3,000 B.C. Primitive Pottery Age in Northeast Asia. Techno-historical consideration of Primitive earthenware. Food culture related with pottery use. Origin of fermentation technology. Origin of Fermented Soybean Foods. Social developments during Primitive Pottery Age.

(36) IFT17 (Institute of Food Technologists). Address: Emeritus Professor, Korea Univ., Seoul, South Korea.

2028. Lee, S.; Lee, S.; Singh, D.; Oh, J.Y.; Jeon, E.J.; Ryu, H.S.; Lee, D.W.; Kim, B.S.; Lee, C.H. 2017. Comparative evaluation of microbial diversity and metabolite profiles in doenjang, a fermented soybean paste, during the two different industrial manufacturing processes. *Food Chemistry* 221:1578-86. *

2029. Douen, Dara; Davaatseren, Munkhtugs; Chung, Myung-Sub. 2017. Biogenic amines in foods. *Food Science & Biotechnology* 26(6):1463-74. [164 ref]*
• ***Summary:*** "A number of studies have demonstrate histamine producing bacteria in soybean fermented products, including *Staphylococcus pasteuri, Bacillus amyloliquefaciens, Bacillus subtilis*, and *Bacillus megaterium* in miso [47], *Bacillus subtilis* in sufu [48], *Bacillus subtilis* and *Staphylococcus pasteuri* in natto [49], and *Bacillus subtilis, Staphylococcus pasteuri,* and *Staphylocuccus capitis* in douchi [50]." Table 1. "Biogenic amines contents in food products," includes those found in traditional Korean fermented soybean paste, natto, sufu, and two types of soy sauce.

One section is titled "Fermented soybean products." Address: Dep. of Food Science and Technology, Chung-Ang Univ., 4726 Seodongdae-Ro, Daedeok-Myeon, Anseong-si, Gyeonggi-do 456-756 Korea.

2030. Lee, Cherl-Ho. 2018. Re: Financing of the Soyworld Science Museum, in Yeongju, Korea. Letter (e-mail) to William Shurtleff at Soyinfo Center, Jan. 15. 1 p. [Eng]
• ***Summary:*** "Dear Mr. Shurtleff,

"The construction cost, building and exhibition except for land and personnel, was 5 billion won (ca. 5 million USD.). The museum was built by Yeongju City. The Yeongju Agricultural Extension Center is managing the museum. The entrance fee has been planned, but for the time being no fee is collected. The number of visitors is 200-300 during weekend, and 50 during weekdays; children 50%, middle and high school students 20%, adults 30%, and a very few foreigners 1-2%. Yes, ASA is still operating in Seoul.

"With my best regards. Cherl-Ho Lee, Seoul, Korea." Address: Emeritus Prof., Korea Univ., Seoul, South Korea.

2031. Rizzo, Gianluca; Baroni, Luciana. 2018. Soy, soy foods and their role in vegetarian diets. *Nutrients* 10(1):43. Jan. [590 ref]
• ***Summary:*** This is a review of the literature based on a non-systematic search of the Medline database. The authors seem to lack in-depth knowledge of their subject.

Contents: Abstract. Introduction. Soy consumption. Soy nutrients and bioactive compounds: Protein content and protein quality, isoflavones, lipids and phytosterols, other bioactive compounds. Health effects: Possible beneficial effects (cardiovascular and metabolic protection, anticancer properties, menopause and osteoporosis, other beneficial effects), possible detrimental effects (thyroid gland disturbance, sex hormones perturbation, procancer activity). Soy foods [traditional East Asian]. New generation foods. Food safety (early stage of infant nutrition, soy allergy). Conclusions. Abbreviations. References.

Tables (references are given for the information in each table): (1) Vegetable protein sources from legumes. Gives the nutritional composition of many edible legumes including soybeans.

(2) Soy consumption per day of soy and soy foods, soy protein, and isoflavones in USA, Europe, Vegetarians and soy users, China, Japan, and Korea. Very vague and incomplete.

(3) Isoflavone content in soybean from different cultivation countries. It is highest in the USA (159.98) and Australia (120.84). Based on USDA database (ref. 64).

Analytical protein quality methods [from oldest to newest]. Net Protein Utilization (NPU), PER, Nitrogen Balance, Biological Value (BV), True Digestibility, Amino Acid Score, Protein Digestibility corrected for amino acid score (PDCAAS; since 1991), Digestible Indispensable Amino Acid Score (DIAAS).

(5) Protein quality of 5 foods evaluated by different methods. The foods are soy, wheat, beef, eggs, and milk (from cows).

(6) Isoflavone content in soy foods (mg per 100 g)–miso 41.45, edamame 17.92, natto 82.29, soy cheese 6.02 to 25.72, soy flour, textured 172.55, soy flour, defatted 150.64. soy lecithin 15.7, soy protein concentrate (by aqueous wash) 94.65, soy protein concentrate (by alcohol extraction) 11.49, soy protein isolate 91.05, shoyu (soy sauce) 1.18, soy beans, roasted 148.5, soy beans, raw 154.53, yuba / foo jook 44.67, soy milk (many types) 0.7 to 10.73, sufu [fermented tofu]

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13.75, tempeh 3.82, tofu 13.1 to 34.78, okara 9.39, fuyu (fermented tofu) 45.51, soybean oil 0.

Soy foods description: The foods are tofu, soy milk, tempeh, natto, sufu, edamame, miso, yuba, soy sauce, textured vegetable protein.

"Soy is a basic food ingredient of traditional Asian cuisine used for thousands of years. In Western countries, soybeans have been introduced about a hundred years ago and recently they are mainly used for surrogate foods production. Soy and soy foods are common nutritional solutions for vegetarians, due to their high protein content and versatility in the production of meat analogues and milk substitutes. However, there are some doubts about the potential effects on health, such as the effectiveness on cardiovascular risk reduction or, conversely, on the possible disruption of thyroid function and sexual hormones. The soy components that have stimulated the most research interest are isoflavones, which are polyphenols with estrogenic properties highly contained in soybeans. In this review, we discuss the characteristics of soy and soy foods, focusing on their nutrient content, including phytoestrogens and other bioactive substances that are noteworthy for vegetarians, the largest soy consumers in the Western countries. The safety of use will also be discussed, given the growing trend in adoption of vegetarian styles and the new soy-based foods availability."

"Soy foods: There are several soy foods, traditional Asian foods (fermented or not) and new generation products, such as soy milk, edamame, tofu, soy cheese, miso, soy sauce (tamari, shoyu), tempeh, natto, sufu, yuba, soy flour, soy protein isolates (SPI) and meat analogues also called Textured Vegetable Protein (TVP). Table 7 shows a description of selected soy foods." Address: 1. Via Venezuela 66, 98121 Messina, Italy.

2032. *Malnutrition Matters Newsletter* (*Ottawa, Canada*). 2018. North Korea / First Steps program grows. June. p. 1.
• ***Summary:*** On May 17th the Air Koryo flight from Beijing to Pyongyang had some very special people and cargo aboard. The Canadian-based charity "First Steps" had a team of 5 travelling to N. Korea to further their long-term program of soymilk and nutritional fortification for schools, daycares and orphanages. The flight's cargo included three more SoyCows, bringing their total number of systems (including VitaGoats) to 98. The team visited five cities and also brought two of the SoyCows with them to two new locations. More than 100,000 children currently receive a daily fresh serving of soymilk under this program, which is now in its 15th year.

"Many of the soymilk operations are in centralized facilities with several systems operating and delivering the milk daily to their region, often by bicycle. Protein malnutrition is chronic among many children in DPRK and the daily soymilk serving provides the critical amount of protein needed. First Steps also provides good quality soybeans for all the operations. More systems are planned to be provided for this successful program later this year. www.firststepscanada.org"

Color photos show: (1) Many kids seated around a long table at Samjion Potae Daycare. (2) Two people in a room with twiny SoyCow systems at Nampo Hangdu daycare and kindergarten supply center.

2033. Cox, John H. 2018. Re: Planning to write an article about SANA's 40th birthday on July 30. Letter (e-mail) to William Shurtleff at Soyinfo Center, July 27. 1 p.
• ***Summary:*** "Hi Bill,

"Thanks for your message. I'm writing an article about SANA's 40th for the SANA newsletter. I plan to make it about what the organization has accomplished along with an appeal for it to continue. I'd like to include some of the history, certainly a photo would be nice. This will be in the SANA newsletter, mostly for members, but hopefully shared. I would love a quote from you about how the industry has changed–the good changes. What was it like at that first meeting?

"SANA will do everything we can to protect the use of 'soymilk' to describe soymilk. The FDA seems to know that if they interfere with soymilk being labeled as soymilk then they will be sued. I'm not sure the members are ready for this, but I will lead them if this happens. I'm not sure I have the complete history about 'the outcome of this issue last time around.' Certainly, the 1997 SANA petition to FDA was a smart move.

"SANA has 20 members, only 12 are making soyfoods. There are only two big ingredient companies–DuPont and ADM. We also have DanoneWave and two tofu companies (House Foods America and Nasoya/Pulmuone.) We continue to lose members and I'm not sure how to turn it around. It is an exciting time for plant-based foods, but soy's brand still needs help, as you know.

"Thanks for any historical information you can share with us. Good luck with your big project–I would love to know more about it.

"Best wishes, John." Address: Executive Director, Soyfoods Assoc. of North America, 1101 17th Street, NW, Suite 700, Washington, DC 20036. Phone: 202-331-2451.

2034. Chukeatirote, E.; Phongtang, W.; Kim, J.; Jo, A.; Jung, L.S.; Ahn, J. 2018. Significance of bacteriophages in fermented soybeans: A review. *Biomolecular Concepts* 9(1):131-42. Nov. 23.
• ***Summary:*** "Bacteriophages are ubiquitous and have been reported to have been found in many food products. Their presence is important as they have the ability to interact with their bacterial host in food matrices. Fermented soybean products, one of the most widely consumed ethnic foods among Asian people, are prepared naturally and include

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Japanese Natto, Indian Kinema, Korean Chongkukjang and Thai Thua Nao." Address: 1. School of Science, Mae Fah Luang University, Chiang Rai 57100, Thailand.

2035. Jeong, Eun Ji; Yoon, Hyang-Sik; Kim, Ik Jei; Hong, Seong Taek; et al. 2018. [Quality characteristics of whole soybean Meju doenjang prepared with addition times and starter contents]. *J. of the Korean Society of Food Science and Nutrition* 47(11):1159-68. [49 ref. Kor; eng]

• ***Summary:*** "This study examined the quality characteristics of whole soybean meju doenjang prepared for addition times and with different contents of starter (*Bacillus amyloliquefaciens*) for 8 weeks. To accomplish this, the quality characteristics, such as pH, moisture contents, total microbial flora counts, amino-type nitrogen content, total polyphenol content, and antioxidant activity, were determined. The pH decreased from 6.36 to 6.55 to 4.95 to 5.44 and the total acidity generally increased from 0.23 to 0.31% to 0.89 to 1.11% in doenjang fermentation. The moisture content of the control (no starter) was 59.90 to 60.58% and there were no significant differences in the aging period." Address: 1. Chungcheongbukdo Agricultural Research and Extension Services;.

2036. Kankanamge, Renda; Jeewanthi, C.; Paik, H-D. 2018. Modifications of nutritional, structural, and sensory characteristics of non-dairy soy cheese analogs to improve their quality attributes. *J. of Food Science and Technology* (*Mysore, India*) 55(11):4384-94. Nov. doi: 10.1007/s13197-018-3408-3 [71 ref]

• ***Summary:*** The focus of this research was to make cheese using a mixture of soymilk and animal milks, or a mixture of dairy cheeses and tofu. The price of soymilk is less than that of cow or buffalo milk. Soymilk can add health benefits. Address: 1. Dep. of Food Science and Biotechnology of Animal Resources, Konkuk Univ., Seoul, Korea.

2037. Ibrahim, Seifeldin Elrayah. 2018. Soybean research [in Sudan]: current status, achievements, challenges and future prospects. Paper presented on "The Symposium to Mark the 100th anniversary of the Gezira Research Station, Wad Medani, Sudan." 33 p. Held 25-26 December, 2018. [12 ref]

• ***Summary:*** Two versions of this paper exist. #1 is a PowerPoint presentation (33 p.). #2 is a Microsoft Word document (8 p.). The titles are slightly different, but the content is very different. We will cite and quote from the #1 first; its pages are unnumbered. Then we will quote from #2.

Outline: Introduction: Economic importance of soybean, soybean utilizations and products, why soybean in Sudan? History and current status. Achievements. Challenges. Future prospects.

"History and current status of soybean:

"In 1910: soybean was first introduced to Sudan by the colonial Garden

"In 1930: soybean research was started in Sudan

"In 1975: intensive research was began to develop improved varieties in collaboration with International Soybean (INTSOY) varietal testing program, USA

"During 1977-1984: International Soybean Variety Evaluation Experiment (ISVEX) trials were conducted at:

"Gezira Research Station

"Abu Naama Research Station

"Kadugli Research Station

"Since 2007, diverse soybean germplasm were introduced from:

"IITA, Nigeria

"USDA Soybean Germplasm Collection, USA

"Rural Development Administration (RDA), Korea

"World Vegetable Center (AVRDC), Taiwan

"Egypt, Brazil, Argentina, and Croatia"

Paper #2: "Soybean research in Sudan is conducted mainly by national soybean research program at Agricultural Research Corporation (ARC). Since 2012, four soybean varieties were released by ARC in Sudan. Soybean cultivation area and production has increased dramatically in Sudan, from about 800 ha in 2013 to and 3,000 ha in 2017, and from 1,200 t [metric tons] in 2013 to 5,000 t in 2017, respectively.

"Soybean was first introduced to Sudan in 1910 by the Colonial Garden (Shurtleff and Aoyagi 2009; Ibrahim 2012a). Further introductions in the country were made in 1912, and in 1949, soybean was planted in southwest Sudan to prevent severe malnutrition among infants, children, and pregnant and lactating women (Ibrahim 2012a; Khojely et al. 2018). Further soybean introductions were continued (Ibrahim et al. 2017) with special efforts to encourage soybean cultivation in Sudan. From 1973 to 1985, hundreds of soybean accessions, especially southern USA and Brazilian varieties, were introduced to the country through the International Soybean Variety Experiments (ISVEX) initiated by the INTSOY soybean varietal testing program at the University of Illinois, IL, USA. Field studies indicated that the introduced tropical soybeans were highly adapted to Sudan's agro-environmental conditions, whereas the temperate germplasm flowered too early under short-day conditions in Sudan, resulting in poor vegetative growth, short plant height, and low yield (Ibrahim 2012a)."

