WILLIAM JOSEPH MORSE - HISTORY OF HIS WORK WITH SOYBEANS AND SOYFOODS (1884-2017):

EXTENSIVELY ANNOTATED BIBLIOGRAPHY AND SOURCEBOOK

Including Palemon Howard Dorsett

Compiled

by

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SOYINFO CENTER

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DEDICATION AND ACKNOWLEDGMENTS

This book is dedicated to William Joseph Morse, the father of soybeans in the United States.

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...

Of the many libraries and librarians who have been of great help to our research over the years, several stand out:

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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.

INTRODUCTION

Brief chronology/timeline of William J. Morse and his work with Soybeans and Soyfoods. Including Palemon Howard Dorsett.

1884 May 10 – William Joseph Morse is born in Lowville, New York, the son of John Baptist Morse (a butcher shop owner) and Lena Kirschner. He attends Lowville Academy (high school) there; a good athlete, he plays on the football team.

1905 – Dr. Charles V. Piper becomes head of USDA's Office of Forage Crop Investigations at the time of its founding.

1907 June 20 – Morse graduates with a BS in Agriculture (BSA) degree from Cornell University. In the College of Agriculture he did considerable field work on the Agronomy Farm. His thesis was about the impurities of grass and clover seeds.

1907 June 22 – Morse, age 24, goes to work as an "Agrostologist" for the U.S. Department of Agriculture, in the Division of Forage Crops and Diseases, Bureau of Plant Industry in Washington, DC – just at the time the division was planning to expand its research on soybeans. Recommended by Thomas F. Hunt, he was hired by the head of the division, Charles Vancouver Piper (age 40), the first man to see clearly the potential of the soybean in America. Piper was to have an immense influence on the rest of Morse's life. For the first year, the position paid $900 a year. Morse's first work included growing and testing soy beans at the Arlington Farm, across the Potomac River in nearby Virginia. Yet until 1931 he was also responsible for research on and writing about other forage crops such as cowpeas, kudzu, velvet beans, etc. Continuing his athletics, he rows with a local crew.

1909 March 24 – Piper sends Prof. A.T. Wiancko at the Ag. Experiment station in, Lafayette, Indiana, and to Dr. G.C. Hopkins at the corresponding station in Urbana, Illinois, a list of 186 varieties of soybeans grown at Arlington Farm. Piper hopes that each man will order varieties, test them at their respective stations, then report the results to Piper and Morse.

1909 April – A new U.S. domestic soybean variety is named "Morse." It is yellow seeded with an olive yellow hilum (PI 19186). It was introduced by Frank N. Meyer, USDA agricultural explorer.

1909 – A total of 16,385 bushels of soybeans are produced on 1,629 acres in the United States (Bureau of the Census, 1913, p. 626).

1909 Oct. 7 – C.V. Piper and H.T. Nielsen publish a 26-page article titled "Soy beans" in *Farmers' Bulletin* (USDA) No. 372. This is Piper's earliest known publication on soy beans. It includes a description of 12 named soy bean varieties, and states: During the past 3 years more than 200 soy bean varieties have been introduced from China, Japan and India; most of these have already been sufficiently tested to give some idea of their value.

1910 Dec. 31 – C.V. Piper and W.J. Morse publish "The soy bean: History, varieties, and field studies," and 84 page article in *USDA Bureau of Plant Industry Bulletin* No. 197. The earliest publication seen written jointly by Piper and Morse, and the earliest document seen written by or about Morse in connection with soybeans, it also the most important document ever published on early soybean varieties, and early soybean history, in the United States. However it contains no mention of food uses.

1910 – W.J. Morse joins the American Society of Agronomy. He was active in its affairs and was elected a Fellow in 1946.

1911 Aug. 22 – In a letter to his superior R.A. Oakley, Morse describes his plans to visit the state experiment stations in North Carolina, then Urbana, Illinois, then Lafayette, Indiana [Purdue] on behalf of soybeans. His first such trip was apparently to Florida and Alabama.

1911 – Dr. C.V. Piper travels to India and, among other things, sends back to the United States 108 varieties of soybeans from different parts of the country.

1911 Sept. 20 – William Morse and Edna Blanche Siggers are married in Washington, DC at the Church of the Advent. They rent an apartment at 158 U St., N.W., Washington, DC. They live here until 1917, when they buy a home at 6809 Fifth St., N.W., Takoma Park, D.C.

1912 June 6 – W.J. Morse writes his first solo article: "The soy bean; a valuable leguminous crop for the North," in *Tribune Farmer* (New York); p. 1-2.

1913 Sept. – Morse visits Purdue University to learn and teach about soybeans. Each year after this, in the spring, summer, and fall, Morse travels to visit agricultural experiment stations, farmers, and soybean processors (including manufactures of food products) to disseminate new and promising soybean varieties, learn and teach about

soybeans – and to renew friendships and make new friends for the soybean and for himself. His most frequent early visits are to Indiana, Illinois, North Carolina, Ohio, Iowa, and Tennessee.

1914 April – Dr. C.V. Piper writes a long article titled "The name of the soy bean: A chapter in its botanical history" in the *Journal of the American Society of Agronomy* in which he gives the soy bean the scientific name *Soja max*. Thus, the name of the plant was thereafter cited as *Soja max* (Piper). Although the soy bean was given its present scientific name (*Glycine max* (L.)) in 1917 by Merrill, it took a long time to be accepted. So Piper's name was used well into the 1940s.

1914 Aug. 2 – The *Washington Post* reports: "W.J. Morse, bureau of plant industry, will leave this week for points in Virginia, the Carolinas, Georgia, Alabama, Mississippi, Louisiana, Tennessee, and Kentucky to inspect experiments in the culture of cowpeas, soybeans, and other forage plants."

1914 Dec. 4 – Morse writes Prof. Piper: "During my trip to the soy bean district of eastern North Carolina this past fall, I learned that the Southern Cotton Oil Mill, of Elizabeth City, North Carolina, conducted experiments in the fall of 1913 with soy beans as an oil proposition… No doubt by getting in touch with the mill at Elizabeth City, Mr. Dillon could obtain complete information on the experiment."

1917 April 6 – United States enters the European War (Great War; World War I) by declaring war on Germany. Almost overnight, the soybean becomes important as source of flour (especially as an extender for wheat flour) and oil, and as