Note: Dr. Ibrahim writes that this is not a peer-reviewed paper. Address: PhD, soybean breeder, Oilseed Crops Research Center, Agricultural Research Corporation (ARC), Wad Medani, Sudan. Phone: +249-912155997.

2038. Kim, J.M.; Kim, J.S.; Yoo, H.; Choung, M.G.; Sung, M.K. 2018. Effects of black soybean [*Glycine max* (L.) Merr.] seed coats and its anthocyanidins on colonic inflammation and cell proliferation in vitro and in vivo. *J. of Agricultural and Food Chemistry* 56:8427-33.

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2039. Park, Kun-Young; Kwon, D.Y.; Lee, K.W.; Park, S.M. eds. 2018. Korean functional foods: composition, processing and health benefits. Boca Raton, Florida: CRC Press. Taylor & Francis Group. xx + 564 p. Illust. (140 black and white). 24 cm. *

• ***Summary:*** Partial contents: 1. Korean Foods–History, Culture, and Characteristics (Cherl Ho Lee). 2. Korean Diet Tables and Its Tastes (Dae Young Kwon)

5. Health Benefit Effects of Doenjang (Soybean Paste) and Kanjang (Soybean Sauce) (Kun Young Park and Eui Seong Park)

6. History, Processing, and Health Benefits of Cheongkukjang (Sunmin Park and James W. Daily)

7. Biological Functions and Traditional Therapeutic Uses of Kochujang (Red Pepper Paste) (Dae Young Kwon and Soon Hee Kim)...

From the publisher: "Koreans believe the adage of food as medicine."

2040. Kim, Sohui; Wharton, Rachel. 2018. Korean home cooking: Classic and modern recipes. New York, NY: Harry N. Abrams. 303 p. Illust. (photos by Zack & Buj). Index. 29 cm.

• ***Summary:*** See next page. This is a beautiful, elegant book. The first author is a woman. There is more emphasis on recipes than ingredients. Every recipe has a full-page facing color photo. Many of the recipes are seasoned with Korean soy sauce (*ganjang*) so we will mention just the first one.

Contents: The Korean kitchen–with photos and explanations of basic ingredients. Names of recipes and most ingredients are given in Romanized Korean followed by English. Soy-related ingredients include: Doenjang (fermented soybean paste). Gochujang. Dried soybeans are soaked and simmered, then mashed into a paste and formed into bricks named *meju* [Korean-style soybean koji]. These are hung up to dry and ferment. The dried meju is then soaked in salt water for months in a stone crock to break down even further. The result is a mixture of doenjang and ganjang (Korean soy sauce). The longer the mixture is aged, the darker its color. Miso makes a fairly good substitute for doenjang.

Gochujang, fermented red chili paste, is made from red chile flakes (*gocharu*), sugar, glutinous rice, doenjang, and salt, traditionally fermented together for years in earthenware pots. Roasted soybean powder (Korean name not given). Tofu (firm and silken). Dried soybeans. Black soybeans (*seoritae*). Soy sauce and white soy sauce.

Banchan: vegetables and sides. The word 'banchan' means "small dishes;" every Korean meal begins with banchan. Jang Jorim: soy-braised beef. Ganja Jorim: potato stewed in soy sauce. Dubu Jorim: soy-braised tofu. Dan Hobak Jorim: sweet soy-glazed kabocha. Kongjang: Soy-braised black soybeans. Kong Namul: soybean sprout salad. Gaji Namus: charred eggplant with white soy and chiles.

Korean Barbecue. Dweji Kalbi: gochujang-glazed baby back ribs. Kong-Garu: soybean powder (roasted). Ssam Jang: seasoned doenjang sauce.

Haesanmul & Gogi: seafood & meat. Bulgogi: grilled sirloin.

Guk, Jjigae, Jjim & Tang: soups and stews. Soondubu: silken tofu stewed with seafood. Kimchi Jjigae: kimchi stew with tofu & gochujang. Doenjang Jjigae: soybean paste stew.

Myeon, Bap & Mandu: noodles, rice & dumplings. Jjang Myeon: black bean noodles (with black bean paste). Juk: congee (with 1 teaspoon soy sauce). Hu-Shik: desserts. Ripe Summer Tomatoes with tofu cream. Samsaek Kyung-Dan: sweet rice dumplings in three colors (one is coated with roasted soy powder (*kong-garu*)*;* [kinako]).

Note 1: "Sohui Kim is the chef and co-owner of Insa and the Good Fork in Brooklyn, She is the author of *The Good Fork Cookbook.*

"Rachel Wharton is a James Beard Award-winning journalist" and the co-author of three books. She lives in New York City.

Note 2. This book does not even mention the influence of the Japanese occupation of Korea–from 1910 to 1945–on Korea. Yet in this book we find mention of udon, sushi, kinako, adzuki / azuki beans, etc.–all Japanese foods. Address: Cook and author, Brooklyn, New York.

2041. **Product Name:** White Rose Gochujang, Benne Miso.
**Manufacturer's Name:** Keepwell Vinegar.
**Manufacturer's Address:** Dover, Pennsylvania.
**Date of Introduction:** 2019 January.
**Ingredients:** Incl. koji.
**Wt/Vol., Packaging, Price:** 9 oz. glass jars.
**How Stored:** Shelf stable.
**New Product–Documentation:** Letter from Sarah Conezio and Isaiah Billington. 2021. April 21. We began selling miso to chefs and restaurants in 2016, and only recently have made it available in retail format.

"Gochujang, Benne Miso–January 2019

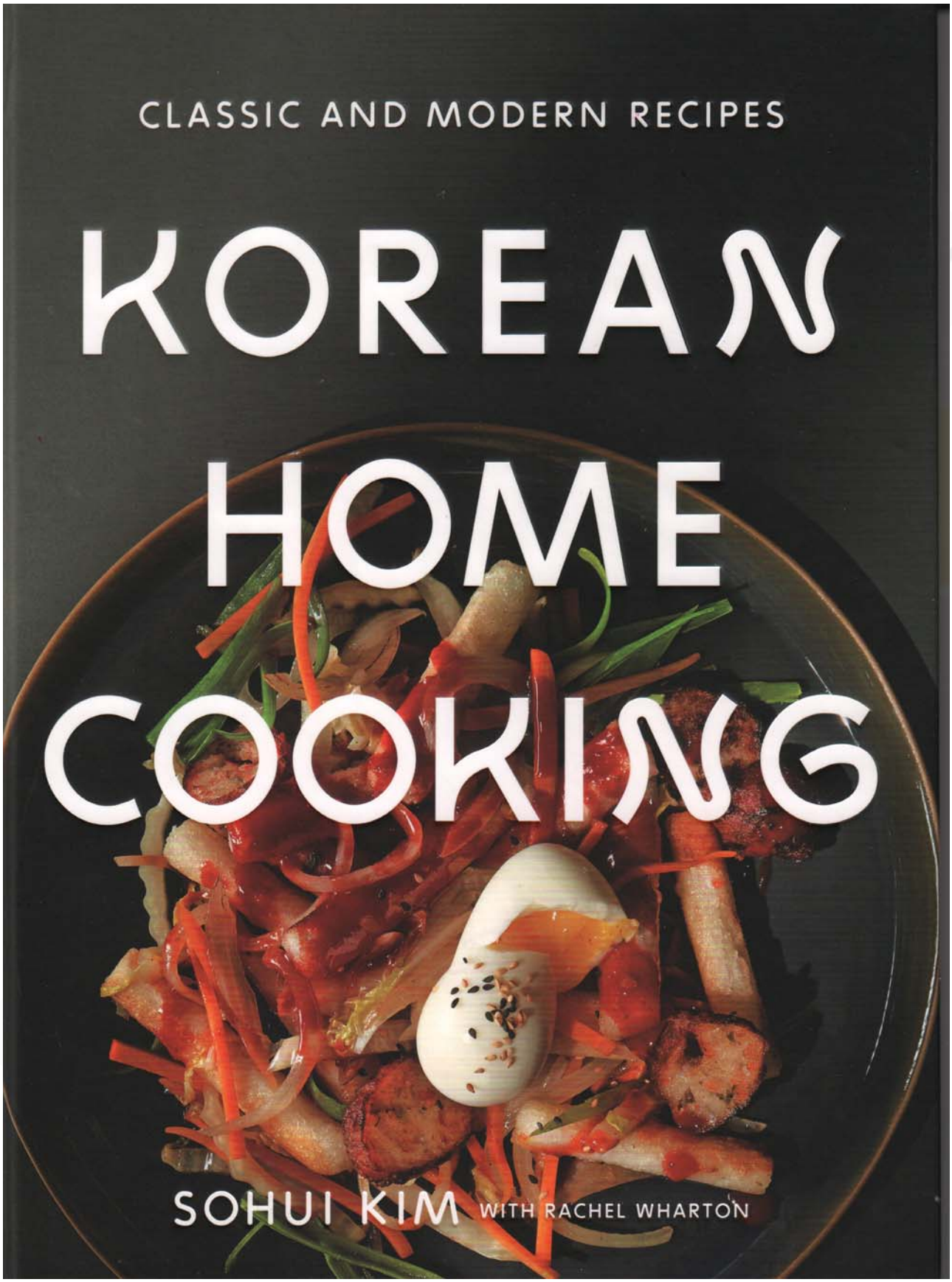
"Farro Miso–February 2019."

2042. Kim, Dakota. 2019. You know gochujang. But do you know doenjang? https://www.myrecipes.com/world-cuisine/korean-recipes/what-is-doenjang 1 p.

• ***Summary:*** "It seems like everywhere you go these days, gochujang, the Korean fermented red chili paste, is on the menu. Gochujang aioli for your pommes frites. Gochujang-marinated steak in your lunch rice bowl. But what about doenjang? This lesser-known, equally popular cousin to gochujang is less known in the U.S., but packs its own uniquely pungent flavor and an even longer history.

"The history of doenjang dates back more than 2000 years, to the Three Kingdoms Period of Korea, from circa 57 BC to 668 AD, when fermented soybean products, including soy sauce and doenjang, defined Korean cuisine.

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(Gochujang, meanwhile, doesn't find its first mention in Korean texts until 1433). In 1613, the Korean traditional medicine book, the *Dongui Bogam*, described doenjang's medicinal properties. By the time of the Joseon Dynasty (1392-1910), the royal court chefs were serving sophisticated varieties of tojangguk, a doenjang stew.

"To make traditional doenjang, humble soybeans go through a wondrous metamorphosis: they are soaked, boiled in salt water, pounded, ground, packaged into blocks that are dried and hung to ferment, washed and dried, soaked in brine in earthenware pots, and finally, mashed to become doenjang. (The remaining liquid becomes ganjang, or Korean soy sauce.) As you can imagine, most Korean food production companies no longer want to wait for natural fermentation, which can take around a year, so a speedier concoction of salt and a soybean, wheat, rice or barley starter is often used to flavor factory-made doenjang.

"While gochujang's primary flavor profile is dominated by red chile peppers, doenjang pushes fermented soybeans to center stage. Both pastes are thick and hearty, especially when gochujang also contains soybean paste, but doenjang is more forgiving. Diners can plop a big dollop of doenjang on ssam (lettuce wraps) without the spiciness from chile, and cooks can stir in doenjang to add a rich, earthy aroma to stews. Think of doenjang as the more introverted cousin at the party who you can handle larger doses of than limelight-loving gochujang."

2043. Park, Young Kyoung; Lee, Jae Hoan; Mah, Jae-Hyung. 2019. Occurrence and reduction of biogenic amines in traditional Asian fermented soybean foods: A review. *Food Chemistry* 278:1-9. April 25. [73 ref]
• ***Summary:*** An excellent, thorough review. Most fermented soybean foods studied contained potentially hazardous biogenic amine content, when compared with recommended limits. Yet regulation of biogenic amines in fermented soybean foods is presently insufficient. Thus, control of biogenic amines is necessary to produce safe fermented soybean foods.

Contents: Introduction. Regulation of biogenic amines: Korea ("Major fermented soybean products in Korea include Cheonggukjang, Doenjang, Gochujang and Korean soy sauce"), China ("The main fermented soybean products consumed in China include Chunjang, Doubanjiang, Douchi, Sufu, and Chinese soy sauce." Plus sweet soy sauce, known as Tianmianjiang in China and Chujang in Korea), Japan, Indonesia. Biogenic amine production by microorganisms isolated from fermented soybean products ("BA are mainly produced by microbial decarboxylation of free amino acids"). Reduction of biogenic amines in fermented soybean products ("Current research focuses on the development of starter cultures to reduce BA in fermented soybean foods"). Conclusion ("Improvements in the food manufacturing process are necessary to reduce BA content in fermented soybean foods. To implement appropriate BA control regulations, it is necessary to continuously monitor BA concentrations and establish BA content limits for fermented soybean products. Further research on practical measures to reduce BA content is necessary to ensure the safety of fermented soybean foods"). Acknowledgements. Declarations of interest. Tables: (1) Biogenic amine content of Korean fermented soybean products. (2) Biogenic amine content of Chinese fermented soybean products. (3) Biogenic amine content of Japanese fermented soybean products (miso, natto, soy sauce, tamari soy sauce). (4) Biogenic amine content of Indonesian fermented soybean products (tempeh). (5) Biogenic amine production by bacteria isolated from fermented soybean food products.

Figures: (1) Structure of biogenic amines and respective precursors: Aliphatic amine, aromatic amine, heterocyclic amine. Address: Dep. of Food and Biotechnology, Korea Univ., Sejong 30019, Republic of Korea [South Korea].

2044. Klisch, May. 2019. Taste of the tropics for mom: Pacific Rim cuisine promises a memorable meal on her day. *Stevens Point Journal* (*Stevens Point, Wisconsin*). May 8. p. B1.
• ***Summary:*** "You've probably encountered miso as a soup in Japanese / sushi restaurants, but in Hawaii I learned to enjoy Miso Butterfish baked in banana leaf. Milk Bar chef Christina Tosi once incorporated miso into her then-named 'Crack Pie' (a chess-style pie that is a runaway seller at her patisseries but that doesn't actually contain illegal substances) for her employees who were 'hooked' on the umami taste."

"I only recently discovered Korean Gochuchang spicy bean paste; now it graces my coq au vin, boeuf bourguignon and oxtail stew." Address: USA Today Network–Wisconsin.

2045. *Malnutrition Matters Newsletter* (*Ottawa, Canada*). 2019. 15 more SoyCows for First Steps' North Korea program: UN sanctions waived to allow latest humanitarian shipment. June. p. 1.
• ***Summary:*** "Since 2004, the Canadian Christian charity First Steps has been working with MM's SoyCows and VitaGoats in DPR Korea and currently has almost 100 systems around the country. Now 15 more are being delivered with the first 5 already being shipped. Over 100,000 children currently receive a daily cup of soymilk at day cares, schools and orphanages.

"This month, a First Steps team led by Susan Ritchie is making another one of their regular trips there to help deploy the new systems and generally coordinate their program which includes distributing 'Sprinkles' micronutrient fortification as well as soybeans and other vital humanitarian supplies. <www.firststepscanada.org>."

Photos show: (1) SoyCows and 2 workers in "Nampo Hangu Daycare and Kindergarten Supply Centre." (2)

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Children seated around a table, each with a plate and cup. "Children getting their daily serving of soymilk and a nutritional biscuit at Samjiyon Potac Daycare."

2046. Jansson, Hart. 2019. Re: Questions and answers about the history of Malnutrition Matters. Letter to William Shurtleff at Soyfoods Center, July 9–in reply to questions. 1 p.

• ***Summary:*** 1. When was Malnutrition Matters founded? Ans: "April 2000."

2. What was its initial address? Ans. "657 Eagle Street. Rockland, ON, Canada."

3. What was the first soy-related equipment you shipped? Ans: "First equipment shipped was an electric VitaCow to Romania."

4. How many units did you send to whom? Ans: "1 unit. Buyer Fito-Fitt."

5. Who paid for it? Ans: "Above."

6. When was your first order paid for by the World Bank? Ans: "We have had one project with the World Bank, in Orissa, India, 2007 to 2009. $150,000 to provide 18 VitaGoats, primarily for school feeding in NGO-run schools."

7. What equipment was it, how many units, and sent where?

Ans: "Most equipment in Orissa, 6 or 7 units in other parts of India."

8. How and when did Child Haven get involved in MM? Ans: "Child Haven was involved in the first pre-Malnutrition Matters project in 1989-1992, where the SoyCow concept was perfected. 15 units (fabricated in Canada) in total went to India, funded by the Canadian International Development Agency (CIDA)."

9. What were some of the first projects they sponsored? Ans: "Child Haven did not sponsor any projects per se; in 2005 and onward, they became customers of Malnutrition Matters–they have since bought 6 SoyCows from MM, for use at their children's homes in India, Bangladesh and Nepal."

10. How and when did Alpro get involved in MM? Ans: "2003. Due to a personal relationship between Frank Daller and Philippe Vandemoortele."

11. What were some of the first projects they sponsored? Ans: "There were no particular projects sponsored as it was



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generally for MM development and overall VitaGoat and SoyaKit system implementation etc. Formal sponsorship started in 2004."

12. 1. When did MM move to its present address? What is it? Ans: "Moved about 15 years ago to 498 Rivershore Crescent, Ottawa, Ontario K1J 7Y7 Canada."

13. How many people work there now, essentially 5 days a week? Ans: "2 headquarters staff."

14. When did you, Hart start working there from day to day? Ans: Started in 2002, day to day from 2006.

15. I know you want to keep your overhead as low as possible when you install a new unit. Which "animals" need a person from MM to install them? All? None? Some, but only on request. Ans: "SoyCow and VitaGoat need onsite installation services; SoyaKit training also needs onsite training, but local trainers can be trained remotely with the help of the Trainers Guide."

16. Do you have MM people pre-positioned in the field to keep air fares and travel time as low as possible. How many people? Where pre-positioned? How does this complex system work and who pays for these extra installation costs?

"Ans: We have contract staff in the field in Kenya, Ghana, South Africa, India, Thailand; as MM is a social business, clients or donors pay for the installation services.

17. Where is each of your soy "animals" now fabricated? Ans: "SoyCow and VitaGoat: Thailand and India; SoyaKit and SolarFlex/3HP dryers: China.

18. Please send me a few color graphics closely related to MM, such as a photo of the place where you work, etc. Ans: "We work in non-descript offices–would prefer that photos from the field are used: pictures attached: (1) Frank at a VitaGoat installation in North Korea in 2009 with Susan Ritchie (ED of First Steps Canada, which has commissioned the installation of over 100 SoyCows and VitaGoats in North Korea). (2) Hart at a SoyaKit training of women trainers in northern Ghana (West Africa), for the NGO MEDA (Mennonite Economic Development Association, May 2017)

"You are welcome to use any other photos from our website, most of the interesting ones are under the project tab." Address: Malnutrition Matters, Ontario, Canada.

2047. Malnutrition Matters. 2019. Projects (Website printout–part). www.malnutrition.org 1 p. Retrieved Aug. 25.

• ***Summary:*** Here is a second look at one of the most

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interesting and innovative organizations working with soyfoods in the world today. Low-tech and appropriate technology "small is beautiful" systems, that operate with or without electricity, make soymilk, tofu, soy yogurt, soy coffee, peanut butter, and related foods at very low cost and high efficiency. Congratulations to Frank Daller, Hart Jansson, their team, and their donors worldwide. See also the videos in the upper left of the home page under New Development and Highlights.

The home page begins: "Malnutrition Matters is a Canadian-registered, non-profit organization, dedicated to providing sustainable low cost food technology solutions for malnutrition, primarily by using soya, but also cereals, grains, fruits and vegetables. These plant-based foods offer the greatest nutritional, environmental and economic benefits. Furthermore, soymilk and its derivative soyfoods are already well-known for their nutritional value, functionality and the sustainability of their agriculture and production."

This time we invite you to explore the Projects section of the website, which is divided into Africa, Americas, Asia, and South Asia.

Projects in Africa–each with a detailed description and dates–include projects in Malawi, Ghana, Mozambique, Liberia, IITA, Tanzania, Kenya, South Africa, Uganda, Zambia, Guinea, and Chad. "NB: Not all projects are shown."

One program is the "Rural Enterprises Program Phase III–2016 (ongoing)." The text states:

"The REP III program, funded by the African Development Bank, the International Foundation for Agricultural Development and the Government of Ghana, and implemented by the Ministry of Trade and Industry in Ghana, is dedicated to economic development of the rural areas of Ghana. Malnutrition Matters had been involved in planning the program before its official launch in December 2014. Malnutrition Matters (MM) is proud to be one of the few official partners in the program. MM began its REP activities in mid-2016. SolarFlex and SoyCow equipment (with PedalPro option) were delivered to 10 sites in Ghana, as shown, in January, 2017. Installation and demonstrations by MM personnel was completed in May of 2017 and full operational and business training is scheduled for July. The production and sale of affordable soymilk and derivative products such as soy yoghurt, soy porridge and tofu will improve nutrition and enable sustainable operations creating employment in these locations. Some sites may partner with local entrepreneurs. The SolarFlex systems will be used and promoted for economical solar drying of food to reduce post-harvest losses and improve food security. Some additional SoyCow and SolarFlex equipment is intended to be produced at various Rural Technology Facilities in Ghana, after transfer of technology to enable local fabrication." The map of Ghana showing 10 sites where MM equipment has been delivered is show. Address: 498 Rivershore Crescent, Ottawa, ON K1J 7Y7, Canada. Phone: 1-613-742-6888.

2048. Oger, Camille. 2019. Tofu, l'anthologie [Tofu: the anthology]. Paris, France: La Plague. 384 p. Aug. Illust. (color photos). Ingredients index. Index: Alphabetical list of recipe names23 cm. [33 ref. Fre]

• ***Summary:*** Contents: Is this a vegetarian book? What is tofu? The textures of tofu. Practical advice. Storing the tofu. Tofu derivatives and by-products. Other types of tofu. The basics of tofu.

Basic recipes: Soymik and okara, Firm tofu. Silken tofu, Silk tofu with citrus. Yuba (*peau de soja*). Tofu curds (2 methods).

China and Taiwan: The cradle of tofu. Tofu culture. One does not prevent the author. Types of tofu and their uses: Lists (in French) the names of 29 tofu recipes from China or Taiwan. In the book, each is accompanied by a full-page color photo.

Japan: The other tofu country. In praise of blandness. Not a product of chicks. Types of tofu and their uses: Lists (in French) 28 tofu recipes from Japan.

Korea: A particular method. Not marginal as in China and Japan. All flame tofu, Or tofu all soft. Types of tofu and their uses: Lists 16 Korean recipes.

Southeast Asia: A Chinese contribution. A firmer tofu. The particular case of Vietnam. The poor man's food. Types of tofu and their uses: Lists (in French) 25 Southeast Asian tofu recipes.

Burma: A special case. Bright yellow tofu. Types of tofu and their uses: Lists 9 Burmese tofu recipes.

India: So much peas but no soy. The soy paneer. Lists 8 Indian tofu recipes.

Elsewhere: An old encounter. A vegetarian product. Good tofus. Two parallel universes. Types of tofu and their uses: Lists (in French) 48 tofu recipes.

Bibliography.

From the publisher: 170 recipes from India, Japan, Burma, France or Italy. The blandness of fresh tofu is an advantage, a culinary "white page," like that of white rice or wheat flour, which can be exploited in many ways. By marinating it, cooking it with spices, herbs and various condiments–it is an inexhaustible source of culinary diversity.

2049. Yang, Hye Jeong; Kim, M.J.; Kim, K.S.; Lee, J.E.; Hong, S.P. 2019. *In vitro* antidiabetic and antiobesity activities of traditional kochujang and doenjang and their components (Open Access). *Preventive Nutrition and Food Science* 24(3):274-82. Sept. [47 ref]

• ***Summary:*** "In this study we investigated the antidiabetic and antiobesity effects of aqueous ethanol extracts of traditional kochujang and doenjang."

Tempeh is mentioned in this article. Address: 1.

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Research Div. of Food Functionality, Korea Food Research Inst., Jeonbuk 55365, Korea.

2050. Messina, Mark J. 2019. Re: Are soyfoods / soy isoflavones endocrine disruptors. Letter (e-mail) to William Shurtleff at Soyinfo Center, Dec. 8-11.

• ***Summary:*** "I may have mentioned that the French and UK are in the process of determining whether soy/isoflavones are endocrine disruptors. Will be terrible if they reach that conclusion.

"I am writing a 30,000 word paper using the clinical data to refute this concern. Hope to have at least 10 coauthors but I will do the bulk of the writing. Hopefully, we can raise the cash to support my effort. Need about 43K (30K for me).

"If the industry doesn't come up with the money I will lose all hope. You have a company like Impossible Foods, which is worth $5 billion and whose only product is soy-based. They should fund the whole thing if need be. Same could be said for Soylent and House Foods (both members of the SNI).

"I am reducing my travel (just turned down a trip to Korea) to focus on what I consider to be most important. Time is short and most trips aren't very productive. Talking to 200 people pales in comparison to writing a paper that will be in the literature for years.

"Mark.

Wm. Shurtleff replies with a note of thanks.

Messina replies, Dec. 9

"The paper from the UK indicating their interest in isoflavones is attached. Also attached a slide deck on endocrine disruptors and the paper I plan to write. Will send some articles from France when I get them.

"Thanks for your offer to contribute financially to the writing of the paper. It is generous but I am confident it won't be needed. I think Dupont and Kellogg's among others will step up to the plate. The company I have no confidence in is Danone North America (WhiteWave). They seem not willing to spend on money on soy even when they claim they want to.

Attachments: (1) Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment. 2018, Oct. "Discussion paper on soya drink consumption in children aged 6 months to 5 years of age." 13 p. At the top of each page: "This is a background paper for discussion. It does not reflect the views of the Committee and should not be cited."

(2) A slide deck titled "Endocrine Disruptors." Contents: (1) WHO (World Health Organization) definition. (2) U.S. EPA (Environmental Protection Agency) definition. Adverse effect. (3) Graphic of effects of Endocrine disruptors. (4) First page of an article titled "Soy as an endocrine disruptor: cause for caution?" 2010. J. of Pediatric Endocrinology & Metabolism, Vol. 23, p. 855+.

(5) First page of an article titled "New evaluation of isoflavone exposure in the French population. 2019. Published in Nutrients.

(6) Article titled "Worrying levels of phytoestrogens found in soy-based products, claims French consumer group" (The French Food Safety Authority)

(7). March 2005 Press release (translated from French) titled "Safety and benefits of phytoestrogens in foods," by AFSSA (*Agence Francaise de Securite Sanitaire des Aliments*) (French Food Safety Agency) and AFSSAPS (Agence Francaise de Securite Sanitaire des Produits de Sante) (French Health Product Safety Agency).

(8-14) Various questions and proposals.

Shurtleff replies (Dec. 10): "My basic perspective on the soy scare is this: If soyfoods are bad for people, why are the Japanese and Okinawans–as well as the Koreans and Chinese–so healthy. Their average per capita daily consumption of soy is much higher than those of people in all Western nations.

"Is this naive.

"Is it inadmissible evidence in a scientific paper?"

Messina replies: "Bill–Those observations are almost worthless. A more credible observation (question) is whether people in Okinawa who frequently eat soy are more or less healthy than people who infrequently eat soy.

"But even that question has rather limited value although it is certainly useful. Do people who eat soy frequently exercise more than those who infrequently eat soy? You can't control 100% for all potentially confounding variables. There is also the issue of Asian vs. non-Asian people–does one group respond differently than the other? And related to that, do people who have historically consumed soy respond differently to soy than people for whom soy is a relatively new food.

"The toxicologists like animal studies because you can completely control their diet and 'lifestyle.' Fortunately, in the case of soy there are literally hundreds of human intervention studies from which one can draw insight about health effects. But there are still limitations. For example, no one has conducted a trial to determine whether feeding soy to 10 year old girls for 20 years affects fertility. Impossible to do some clinical trials. So in the end, you look at the animal, clinical and observational studies and try to make the most sense of the data."

Dec. 11. Shurtleff replies: "Mark, I really appreciate your detailed reply.

"If the consensus is that soyfoods/isoflavones are endocrine disruptors, would I (and others) be wise to stop daily consumption of soyfoods–in my case tofu, soymilk and edamame–which are my main sources of protein?

"In science doesn't a consensus eventually emerge?

Dec. 11. Messina replies: "I consume soy 2-3 times per day. Second, there is rarely a consensus. In its evaluation of the cholesterol lowering effect of soy protein, the FDA concluded soy is safe at levels required for the health

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claim (25 g soy protein per day) (October 31, 2017). The claim deals with soy protein but the FDA evaluated 1300 comments that mostly dealt with isoflavones. So if ANSES concludes soy could be harmful, there won't be a consensus.

"Bear in mind, most concerns are mostly related to infants and children and in utero exposure, not old white guys like you and me. Finally, right now ANSES thinks 21 mg per day is the upper safe limit for isoflavone intake. That is 6-7 ounces of Silk soymilk. Do you really think consuming 2 cups of soymilk per day is harmful?" Address: PhD, Pittsfield, Massachusetts.

2051. Kim, Jae-Yoon Kim; Jeong, S.; Kim, H.K.; Lim, W.-J.; Lee, H.-Y.; Jeong, N.; Moon, J.K.; Kim, N. 2019. Dissection of soybean populations according to selection signatures based on whole-genome sequences (Open Access). *GigaScience* 8(12):1-19. Dec. [127 ref]

• ***Summary:*** "Background: Domestication and improvement processes, accompanied by selections and adaptations, have generated genome-wide divergence and stratification in soybean populations. Simultaneously, soybean populations, which comprise diverse subpopulations, have developed their own adaptive characteristics enhancing fitness, resistance, agronomic traits, and morphological features. The genetic traits underlying these characteristics play a fundamental role in improving other soybean populations.

"Results: This study focused on identifying the selection signatures and adaptive characteristics in soybean populations. A core set of 245 accessions (112 wild-type, 79 landrace, and 54 improvement soybeans) selected from 4,234 soybean accessions was re-sequenced. Their genomic architectures were examined according to the domestication and improvement, and accessions were then classified into 3 wild-type, 2 landrace, and 2 improvement subgroups based on various population analyses. Selection and gene set enrichment analyses revealed that the landrace subgroups have selection signals for soybean-cyst nematode HG type 0 and seed development with germination, and that the improvement subgroups have selection signals for plant development with viability and seed development with embryo development, respectively. The adaptive characteristic for soybean-cyst nematode was partially underpinned by multiple resistance accessions, and the characteristics related to seed development were supported by our phenotypic findings for seed weights. Furthermore, their adaptive characteristics were also confirmed as genome-based evidence, and unique genomic regions that exhibit distinct selection and selective sweep patterns were revealed for 13 candidate genes.

"Conclusions: Although our findings require further biological validation, they provide valuable information about soybean breeding strategies and present new options for breeders seeking donor lines to improve soybean populations." Address: 1-5. Genome Editing Research Center, Korea Research Institute of Bioscience and Biotechnology (KRIBB), Gwahak-ro 125, Yuseong-gu, Daejeon 34141, Republic of Korea.

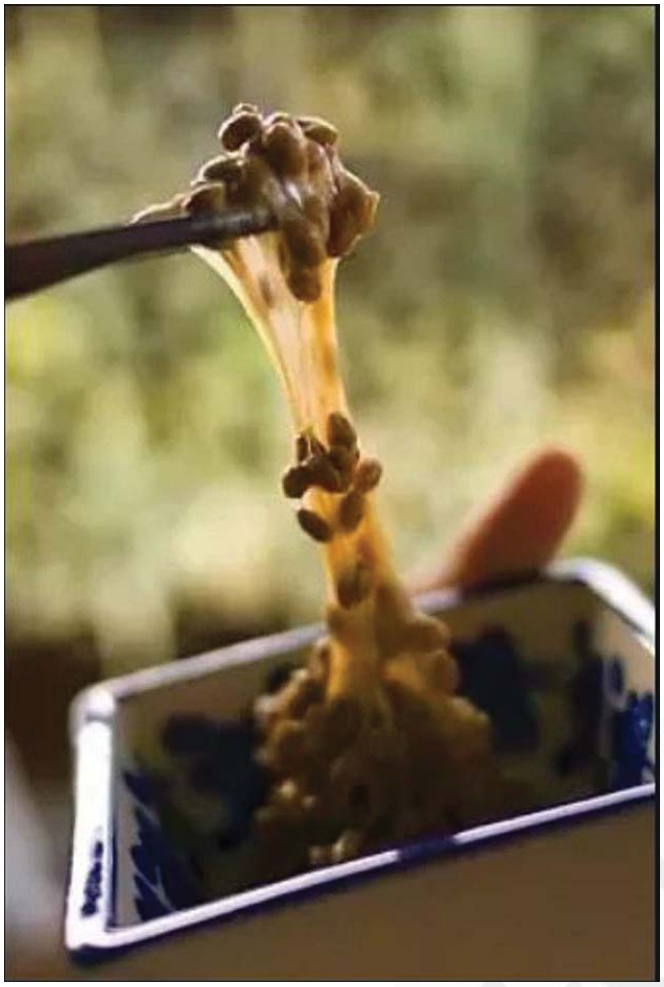
2052. Scherer, Laura; Behrens, P.; Tukker, A. 2019. Opportunity for a dietary win-win-win in nutrition, environment, and animal welfare (Open Access). *One Earth* 1(3):349-60.

• ***Summary:*** "Summary: Sustainable food systems are essential for meeting nutritional requirements, limiting environmental impacts, and reducing animal welfare loss. Although current dietary trends in many regions rather go in the opposite direction, the adequacy of dietary guidelines is unknown, and the three sustainability dimensions are generally not assessed simultaneously. Here, we assessed nation-specific recommended diets for these impacts compared with the average diet. We assessed the trade-offs between nutritional quality, environmental sustainability (carbon, land, and water footprints), and animal welfare. Most countries reduce their animal product consumption in terms of food calories when switching to the nationally recommended diet. Recommended diets have the potential for 'win-win-wins' in all three categories when compared with the current average diet, such as that shown in Brazil. However, South Korea loses in all three regards, and many other countries face trade-offs. This highlights the scope for the optimization of dietary guidelines to minimize such trade-offs." Address: Inst. of Environmental Sciences (CML), Leiden University, 2333 CC Leiden, the Netherlands.

2053. Kwon, Dae Young; Chung, Kyung Rhan; Jang, Dai-Ja. 2019. The history and science of Chongkukjang, a Korean fermented soybean product: review article (Open Access). *J. of Ethnic Foods* 6(1):5 17 p. [77 ref]

• ***Summary:*** About Korean natto. "With several thousands of years of tradition, Chongkukjang is one of Korea's most well-known fermented soybean foods. Chongkukjang has existed in Korea since the first century BC and throughout the Koryo dynasty and kingdom of Silla, while si (shi [fermented black soybeans] 1 Cc [Chinese character], Chongkukjang) in Chaeksong was highly regarded according to the customs of Balhae. The fact that Koreans are good at creating fermented foods (3 Cc) is recorded in *Samkukjiwijidongijeon* (Records of the Three Kingdoms, 8 Cc), and Chongkukjang has been in Korea even longer than its 2000-year history in China. Chinese documents dating back to before 40 BC contain records of Chongkukjang or a similar fermented bean. Si does not originally come from China and was introduced to the country by an individual called Kang Baik (2 Cc) who is thought to have hailed from Korea, and there were many names for Chongkukjang in pure Korean such as jyeonkuk, cheongkuk, chyeonkuk, and chyeongkuk.

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"In short, Chongkukjang has existed as a fermented soybean food in Korea for more than 2000 years. However, some scholars have been distorting the truth and spreading false information about Chongkukjang. Some of these claims include "Chongkukjang was first created during wartime, as it could be prepared quickly," "Chongkukjang was introduced to Korea via the Qing dynasty," and "The first documented record of Chongkukjang in Korea is in *Junbosallimkyongje* (6 Cc), written by Yu Jung-im (3 Cc) in 1760." If these claims were true, the Chongkukjang would be less than 400 years old. However, these theories are mostly put forward by scholars who are familiar with Chinese characters but know nothing about natural science or food science. By examining Korean history purely through the analysis of Chinese characters, which is indicative of the toadyish attitude of such scholars, they have committed the error of misrepresenting Korean food culture and history. Instead of looking at the history of Chongkukjang through the character si (1 Cc), they claim that the only references to Chongkukjang in ancient texts are words written in Chinese characters (3 Cc, 3 Cc, 3 Cc, 3 Cc, or 3 Cc). How did this happen? Analysis of these documents can be used to demonstrate how these scholars came up with the baseless claim that Chinese characters, 3 Cc, 3 Cc, 3 Cc, 3 Cc, or 3 Cc, refer to Chongkukjang, instead of the names that were actually used (jyeonkuk, cheongkuk, chyeonkuk, and chyeongkuk), and how they inadvertently relegated Chongkukjang to the position of a food that has only existed in Korea for less than 400 years. Before Korean script (Hankeul [often spelled Hangul]; 2 Korean characters = 2 Kc) was developed, Chongkukjang was pronounced jyeonkuk, cheongkuk, chyeonkuk, or chyeongkuk and was referred to as si (1 Cc) in official records which were written in Chinese characters. After the advent of Korean script, Chongkukjang was recognized as a kind of jang alongside doenjang (soybean paste), kanjang (soy sauce), and kochujang (red pepper paste), which is why the character jang (1 Cc) was added as a suffix. Scholars then created the words 3 Cc, 3 Cc, 3 Cc, 3 Cc, and 3 Cc by selecting Chinese characters that represent the pronunciation of jyeonkuk, cheongkuk, chyeonkuk, and chyeongkuk and adding the character jang to the end of each. This kind of mistake is understandable. However, these scholars have taken it further to the point that their interpretation, based on a false understanding of the way in which Chinese characters were used to spell out Korean words phonetically, has distorted the history and origins of Chongkukjang."

"Recently, Chung published a paper in which he translated ancient documents about the history of Chongkukjang and used this as evidence to refute some high profile wrong theories about the food [endnote 4]. It was a very well-written paper based on written evidence [see: Chung, K.R. 2018. The history of Chongkukjang. J. Korea Contents Soc. 18:647-77. Note: "Chongkukjang: A type of Korean soybean paste made by placing soft boiled soybeans in a hot place to stimulate the production of *Bacillus subtilis*].

"After harvesting soybeans in autumn, they are washed, boiled, and left to cool. They are then placed in the warm part of a room on a basket or clay pot covered with straw, covered with a blanket to regulate the temperature, and left to ferment for 2-3 days [8, 9]. The fermenting agent is Bacillus, as most of the strains involved in the fermentation of Korean Chongkukjang come from straw. Chongkukjang is a classic example of a fermented soybean food that does not contain salt. Since Chongkukjang has been eaten in Korea for a long time, it makes sense that the food has several thousands of years of history. Japanese natto, a type of Chongkukjang that originated in Korea, has also been around for several thousands of years. Natto is an improved version of Chongkukjang that has become a global food, but its origins lie in Korea. Chongkukjang in Korea is usually eaten as a Kuk (like soup) and Chigae [6], while in Japan, natto was allowed to be eaten on its own after inoculating the strains."

Page 13: Meju, soybean koji, is made by fermenting soybeans for the purpose of making kanjang (soy sauce),

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doenjang (Korean-style soybean paste or miso) and kochujang (fermented red chili paste).

2054. Intersimone, Jenna. 2020. Where to get the best ramen in Central NJ. *Central New Jersey Home News* (*New Brunswick, New Jersey*). Jan. 27. p. 7B, 8B.
• ***Summary:*** One type of ramen is miso ramen, which is a relative of miso soup. Spice miso ramen is also popular–costing about $15 a bowl.

"In New Jersey, no restaurant is perhaps better known for ramen than Ani Ramen, a modern, local restaurant chain with six New Jersey locations and one about two months away from opening in New Brunswick.

"To develop proprietary ramen variations, Ani Ramen partnered with Sun Noodle company based in Carlstadt. All broths are made from scratch and slow-cooked, and ramen is made using traditional methods. Currently Ani Ramen offers five ramen varieties."

Miso is also used in "miso tare," "spick miso tonkatsu ramen," "miso crab ramen."

Roosterspin, an Asian fusion restaurant, uses half Japanese miso and half Korean miso in their miso ramen. Owner Mihae Cho describes it as tasting like "chicken soup with a miso flavor." He adds that "the miso brings a lot of flavor."

2055. Tamang, Jyoti Prakash; Cotter, P.D.; Endo, A.; et al. 2020. Fermented foods in a global age: East meets West. *Comprehensive Reviews in Food Science and Food Safety* 19(1):184-217. Jan. *
• ***Summary:*** Table 1, under "D. Fermented Legume foods," contains four columns: 1. Country. 2. Substrate. 3. Food. 4. Organoleptic characters and culinary.

The following have "Soybean" as the substrate.

India. Bekang. Alkaline, sticky, paste, curry

Korea. Chungkokjang (or jeonkukjang, cheonggukjang). Alkaline, sticky, soup.

China, Taiwan. Douchi, Alkaline paste.

Korea, Doenjang. Alkaline, paste, soup.

China. Soybean curd. Furu. Mild acidic.

Korea, Soybean, red pepper. Gochujang. Hot-flavored seasoning.

India. Hawaijar. Alkaline, sticky.

Korea. Soybean, meju, salt water. Kanjang. Soya sauce.

Indonesia. Soybean, wheat. Kecap. Liquid.

Indonesia. Soybean (black). Kecap. Syrup.

India, Nepal, Bhutan. Kinema. Alkaline, sticky; curry.

China, Taiwan. Meitauza. Liquid.

Korea. Meju. Alkaline paste.

Japan. Miso. Alkaline paste.

Japan. Natto. Alkaline, sticky; breakfast.

Japan, Korea, China. Shoyu. Alkaline, liquid seasoning.

China, Taiwan. Soybean curd. Sufu. Mild-acidic, soft.

Indonesia. Tauco. Alkaline paste, use as a flavoring agent.

Indonesia (Origin), The Netherlands, Japan, USA. Tempe. Alkaline, solid, fried cake, breakfast.

Thailand. Thua nao. Alkaline, paste, dry, side dish.

India. Tungrymbai. Alkaline, sticky, curry, soup.

China. Yandou. Alkaline, sticky, salted, snack.

Acknowledgments: This paper was based in part on an expert panel discussion session held at the International Scientific Association for Probiotics and Prebiotics Annual Meeting in Singapore in June, 2018. We thank Mary Ellen Sanders for helpful suggestions. Address: DAICENTER and Bioinformatics Centre, Department of Microbiology, School of Life Sciences, Sikkim. Phone: 00270.

2056. Nawaz, Muhammad Amjad; Lin, X.; Chan, T.F.; et al. 2020. Korean wild soybeans (*Glycine soja* Sieb & Zucc.): geographic distribution and germplasm conservation: review (Open Access). *Agronomy* 10(2):214. Feb. 19 p. doi:10.3390/agronomy10020214 [117 ref]
• ***Summary:*** "Domesticated crops suffer from major genetic bottlenecks while wild relatives retain higher genomic diversity. Wild soybean (*Glycine soja* Sieb. & Zucc.) is the presumed ancestor of cultivated soybean (*Glycine max* [L.] Merr.), and is an important genetic resource for soybean improvement. Among the East Asian habitats of wild soybean (China, Japan, Korea, and Northeastern Russia), the Korean peninsula is of great importance based on archaeological records, domestication history, and higher diversity of wild soybeans in the region. The collection and conservation of these wild soybean germplasms should be put on high priority. Chung's Wild Legume Germplasm Collection maintains more than 10,000 legume accessions with an intensive and prioritized wild soybean germplasm collection (>6000 accessions) guided by the international code of conduct for plant germplasm collection and transfer. The center holds a library of unique wild soybean germplasms collected from East Asian wild habitats including the Korean mainland and nearby islands. The collection has revealed interesting and useful morphological, biochemical, and genetic diversity. This resource could be utilized efficiently in ongoing soybean improvement programs across the globe." Address: 1. Dep. of Biotechnology, Chonnam National University, 59626 Yeosu, Korea.

2057. Jo, Hyun; Kim, Minsu; Ali, Liakat; Tayad, Rupesh; et al. 2020. Environmental stability of elevated α-linolenic acid derived from a wild soybean in three Asian countries. *Agriculture* (*Open Access*) 10, 70. 12 p. [45 ref]
• ***Summary:*** "Soybean can be a source of essential fatty acids-linoleic (18:2, omega-6) and α-linolenic acid (18:3, omega-3)-for humans. Intake of fatty acids with high omega-3 concentration or low omega-6/omega-3 ratios is more desirable for human health. However, in soybean, the

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unsaturated fatty acids are less stable than the saturated fatty acids in different environments... Particularly, temperature influenced the accumulation of 18:3 concentration. The soybean genotype, UT-385-4-4, produced the highest 18:3 concentration and is more stable than all the other soybean genotypes, excluding PT-100-3. UT-385-4-4 is a potential genetic resource to develop novel cultivars with high 18:3 concentration, which could be dietary sources of plant-derived omega-3 fatty acids." Address: 1. School of Applied Biosciences, Kyungpook National Univ., Daegu 41566, Korea.

2058. Bhartiya, Anuradha; Aditya, J.P.; Pal, R.S.; Chandra, N.; Kant, L.; Pattanayak, A. 2020. Bhat (black soybean): A traditional legume with high nutritional and nutraceutical properties from NW Himalayan region of India. *Indian J. of Traditional Knowledge* (*New Delhi*) 19(2):307-19. April. [146 ref]
• ***Summary:*** *"Bhat* (black soybean) under the genus *Glycine*, is cultivated for food, fodder and medicinal uses by rural communities in Asia particularly, in China, Japan, Korea, Indonesia and India. In the Himalayan region of India, this legume is not only an integral part of a climate resilient farming system but also finds place in ethnodietary recipes and fondly consumed as a pulse. Black soybean ensures both food and nutritional security in hills where nutritional deficiencies are in abundance among rural, tribal and backward population engaged in subsistence farming in marginal rainfed terrains. Cultivation of black soybean is less capital intensive. Its ability to survive under harsh conditions particularly, in the event of failure of rain, makes it a better choice than other competitive crops grown during rainy season. Despite its enormous potentials, the legume has not gained the popularity in India and presently, area under this valuable legume is confined to North Himalayan hill region and scattered pockets of central India. Its high nutritive value, remedial and health promoting effects due to presence of various bioactive compounds make this legume an excellent functional food. Present review summarizes the potential role of black soybean for human nutrition and health benefits."

This black-seeded soybean is known by many names: *He-teou* (China), *Kokuzui* [sic] (Japan) and *Kongjaban* (Korea) and *Bhat, Bhatman, Bhatmas, Bhut, Teliakulth, Gerakalay, Kalitur* and *Kala Hulga* in India (refs. 12-14).

Contents: Introduction. History, origin and domestication: botanical description, nutritional composition, crude protein, fat, carbohydrate, dietary fibre, antinutritional factors, protease inhibitors, polyphenols, haemagglutinins (the sugar specific proteins sometimes referred to as phytoagglutinins or lectins), phytic acid, lipoxygenase, nutraceutucal properties ("still widely used as a key ingredient in Chinese herbal medicine" {108, 109}), anthocyanins (impart black color), isoflavones, other bioactive compounds imparting health benefits (flavonoids, saponins, sprout extract), potential of black soybeans as nutraceutical, functional food and feed (antioxidants, bioactive ingredients). Conclusion (Traditionally important, has played a "vital role in sustaining the traditional food production system of the Northwest Himalayan region." Yet it remains a "neglected legume"). Address: ICAR-Vivekananda Inst. of Hill Agriculture, Almora 263 601, Uttarakhand, India.

2059. Ismail, Ishamri; Hwang, Young-Hwa; Joo, Seon-Tea. 2020. Meat analog as future food: a review. *J. of Animal Science and Technology* 62(2):111-20. [59 ref]
• ***Summary:*** "Conclusion: It can be concluded that there is a high demand for meat analog in the current and future markets. The most significant interest in this product is not due to vegan consumer's number increase, but it was driven by the consumers concerned about healthy foods and a sustainable environment. Nevertheless, there is still limited meat analog in the current market and predominantly available only plant-based meat." Address: 1. Div. of Applied Life Science (BK21+), Gyeongsang National Univ., Jinju 52828, Korea.

2060. Kim, Jinyup. 2020. Tackling biopiracy in Southeast Asia: the need for a legally binding regional instrument. *Asia Pacific Journal of Environmental Law* p. 74-98. *

2061. Li, Man-Wah; Wang, Z.; Jiang, B.; Kaga, A.; Wong, F-L.; Zhang, G.; Han, T; Chung, G.; Nguyen, H.; Lam, H-M. 2020. Impacts of genomic research on soybean improvement in East Asia (Open Access). *Theoretical and Applied Genetics* (*TAG*) 133(5):1655-78. May. [133 ref. Eng]
• ***Summary:*** Soybean domestication originated in East Asia. However the USA has been the world's top soybean producer since the 1950s. Brazil became a major soybean producer in the 1970s, and Argentina in the 1990s. China was an exporter of soybeans to Japan before the 1990s, yet today, like Japan and Korea, China is a soybean importer [the world's largest]. Soybean yields in East Asia have stagnated during the past decade. To improve soybean production and enhance food security, these Asian countries have made major investments in breeding better-performing soybean germplasm. "As a result, China, Japan, and the Republic of Korea have become three important centers for soybean genomic research. With new technologies, the rate and precision of the identification of important genomic loci associated with desired traits from germplasm collections or mutants have increased significantly. Genome editing on soybean is also becoming more established. The year 2019 marked a new era for genome crop editing in the commercialization of the first genome-edited plant product, which is a high-oleic-acid soybean oil." In this review we summarize the latest developments in soybean breeding and the remarkable

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progress in this area in China, Japan and the Republic of Korea. Address: 1-2. Centre for Soybean Research, State Key Lab. of Agrobiotechnology and School of Life Sciences, The Chinese Univ. of Hong Kong, Shatin, China.

2062. Zimberoff, Larissa. 2020. Tofu goes mainstream in America thanks to Big Meat's Covid crisis (Web article). https://www.bloomberg.com/news/articles/2020-06-11/the-pandemic-opens-the-door-to-tofu-makers-who-race-to-meet-deman?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosam&stream=top 4 p.
• ***Summary:*** The coronavirus made meatpacking plants more dangerous than usual. "Consumers suddenly found themselves in empty meat aisles, searching for protein.

"Enter tofu. In the U.S., it's historically been a niche product," even though popular throughout East Asia. "Now, more American shoppers are giving it a second look."

One major beneficiary of this new fame is "Pulmuone, a South Korea-based food maker boasting a 78% share of U.S. tofu sales with brands like Nasoya, Wildwood and Azumaya." With the new demand, three of its U.S. plants are operating six days a week and its has even been forced to import tofu from South Korea.

Sales of tofu last year in the U.S. were $363 million. Tofu is inexpensive; One pound of Beyond Meat ground "beef" sells for $8.99 versus 14 ounces of tofu retails for $2.99.

2063. Wikipedia, the free encyclopedia. 2020. Lysine price-fixing conspiracy (Web article). https://en.wikipedia.org/wiki/Lysine_price-fixing_conspiracy 2 p. Accessed July 30.
• ***Summary:*** The introduction begins: The lysine price-fixing conspiracy was an organized effort during the mid-1990s to raise the price of the animal feed additive lysine. It involved five companies that had commercialized high-tech fermentation technologies, including American company Archer Daniels Midland (ADM), Japanese companies Ajinomoto and Kyowa Hakko Kogyo, and Korean companies Sewon America Inc. and Cheil Jedang Ltd. A criminal investigation resulted in fines and three-year prison sentences for three executives of ADM who colluded with the other companies to fix prices. The foreign companies settled with the United States Department of Justice Antitrust Division in September through December 1996. Each firm and four executives from the Asian firms pleaded guilty as part of a plea bargain to aid in further investigation against ADM. The cartel had been able to raise lysine prices 70% within their first nine months of cooperation. [1] Also discusses: ADM's role.

Popular adaptations: The Informant is a nonfiction thriller book written by journalist Kurt Eichenwald and published in 2000 by Random House [18] that documents the case and the involvement of ADM executive Mark Whitacre. It has been adapted into the 2009 film The Informant! starring Matt Damon, which was released September 18, 2009.

See also: United States v. Archer Daniels Midland Co. [link].

2064. Kang, Gyung Young; Choi, Sang Woo; Chae, Won Gi; Chung, Jong Il. 2020. Accumulation of triple recessive alleles for three antinutritional proteins in soybean with black seed coat and green cotyledon. *J. of Plant Biotechnology* 47:118-23.
• ***Summary:*** "The black seed coat of soybeans contain anthocyanins which promote health. However, mature soybean seeds contain anti-nutritional factors like lipoxygenase, lectin and Kunitz Trypsin Inhibitor (KTI) proteins. Furthermore, these seeds can be used only after the genetic elimination of these proteins."

"This black soybean strain with *lx1lx1lx2lx2lx3lx3, titilele* genotype is a novel strain free of lipoxygenase, lectin, and KTI proteins." Address: Dep. of Agronomy, Gyeongsang National Univ., JinJu, Korea, 52828.

2065. Kim, So Yeon; Lee, Kyung Bok; Cho, Young Ho; et al. 2020. [Inhibitory effect of the extract of cheonggukjang fermented with *Bacillus amyloliquefaciens* SCGB 1 on LPS-induced inflammation and inflammatory diseases]. *J. of the Korean Society of Food Science and Nutrition* 49(7):659-67. July. [23 ref. Kor; eng]
• ***Summary:*** "Furthermore, mice given SCGB 1 showed significant inhibition of severe gastritis induced by HCl/EtOH in mice. Taken together, SCGB 1 is an excellent material to inhibit inflammation and inflammatory diseases." Address: 1. Dep. of Microbiology, College of Medicine.

2066. Lee, Hyun Jung; Yong, H.I.; Kim, M.; Choi, Y.S.; Jo, C. 2020. Current status of meat alternatives and their potential role in the future meat market (Open Access). *Asian-Australasian J. of Animal Science* https://doi.org/10.5713/ajas.20.0419 [80 ref]
• ***Summary:*** "Plant-based meat analogues, edible insects, and cultured meat are major meat alternatives that can be used as promising protein sources in the future. It is also believed that the importance of meat alternatives will continue to increase because of concerns on limited sustainability of the traditional meat production system. The meat alternatives are expected to have different roles based on their different benefits and limitations. Plant-based meat analogues and edible insects can replace traditional meat as a good protein source from the perspective of nutritional value. Furthermore, plant-based meat can be made available to a wide range of consumers (e.g., as vegetarian or halal food products). However, despite ongoing technical developments, their palatability, including appearance, flavor, and texture, is still different from the consumers' standard established from livestock-based traditional meat. Meanwhile, cultured meat

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is the only method to produce actual animal muscle-based meat; therefore, the final product is more meat-like compared to other meat analogues. However, technical difficulties, especially in mass production and cost, remain before it can be commercialized. Nevertheless, these meat alternatives can be a part of our future protein sources while maintaining a complementary relationship with traditional meat." Address: Dep. of Agricultural Biotechnology, Center for Food and Bioconvergence, and Research Inst. of Agriculture and Life Science, Seoul National University, Seoul 08826, Korea.

2067. Jung, Young Sung; Rha, Chan-Su; Baik, Moo-Yeol; Baek, Nam-In; Kim, Dae-Ok. 2020. A brief history and spectroscopic analysis of soy isoflavones. *Food Science & Biotechnology.* Sept. 15. https://doi.org/10.1007/s10068-020-00815-6. *

• ***Summary:*** Contents: History and origin of the English name and scientific term for soybeans. The history of soybeans has been well organized by researchers. Address: 1. Dep. of Food Science and Biotechnology, Kyung Hee Univ., Yongin, 17104, Republic of Korea.

2068. Lum, Bob. 2020. Re: Phoenix Bean LLC and Jenny's Tofu in Chicago. Letter (e-mail) to William Shurtleff at Soyinfo Center, Nov. 17. 2 p. [Eng]

• ***Summary:*** Note: This email is in reply to one from Soyinfo Center based on an excellent article in the *South China Morning Post.*

"Thanks for contacting Jenny. She was thrilled to hear from you and honored to find out she was part of the *South China Morning Post* article that featured you and *The Book of Tofu.* She considers it the tofu bible and owns several copies!

"I help Jenny here at Phoenix Bean with various marketing and communications activities and hopefully can answer your questions. I'm not sure what detail you need for your dB, but I've prepared a short story below. Please let me know if you need more/less and any additional info.

Jenny is the 3rd owner of Phoenix Bean which has operated continuously in Chicago since 1981. The original owners only focused on selling tofu to the local Asian immigrant community. Since Jenny purchased the business in 2006, it operates as Phoenix Bean LLC and produces a variety of tofu, soy milk, and bean sprout products under the Phoenix Bean and Jenny's Tofu brands. Jenny's business mission has focused on educating a broader audience on the benefits of tofu, making quality improvements while retaining the authenticity and taste of traditional tofu products, increasing the appeal and accessibility of tofu, and improving sustainable practices. Our soymilk and tofu products are made fresh daily from organic or organically raised non-GMO Midwest grown soybeans. We now produce 30+ varieties of traditional tofu and ready-to-eat tofu salads for retailers, restaurants, wholesalers, and food producers. You can find our tofu in dishes at neighborhood eateries and Michelin starred restaurants, used as an ingredient in products such as Eli's Cheesecake vegan cheesecakes, and retailed in 10 states by Whole Foods, Mariano's and other grocers. We are currently in an expansion that includes a retail location and a new larger factory. Hopefully our new factory expansion will be up and running within the next few months. It is located just a few doors down on the same city block as the existing facility which will continue to serve as our main address.

"Thanks for all that you do at the SoyInfo Center and sharing about all the goodness of the soybean and its products. Feel free to contact either me or Jenny if you have any additional questions. Looking forward to being part of your project.

"Take care and hope you are also staying safe and well. Bob Lum.

Shurtleff asked a few more questions:

"Q1. What was the name of the business when Jenny bought it in 2006. Who owned it, how many employees, at what address? I know it existed since 25 Dec. 1986 at 5438 N. Broadway. Phone 312-784-2503.

"Ans. 1. Previous to Jenny–Phoenix Bean Products Inc. Sold as Phoenix Bean brand only. 6 employees "Currently–Phoenix Bean LLC. Sold as Phoenix Bean and Jenny's Tofu. 35 full time and 14 part time employees

"We are still at the same address on Broadway. The original owner started in 1981, but we do not have the original location before it was moved to Broadway.

"Q2. What coagulants do you you use?

"Ans. 2. "Calcium Sulfate

"Q3. What percent of your customers are Asian American? (estimate).

Ans 2. Over 60% overall.

"Q4. Where do you sell your tofu? Retail food stores (% Asian American vs Caucasian), % institutional, % restaurants, etc.

"Ans. 4. Retail 40% (60% Asian), 40% wholesalers and producers, 20% restaurants and institutions.

"Q5. What % of the Chicago tofu market do you control?

Ans. 5. Not known.

"Q6. Do you have any competition? Local vs. out of state?

"Ans. 6. Major competitors manufacture out of state–Pulmuone (Nasoya, Wildwood, etc), House Foods, Nature Soy, store brands.

Note: On Phoenix Bean's website (www.phoenixbean.com) under Products the following soyfood products are listed:

Tofu: Soft Tofu. Firm Tofu. Extra Soft Tofu. Extra Firm Tofu (white tofu).

Fried Tofu: Fried Tofu Puff. Fried Rectangle Tofu. Fried Triangle Tofu. Fried Extra Firm Tofu (fried white tofu).

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Baked Tofu: Baked Turmeric Tofu. Smoked Five Spice Tofu.

Noodles: Soybean Noodle. Sprouts Mung Bean Sprouts Soybean Sprouts

Soy Milk: Fresh Sweetened Soy Milk. Fresh Unsweetened Soy Milk.

Tofu Salads: Spicy Tofu Stir Fry. Teriyaki Tofu with Shiitake Mushroom. Asian Smoked Tofu with Chili. Chinese (Red) Peanut Tofu Salad. Thai Peanut (Green) Tofu Salad. Sweet & Spicy Tofu. Sweet & Spicy Tofu with Eggplant. Vegan Mapo Tofu. Teriyaki Shiitake Tofu. Tofu Skin (Yuba).

NEW! Jenny's Tofu Products:

Tofu: Organic Extra Firm Tofu.

Baked Tofu: Organic Baked Turmeric Tofu. Organic Smoked Five Spice Tofu.

Noodles: Organic Tofu Noodles.

Soy Milk: Organic Soy Milk (sweetened). Organic Soy Milk (unsweetened).

Tofu Salads: Szechuan Mapo Tofu. Chinese Red Peanut Tofu. Five Spice Chili Tofu. Address: Chicago, Illinois.

2069. Sim, Eun-Yeong; Kim, Hong-Sik; Park, Hye Young; Choi, Hye-Sun; Park, Jiyoung. 2020. [Studies on quality characteristics of commercial silken tofu products]. *Korean J. of Food and Nutrition* 33(5):576-83. [25 ref. Kor; eng]

• ***Summary:*** Seven types of commercial silken tofu were sampled and their physicochemical properties, including soluble solid contents, salinity, pH, total acidity, moisture contents (total solid contents), crude protein and fat contents were evaluated. The TPA results suggest that the texture of silken tofu was very different from one another according to the type of and the amount of coagulant. The commercial silken tofu showed a range of pH 5.53-6.48, total acidity of 0.12-0.32%, soluble solid contents of 2.62-5.07 ºBrix, salinity of 2.28-4.30%, and moisture contents of 87.10-92.24%, respectively. In terms of the coagulant of tofu, besides the GDL (glucono-delta-lactone), other coagulants such as MgCl2 for making silken tofu in the Korean tofu market. Address: 1-2. Researcher, Dept. of Central Area Crop Science, National Inst. of Crop Science, RDA, Suwon 16613, Korea.

2070. Choi, Duk-Kyung. 2020. [The rise of Chinese soybean jiang {*doujiang*} and the spread of soybean jiang culture on the Korean Peninsula]. *Yoksa Minsokhak* (*History and Folklore*) (*Journal of Korean Historical-Folklife*) (*The*) (*The Society for Korean Historical-Folklife Studies: Seoul*) 59:99-126. Dec. 31. [25 + 88 footnotes. Kor; eng]

• ***Summary:*** The summary in English states: Soy sauce is a fermented soybean food that leads the way in fermented foods in East Asia. It raises the possibility that the origin of soybeans was in northeastern China and the Korean Peninsula. From the perspective of the Chinese, the northeastern part of China was the production site of Long Shu [2 Chinese characters = 2 Cc] and Goguryeo beans [3 Cc] suitable for the manufacture of soy sauce. It was found that earthenware plasticization technology developed early on, and naturally towed stored fermented foods such as soy sauce without 'painting the inside of the jar' [2 cc]" such as the Zhongyuan [2 Cc] area.

"Unlike the Zhongyuan region, the records of Zengjiang [2 Cc], which means soy sauce, are handed down from various fis during the Goryeo and Joseon Periods. And the manufacturing method is well presented there. This suggests that Zhongyuan's soy sauce culture has advanced by communicating with the soy sauce class [2 Cc] on the Korean Peninsula and the salted fish [2 Cc] culture unique to the southern region.

"At the "Qiminyaoshu [4 Cc]" stage, soybeans are developed for the use of condiments that are corrosive rather than staple foods. In particular, after the Tang and Song dynasties, the milling industry developed, expanding the distribution of soy sauce, soybean oil, and tofu. In the Song Dynasty, soybeans were established as the main ingredient for the private necessities of "seven important items" [3 Cc], making them more important than the five staple grains [2 Cc]. In the Mingqing era, various kinds of soy sauce appeared, and soy sauce kimchi [2 Cc] was developed in the north and water kimchi [2 Cc] in the south, accounting for 60% of the use of soy sauce in today's Chinese diet."

Email from Prof. Choi (24 Feb. 2021): Korean jang has almost the same recipe as that for *doujang* in China. The only difference is how to make miso. As a liquid, it is used as a source for many foods.

The origin of soybean jiang [doujiang] has not been confirmed. China is said to have origins in China, but that is not clear either. My point of view is that Korea and Northeast China (in ancient times, Korean territory) were the origins of soybeans and bean paste.

The data sent (published in December 2020) is a thesis that revealed the possibility that Korea is the place of origin through archeology and literature studies.

As research continues, the origin will become clear. There are only possible hypotheses now. I will also publish a book about the origin and culture of beans this year or next year. Address: Prof., Dep. of History, Pusan National Univ. [Pusan, Korea].

2071. Arafin, Hana Akari; Hashiguchi, T.; Nagahama, K.; et al. 2020. Varietal differences in flavonoid and antioxidant activity in Japanese soybean accessions. *Bioscience, Biotechnology & Biochemistry* https://doi.org/10.1093/bbb/zbaa104 [27 ref]*

• ***Summary:*** They "examined the seed content of isoflavones, total flavonoids and total phenolics in 26 soybean accessions," 23 of which are widely consumed in Japan. Then, the antioxidant activity of each accession was examined using antioxidant responsive element (ARE)...

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The soybean "has long been conserved among plant genetic resources and there are more than 230,369 soybean accessions maintained in germplasm collections throughout the world." Address: 1. Interdisciplinary Graduate School of Agriculture and Engineering, Univ. of Miyazaki, Miyazaki 889-2192, Japan.

2072. Choi, Sang Woo; Chae, Won Gi; Kang, Gyung Young; Chung, Jong Il. 2020. Breeding of tetra null soybean (*Glycine max*) for lipoxygenase, kunitz trypsin inhibitor, lectin, and 7Sα' subunit proteins. *Plant Breeding* *

2073. Kharnaior, Pynhunlang; Tamang, Jyoti Prakash. 2021. Bacterial and fungal communities and their predictive functional profiles in kinema, a naturally fermented soybean food of India, Nepal and Bhutan. *Food Research International* 140:110055. Feb. [90 ref]
• ***Summary:*** 277 bacterial and 80 fungal species were detected in Kinema. *Bacillus subtilis*, the core bacterium, showed the maximum predictive functional profiles. *Firmicutes* was the abundant phylum in kinema samples.

Note: Doenjang (fermented soybean pastes of Korea) is mentioned 6 times in this paper, and sufu (fermented tofu from China) is mentioned 3 times. Address: Dep. of Microbiology, School of Life Sciences, Sikkim University, Gangtok 737102, Sikkim, India.

2074. Choi, Sunchu. 2021. Oilseeds and products annual–Republic of Korea. Seoul, Korea: USDA Foreign Agricultural Service. 32 p. Report No. KS2021-0004.
• ***Summary:*** "Report Highlights:

"MY [Marketing Year] 2021/22: Korean soybean production and consumption is projected to remain mostly unchanged from the prior year, amid stagnant domestic production and flat consumer demand, following a small decline in 2020/21. 2021/22 soybean imports are also expected to hold steady, after a small in increase in 2020/21. Korea resumed the use of soybean oil in biodiesel production in 2019 and soybean oil imports are expected to rise moderately over the next few years, with expanding U.S. market share. COVID-19 has created greater demand of soybean oil to produce mayonnaise for both home consumption and home meal replacement (HMR).

"Executive Summary:

"Total domestic soybean consumption in MY 2021/22 is forecast to stay around 1.39 million MT (MMT). MY 2020/21 soybean consumption is expected to stay around 1.39 MMT, down 0.9 percent from the previous year.

"MY 2021/22 soybean imports are forecast to remain unchanged at 1.3 MMT. MY 2020/21 soybean imports are expected to increase slightly (0.7 percent) to 1.3 MMT.

"The 2021 autonomous food grade TRQ is expected for release in early March 2021.

"MY 2021/22 demand for crushing soybeans will remain flat at one MMT if crushing margins remain steady.

"MY 2021/22 soybean oil imports are forecast at 450,000 MT, up five percent from the current marketing year's estimate. In MY 2020/21, soybean oil imports are expected to increase seven percent to 430,000 MT."

Note: This 32-page USDA report is a combination of many large graphs with an explanation of the contents of each. For example, Table 1 shows soybean production in Korea from Crop Year 2013 to 2021. Area (ha), yield (kg/ha), and production (MT) are given. Production has decreased from 154,067 metric tons in 2013 to 80,926 metric tons in 2020–which is only 52% of the production in 2013.

2075. Ko, Genevieve; Testani, Christopher. 2021. Sheet-pan everything: the kitchen's most unassuming piece of cookware has become a star. *Chicago Tribune* (*Illinois*). March 17. p. 5-8.
• ***Summary:*** "Yewande Komolafe uses gochujang, a Korean chile paste with a hint of sweetness, to anchor a soy-ginger sauce that caramelizes into chicken, squash and turnips as they roast." Address: The New York Times.

2076. Jang, Chan Ho; Oh, Jisun; Lim, Ji Sun; Kim, Hyo Jun; Kim, Jong-Sang. 2021. Fermented soy products: beneficial potential in neurodegenerative diseases (Open Access). *Foods* (*Basel, Switzerland*) 10(3):636. March 18.
• ***Summary:*** "Fermented soybean products, such as *cheonggukjang* (Japanese natto), *doenjang* (soy paste), *ganjang* (soy sauce), and *douchi*, are widely consumed in East Asian countries and are major sources of bioactive compounds. The fermentation of cooked soybean with bacteria (*Bacillus* spp.) and fungi (*Aspergillus* spp. and *Rhizopus* spp.) produces a variety of novel compounds, most of which possess health benefits. This review is focused on the preventive and ameliorative potential of fermented soy foods and their components to manage neurodegenerative diseases, including Alzheimer's and Parkinson's diseases." Address: 1. School of Food Science and Biotechnology, Kyungpook National University, Daegu 41566, Korea.

2077. Song, Da Hye; Chun, Byung Hee; Lee, Sunmin; Don, Su Young; et al. 2021. Comprehensive metabolite profiling and microbial communities of *doenjang* (fermented soy paste) and *ganjang* (fermented soy sauce): a comparative study (Open Access). *Foods* (*Basel, Switzerland*) 10(3):641. March 18. [5 ref]
• ***Summary:*** "Doenjang and ganjang are secondary fermented soybean products from meju (primary fermented product) following a complex fermentation process that separates the products into solid (doenjang) and liquid (ganjang) states. We performed a comparative study on gas chromatography mass spectrometry-(GC-MS) and liquid chromatography mass spectrometry-(LC-MS) based metabolite profiling with fungal and bacterial

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microbial community analysis of doenjang and ganjang during fermentation..” Address: 1. Dep. of Bioscience and Biotechnology, Konkuk Univ. Seoul 05029, Korea.

2078. Kim, Il-Sup; Kim, Cheorl-Ho; Yang, Woong-Suk. 2021. Physiologically active molecules and functional properties of soybeans in human health–a current perspective (Open Access). *International J. of Molecular Sciences* 22(8):4054. April 14. 26 p. [205 ref]

• ***Summary:*** “Abstract: In addition to providing nutrients, food can help prevent and treat certain diseases. In particular, research on soy products has increased dramatically following their emergence as functional foods capable of improving blood circulation and intestinal regulation. In addition to their nutritional value, soybeans contain specific phytochemical substances that promote health and are a source of dietary fiber, phospholipids, isoflavones (e.g., genistein and daidzein), phenolic acids, saponins, and phytic acid, while serving as a trypsin inhibitor. These individual substances have demonstrated effectiveness in preventing chronic diseases, such as arteriosclerosis, cardiac diseases, diabetes, and senile dementia, as well as in treating cancer and suppressing osteoporosis. Furthermore, soybean can affect fibrinolytic activity, control blood pressure, and improve lipid metabolism, while eliciting antimutagenic, anticarcinogenic, and antibacterial effects. In this review, rather than to improve on the established studies on the reported nutritional qualities of soybeans, we intend to examine the physiological activities of soybeans that have recently been studied and confirm their potential as a high-functional, well-being food.” Address: 1. Advanced Bio-resource Research Center, Kyungpook National University, Daegu 41566, Korea.

2079. *SoyaScan Notes.* 2021. Types of White Rose miso, a brand of Keepwell Vinegar (Overview). April 21. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** All are sold in 9-oz. glass jars. 1. White Miso. 2. Benne Miso. 3. Gochujang [Korean red-pepper paste]. 4. Farro Miso. 5. Black Walnut miso. 6. American Runner peanut miso. 7. Sunchoke miso.

Note: Keepwell is located in Dover, 8 miles southwest of York, Pennsylvania. The company started in early 2016. It was founded by Isaiah Billington and Sarah Conezio, who met as pastry chefs at a restaurant.

2080. Uyehara, Paul. 2021. Re: Another look at the tofu industry and market in Hawaii. Letter (e-mail) to William Shurtleff at Soyinfo Center, May 17.

• ***Summary:*** Q1. The biggest surprise for me in your last email was to learn that your main competition comes from brands of tofu made on the mainland. House Tofu (started by Mr. Shoan Yamauchi) is probably one of them.

Ans: House (Hinoichi) is our main competitor. When Mr. Yamauchi was running the company, he promised to never enter the Hawaii market (perhaps out of deference to his brother at A’ala Tofu). Once they were taken over by HouseFoods, they entered the Hawaii market immediately.

Q2. What are the main brands of tofu made on the mainland and sold in Hawaii, in descending order of importance?

Ans: I would say the following (loosely in descending order–the top two are the majority): Hinoichi (House Foods). Pulmone (A Korean brand). Azumaya. White Wave. Morinu (Morinaga) and Kikkoman (the aseptic pack tofus). Whole Foods and Don Quijote/Marukai have their own private label tofus, but probably made by the major tofu manufacturers.

Q3. What percentage of the tofu market in Hawaii would you guess these tofu brands made on the Mainland command?

Ans: Not sure, but I would guess around 70-80%. Address: President, Aloha Tofu Factory.

2081. Mao, Chi Tzeng. 2021. Re; His work with Mrs. Cheng’s Soybean Products and Toyohara Soybean Products, Inc. Letter (e-mail) to William Shurtleff at Soyinfo Center, May 19–in reply to questions.

• ***Summary:*** “First, thank you for those years you are promoting soybean products for the human consumption. It’s not only good for the global environment, but also helping the soybean related business.

“To answer your questions:

“1. We took over the business from Mr. Cheng on August 1, 1984. We moved to Hawaii from Taiwan in May, 1984.

“2. Our company’s name: Toyohara Soybean Products, Inc.

“dba Mrs. Cheng’s Soybean Products.

“3. Yes, our company is incorporated.

“4. Our products at present: Tofu (Regular Tofu, Soft Tofu and Nigari Tofu) all traditional hand-made style. Soymilk (Plain Soymilk, Maple Soymilk in a variety of sizes). Soycheese [savory baked tofu]. Special Order for: Traditional (Chinese) Tofu Pudding, Korean style Soon Tofu.

“5. About 75% of our sales go to restaurants (depends on the season).

“6. We are trying to use the highest grade ingredients as available. If the Pharmaceutical Grade in unavailable, we use Food Grade.

“7. I agree that the three largest makers of soyfoods in the Hawaiian Islands are Aloha Tofu Factory Inc., Mrs. Cheng’s Soybean Products, and A’ala Tofu Factory.

“8. The first thing I want our company to be is the most Unique, not the size or volume of sales. There were about 8 tofu manufactures in Oahu in 1984. We were the 7th or so smaller sales. The local consumption of tofu was small too. Both of us had a pharmaceutical background and working for a major medicine manufacturer for years. Food

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and medicine are related. So there is no problem for us to upgrade the equipment. For our equipment: they are special, custom design and made by the Japanese tofu machinery for us, it took more than a year from design, modify, redesign and modify so many times. We request the Tofu products keeps 'Hand Made' style, so the production isn't as fast as the mass production. That's why our products take more time and material to make. I would said we are small compared to the big guys." Address: President, Mrs. Cheng's Soybean Products.

2082. Choi, Sang Woo; Kang, Jae Eun; Lee, Seong Kyeong; Ly, Sarath; Chung, Jong Il. 2021. Breeding of black soybean with green cotyledon and four recessive alleles for lipoxygenase, Kunitz trypsin inhibitor, lectin, and stachyose (Open Access). *Agronomy* (*Basel*) 11(2):309. doi:10.3390/agronomy11020309

• ***Summary:*** "Anthocyanins from the black soybean seed coat are known to have many pharmaceutical effects. However, black soybean seed contains antinutritional factors such as lipoxygenase, Kunitz trypsin inhibitor (KTI), lectin, and stachyose. The genetic removal of these components will improve the nutritional value of black soybean seed... The soybean line with the black seed coat color, the green cotyledon color, a large seed size, and tetra recessive alleles has purple flowers, a determinate growth habit, and brown pods at maturity. The stem height of the breeding line was 52.3 cm. The 100-seed weight of the breeding line was 35.2 g and the yield (Ton/ha) was 2.50. The stachyose content of the breeding line was 3.30 g/kg. This is the first soybean strain with the black seed coat color, the green cotyledon color, a large seed size, and tetra null alleles (lox1lox2lox3/lox1lox2lox3-ti/ti-le/le-rs2/rs2, low content of stachyose, free of lipoxygenase, KTI, and lectin proteins)." Address: Dep. of Agronomy, Gyeongsang National Univ., JinJu 52828, Korea.

2083. Kim, See Hun; Kang, S.A. 2021. [Antioxidant and anti-diabetic activities of soybean fermented with *Monascus*]. *Korean J. of Food and Nutrition* 34(2):187-95. [39 ref. Kor; eng]

• ***Summary:*** "The DPPH radical scavenging activity of soybean fermented with Monascus was significantly increased compared to that of soybean... These results suggest that soybean fermented with *Monascus* has the potential to be used as a beneficial ingredient with antidiabetic and antioxidant effects."

Note: "DPPH free radical scavenging is an accepted mechanism for screening the antioxidant activity of plant extracts. In the DPPH assay, violet color DPPH solution is reduced to yellow colored product, diphenylpicryl hydrazine, by the addition of the extract in a concentration dependent manner." Address: Ph.D. Student, Dep. of Convergence Technology, Graduate School of Venture, Hoseo Univ., Seoul 06724, Korea.

2084. Spots at front of book: History of soybeans and soyfoods in Japan. 2021.

• ***Summary:*** (a) Graph of soybean production in Japan, 1878-1984. Soybean production in Japan was first recorded in 1878. From that date until its all-time peak in 1920, it climbed steadily.

In 1905, after the Russo-Japanese War (1904-05), victorious Japan, through the Treaty of Portsmouth, became the lessee of the Kwantung Leased Territory (1,337 square miles), the southernmost point of Manchuria. It contained the greater part of the southern branch of the Chinese Eastern Railway, which is now known as the South Manchuria Railway. This was Japan's first foothold on Manchuria.

In 1910 (Aug. 22) Japan annexed Korea as Chosen, a colony; this harsh domination lasted until 1945–the end of World War II.

After about 1910, Japan started to import small but steadily increasing amounts from Korea and Manchuria. These imports finally became so large that they led to a decrease in soybean production in Japan.

1931–"Manchurian Incident," also called the "Mukden Incident" took place on the night of 18 September 1931. A bomb exploded on the tracks of the Japanese railway north of Mukden. Japanese Colonel ordered a full-scale attack against the Chinese troops in Mukden, and General Honjô, hearing of the crisis, called out the whole Kwantung Army–which proceeding to take over Manchuria.

By early 1932 the conquest of all Manchuria had been completed. In March 1932 Manchuria was proclaimed an independent state named Manchukuo or Manchoukuo under the last Ch'ing ruler (P'u-yi).

The Lytton Commission of the League of Nations visited Manchuria in the spring of 1932 and condemned Japan as an aggressor. The report was adopted by the League of Nations, from which Japan withdrew in protest the following year. Japan was now in control of Manchuria, the world's greatest producer of soybeans.

1941–Japan attacks Pearl Harbor; soybean production plummets during the war. But it quickly climbed after Japan surrendered in 1945 and imports from the USA began.

2085. Spots at front of book: History of soybeans and soyfoods in Korea. 2021.

• ***Summary:*** Various maps of Korea. (a-b) Photos of kongnamul (Korean-style soybean sprouts) and kongnamul bap (soybean sprouts on rice dish). (d) Traditional Korean meju (soybean koji). (e) Korean women using meju to prepare kanjang (soy sauce). (f) Jars with doenjang fermenting (Korean-style soybean paste). (g-h) Gochujang (red pepper and soybean paste). (i) Soon dubu (Korean-style tofu curds). (j) Korean tubu (tofu). (k-l) Korean soymilk. (m) Ham Sok Hon–a Korean saint. (n-o) Korean soy sauce in the snow and in traditional jars fermenting. (p) Hand

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turned stone mill for making tofu. (q) Korean fried tofu (Tofu BuChim). (r-s) Regular sliced Korean tofu. (t) Korean soon dubu (tofu). (u-v) Cheonggukjang (Korean-style natto). (w) Kongnamul gook (Korean soybean sprout soup). (x) A Korean girl holding a package of soymilk next to her cheek. (y) A package of Korean soymilk. (z) The provinces of South Korea.

2086. Spots: Roasted soy flour (kinako). 2021.
• ***Summary:*** (a) Nestlé KitKat Kinako Ohagi, a traditional Japanese confection coated with roasted soy flour (kinako). (b) Kinako in a bluish-white Japanese bowl. (c) Rounds of mochi dango coated with roasted soy flour. (d) Two skewered mochi dango coated with kinako. (e) In Korean *k'ongaru, k'ong karu, konggaru* ("roasted soybean powder") is widely used to cover rice cakes (mochi). (f-g) It can be found at most Korean grocery stores. (h) In Indonesian *Bubuk kedele* means roasted soy flour. (i-j) Sari Bubuk Kedelai (from Indonesia). (k-l) *Bubuk kedele* as a coating for mochi (pounded rice cakes) in Indonesia. (m-n) Two views of Japanese kinako. (o) Sifting kinako. (p-q) Two bags of Shirakiku kinako from Japan. (r) Korean konggaru. (s) A Korean woman coating a food with *konggomul* (roasted whole soy flour). (t) Indonesian lontong (rice steamed in banana leaves, sliced and served topped with *bubuk kedelai*). (u-w) Kinako in Japanese hiragana. (x) Three ways of writing kinako in Japanese. (y) Kinako Latte written on a restaurant blackboard. (z) Kinako on a red tray.

2087. Spots: Soy sprouts. 2021.
• ***Summary:*** (a) Mature soy sprouts in a bamboo basket. (b) Cooked soy sprouts served with chopsticks. (c) Vigorous soy sprouts growing. (d) A bag of Korean soy sprouts. (e) Soybeans sprouting in a sprouter. (e-f) A background of soybean sprouts. (g-i) Kongnamul Korean soybean sprout dish. (k-l) More background of soy sprouts.

2088. *SoyaScan Notes.* 2021. Soyfoods historical research and writing wish list; we would strongly prefer that each of these be written in English (Overview). Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** 1. Early history of Chinese soyfoods companies and products in America and Europe. Especially Chinese tofu manufacturers in San Francisco and Los Angeles from 1850 to 1910.

2. Statistics on soyfoods in China during the 1980s.

3. The Swedish trading mission in Canton during the 1700s and 1800s and its work with soy sauce.

4. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in China written by a Chinese.

5. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in Japan written by a Japanese.

6. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in Korea written by a Korean.

7. A history of the health foods industry in America, 1930-1980.

8. A book on mochi or how mochi came to the West, with a clear chronology of commercial mochi manufacturers in the western world.

9. A scholarly history (with an extensive bibliography) of each of the following soyfoods in Japan, written by a Japanese with a long-term involvement in the field: natto, miso, shoyu, tofu.

10. Explain why Linnaeus stated in *Hortus Cliffortianus* (1737, p. 499) that the soy bean was grown in the colony of Virginia in North America.

11. A lengthy, scholarly history (with a good bibliography) of Chinese growing and processing soybeans in California. They must have grown them between 1849 and 1899! (13 Sept. 1991)

12. Visit the best libraries and centers in Germany for doing research on soybeans and soyfoods (See #37465) and try to get missing old documents.

13. Try to document the statement that the soybean was used as a coffee substitute during the Civil War in the USA (1861-1865).

14. Use the Coker family archives in South Carolina to write a history of the company's pioneering work with the soybean.

15. A history of early experimental gardens such as those that the Portuguese developed on the Cape Verde Islands, the British at Kew, Nairobi, Singapore, and the colony of Georgia (the Trustees' Garden of Georgia, a government experimental farm at Savannah, laid out in 1733), the Spanish (under Cortez / Cortés) in today's Mexico, etc. Did soybeans appear in any of them? When did they first appear in each?

16. Learn much more about Korean natto. Did it exist in Korea before Korea became a Japanese colony? Try to find some references, as in early studies of food in Korea. How widely was it made and used? Try to find some estimates of annual production. How was it served? What was its distribution in Korea in 1900? 1950? 2000?

17. A scholarly biography of Clifford E. Clinton of Los Angeles.

18. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in the Soviet Union (USSR) written by a Russian speaker with a long and deep familiarity of the subject.

19. When and where were soybeans first grown in Iceland. Did they mature? Produce seeds. Did the first soybeans in Iceland come from Sven A. Holmberg of Sweden? Who was in charge of the soybean trials in Iceland?

2089. *SoyaScan Notes.* 2021. The languages and writing

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systems of East Asia, including Korea, China, and Japan (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** According to *East Asia: The Great Tradition*, by Reischauer and Fairbank (1960, p. 15-18), the two main language groups of East Asia are the Sinitic (or Sino-Tibetan, the largest group) and the Altaic. Within the Sinitic group, Chinese is by far the largest and historically the most important subdivision. The main Sinitic languages inside China are Mandarin, Wu (near Shanghai), Kan, Min (near Fukien / Fujian), Hsiang, Cantonese, Miao-Yao (southwest China), and Tibetan. Note that these are different enough from Mandarin to be considered virtually independent languages rather than dialects. Sinitic languages outside China include Burmese, Thai, Vietnamese.

The three major Altaic languages (named after the Altai Mountains in Mongolia) are Mongolian, Turkish (in the west), and Tungusic (in the far northeast). Peoples speaking Altaic languages, unlike the agriculturist Chinese, were nomads. "Korean and Japanese show close structural resemblances to the definitely Altaic languages, and the Koreans and Japanese may, therefore, be two eastern extensions of Altaic-speaking people into predominantly agricultural areas."

Concerning the Korean writing system, in the late 600s (7th century), a system called idu, using Chinese characters for phonetic purposes was developed as an aid to rendering Chinese texts into Korean. Though never extensively used, it was the beginning of Korea's native writing system. In the mid-1400s an excellent phonetic system for writing the Korean language was developed by the ruler named Sejong. Originally known as onmun ("vernacular writing") but known today as han'gul ("Korean letters") it was officially adopted by royal decree in 1446. "Han'gul is perhaps the most scientific system of writing in any country... Finally, the advantages of an alphabetic script and a syllabary (in which each symbol represents a whole syllable) are combined by bunching the individual letters into syllabic groups" (p. 435-36). [Note: the bunching makes use of a word processor more difficult than the linear alphabetic Indo-European languages]. Although han'gul was simple, it was little used during the next 5 centuries; scholars emphasized the Chinese written language. "It was not until after the liberation of Korea from Japanese rule in 1945 that han'gul came into its own as the primary method of writing in Korea."

In Japan, the development of purely phonetic scripts (called the Kana Syllabaries, hiragana and katakana) arrived in the early 800s and were attributed to Kôbô Daishi (Kûkai), Japan's most beloved and best known Buddhist saint, who founded the Shingon sect in Japan in about 806 and built his monastic headquarters atop Mt. Koya in 816. "The development of the kana was no doubt influenced by the Sanskrit studies of Buddhist monks and their knowledge of the alphabets of India. The kana, however, did not constitute alphabets but were syllabaries, in which the symbols represented whole Japanese syllables, which at that time invariably consisted of one of the five vowels (a, i, u, e, o) usually preceded but never followed by a consonant. Thus they required a minimum of 47 different symbols, instead of the 14 that would have sufficed to write 10th century Japanese with an alphabet... Thus hiragana and katakana constituted a less simple and flexible system than an alphabet would have provided."

2090. *SoyaScan Notes*. 2021. The best libraries for Asian-American studies in California (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** Mr. Seizo Oka of San Francisco, whose life work is writing a history of Japanese in America, has built an excellent library of documents on this subject. These archives have many early documents including America's best collection of early Japanese-American City Directories. Mr. Oka used to work for Bank of Tokyo, renamed Bank of California, and his project was part of the California First Bank History Project. The bank provided him with financial support. But they withdrew their support in late 1989, and on 15 Dec. 1989 the library had to be closed. But, with community support, it was reopened in Dec. 1990 in a new room at the same location: History Archives of the Japanese Cultural & Community Center, 1840 Sutter St., #206, San Francisco, CA 94115.

The second library is the Japanese-American Library, located at 1619 Sutter St, on Octavia & Sutter on the entire ground floor (1,500 square feet) of Hinode Towers (P.O. Box 590598, San Francisco, CA 94159. Phone: 415-567-5006). The director, Karl Matsushita, a graduate of UCLA in his mid- to late-40s, has collected for 20 years. Founded in 1969 (at the time of student demands for Ethnic Studies Programs) by Karl and a group named Center for Japanese-American Studies from Ethnic Studies Program, it became independent from the group in 1985. The library has at least 10,000 documents, lots in boxes, mostly post-war. They have no early city directories. The pre-war material is mostly in English. They have little or no information on soyfoods. They are planning to computerize the library to make it compatible with the University of California at Berkeley, Stanford, and Harvard-Yenching libraries. In the meantime they are typing 3x5 catalog cards for their documents.

Two libraries at the University of California have excellent, large collection of documents, many very early and many archival, on Chinese and Japanese in America. The Bancroft Library focuses on the far western USA. The Asian American Studies Library is more nationwide in scope. Its holdings include monographs, serials, theses and dissertations, conference papers, student research papers, and non-print media. It is the best source of Chinese-American documents in California. Many documents came from the Chinese Historical Society in San Francisco. Unfortunately

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no one on the staff can read or speak Japanese none of their Japanese-language documents can be cataloged.

A major library is found at the Asian-American Studies Center at UCLA; it is complemented by the East Asian Library at UCLA, which has mostly Asian-language materials. Hosokawa (1969) notes that "the Japanese American Citizens League, a nationwide organization of fewer than 25,000 members, launched in 1962 what was called the Japanese American Research Project. Funds were contributed by members and other interested persons and $100,000 presented to the University of California at Los Angeles. UCLA in turn undertook to seek out and preserve documentary materials and gather and analyze information relating to the Japanese Americans. Despite its modest scale this research project proved to be of sufficient academic and sociological interest that the Carnegie Corporation and the National Institute of Mental Health, a federal agency, provided grants for detailed studies into specific contributions by Japanese Americans to the American way of life." A number of independent papers, both popular and scholarly, have resulted from this project.

Another interesting group, which has no library, is the Center for Japanese-American Studies.

2091. *SoyaScan Notes.* 2021. Chronology of Korea. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1st century B.C.–Recorded history began.

688 A.D.–The country was united in a kingdom under the Silla dynasty. It was at times associated with the Chinese empire.

1592-98–Invaded by Japanese under Hideyoshi.

About 1637 shut out foreign contacts.

1876–Forced to grant treaty ports to Japan, which recognized Korean independence. 1894-95–Sino-Japanese war caused by Korea uniting with Japan in a time of internal disorder in order to resist Chinese interference (Korea was considered a Chinese vassal). The treaty that concluded this war recognized Korea's complete independence.

1904-04–Russo-Japanese War caused in part by rivalry between Russia and Japan over Korea.

1907–Became a Japanese protectorate.

1910–Japan forcibly annexed Korea as a province called Chôsen.

1945 July–At the Potsdam conference, the 38th parallel was designated as the line dividing the country into two zones of occupation: Russian in the north and American in the south.

1945 Aug. 10–Russian troops enter Korea. Aug. 15–Korea celebrates Victory over Japan Day, which liberated Korea from colonial rule. 1945 Sept. 8–U.S. Troops enter Korea. The Soviet military organizes socialists and communists and blocks efforts to let the Koreans unite their country.

1948 May 1–North Korea declares independence. The Democratic People's Republic of Korea founded in north Korea; its capital is P'yongyang. 1948 May–The South Koreans declare independence and form the Republic of Korea with Seoul as the capital. Dr. Syngman Rhee is chosen president. 1948 Aug. 15. South Korea gains independence. Freed from Japanese control upon defeat of Japan at the end of World War II.

1950 June 25–Over 60,000 North Korean troops invade South Korea in a surprise attack, starting the Korean War. The North is the stronger state, both industrially because of its mineral and hydro-power resources, and militarily because of Soviet armament for offensive warfare. The attack is immediately condemned by the United Nations Security Council. June 27–The U.S. under president Truman, backed by the United Nations Security Council, sends in Air Force and Naval troops under the unified command of General Douglas MacArthur. Troops from many countries in the United Nations join the fight. June 30–Truman approves air and ground strikes against the north.

1950 Sept. 15–General Douglas MacArthur launches a surprise amphibious invasion of Korea at Inchon, South Korea, behind the North Korean Army's lines. The battle of Inchon resulted in a decisive victory and strategic reversal in favor of the United Nations (UN). The operation involved some 75,000 troops and 261 naval vessels, and led to the recapture of the South Korean capital, Seoul, two weeks later.

1951 April 11–General MacArthur's increasingly public disagreement with the fixed American policy of no more than a limited war led to his dismissal by President Truman. 1951 July–Truce talks begin at Panmunjom, but drag on for 2 years (due to Stalin's stalling tactics) while sporadic fighting continues.

1953 July 27–After 3 years of fighting, an armistice is signed. A closed border at about the 38th parallel is established. U.S. troops remain in the south, and U.S. economic and military aid are continued. War casualties were: Chinese about 900,000, North Korean 520,000, South Korean 300,000, American 142,000 (the 4th largest in U.S. history).

1960 April 26–A movement spearheaded by college students forces the resignation of president Syngman Rhee in South Korea.

1961 May 16–In an army coup, General Park Chung Hee becomes chairman of the ruling junta. In 1963 he is elected president. A 1972 referendum allows him to be reelected for 6-year terms unlimited times. 1979 Oct. 26–Park is assassinated by the chief of the Korean CIA.

2092. *SoyaScan Notes.* 2021. Definition of soy sprouts (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** Soy sprouts (also called soybean sprouts) are whole soybeans that have been soaked in water and allowed

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to sprout or germinate for 4 to 7 days, at which point a 3-to-5-inch-long sprout (hypocotyl) will be attached to each bright yellow soybean. Soy sprouts are easily grown at home at any time of year. Though not as popular or widely available in the United States as mung bean sprouts or alfalfa sprouts (except at Korean-American grocery stores), soy sprouts are nevertheless an excellent source of nutrition, packed with protein, vitamin C, and isoflavones. They are also one of the world's best diet foods, containing less calories per gram of protein than any other known vegetable food. Soy sprouts must be cooked before serving. Try using them as a green vegetable year-round, parboiled in fresh salads or soups, or in stir-fried, sauteed, or baked dishes. Address: Soyinfo Center.

An asterisk (*) at the end of the record means that SOYINFO CENTER does not own that document. A plus after eng (eng+) means that SOYINFO CENTER has done a partial or complete translation into English of that document. An asterisk in a listing of number of references [23* ref] means that most of these references are not about soybeans or soyfoods.

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Jacob Hartz Seed Co. (Stuttgart, Arkansas). Founded by Jacob Hartz, Sr. (1888-1963) in 1942. Continued by Jake Hartz, Jr. (1920- ). Acquired by Monsanto in April 1983. Headquarters at Des Moines, Iowa, since Jan. 1998 935, 966, 1137, 1308, 1353, 1413, 1526

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Jiang (Chinese-Style Fermented Soybean Paste), Made with a Significant Proportion of Wheat or Barley 1822

Jiang–Chinese-Style Fermented Soybean Paste / Miso (Soybean Jiang {doujiang} or Chiang / Tou Chiang [Wade-Giles]). Includes *Tuong* from Indochina, Tao-Tjiung and Tao-Tjiong from Indonesia 1, 26, 95, 113, 127, 178, 195, 328, 405, 515, 784, 785, 799, 800, 801, 811, 812, 898, 907, 922, 1040, 1090, 1096, 1119, 1160, 1192, 1212, 1231, 1271, 1294, 1340, 1342, 1459, 1518, 1526, 1547, 1570, 1584, 1666, 1687, 1688, 1822, 1839, 1879, 1880, 2070

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Kecap manis. *See* Soy Sauce, Indonesian Sweet, Kecap Manis / Ketjap Manis

Kefir, soy. *See* Soymilk, Fermented–Soy Kefir

Kellogg Co. (breakfast cereals; Battle Creek, Michigan). *See* Kellogg, Will Keith,... Kellogg Company

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Kin, Yamei. *See* Yamei Kin (1864-1934)

Kinako. *See* Roasted Whole Soy Flour (Kinako–Dark Roasted with Dry Heat, Full-Fat) and Grits

Kinema (Whole Soybeans Fermented with *Bacillus subtilis* strains from Eastern Nepal, Darjeeling Hills, Sikkim, and South Bhutan). Occasionally spelled Kenima. Close relatives are from Northeast India are: *Aakhone*, *Akhoni*, *Akhuni* (Nagaland), *Bekang* (Mizoram), *Hawaijar* (Manipur), *Peruyyan* (Arunachal Pradesh), *Tungrymbai* (Meghalaya) 740, 986, 1181, 1182, 1192, 1231, 1342, 1364, 1371, 1499, 1519, 1584, 1605, 1606, 1623, 1639, 1664, 1712, 1763, 1814, 1847, 1876, 1878, 1880, 1905, 1908, 1961, 1994, 2055, 2073

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Kloss, Jethro (1863-1946) and his Book *Back to Eden* 1493

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Koji (Cereal Grains {Especially Rice or Barley} and / or Soybeans Fermented with a Mold, Especially *Aspergillus oryzae*) or Koji Starter. Chinese *Qu* / Pinyin or Ch'ü / Wade-Giles 1, 23, 28, 54, 61, 72, 86, 92, 113, 421, 477, 512, 525, 568, 593, 598, 636, 640, 663, 691, 740, 800, 808, 809, 811, 839, 896, 929, 936, 964, 980, 1011, 1015, 1032, 1039, 1040, 1049, 1060, 1081, 1100, 1160, 1171, 1176, 1192, 1231, 1293, 1307, 1342, 1371, 1459, 1499, 1518, 1526, 1570, 1584, 1595, 1705, 1716, 1875, 1980

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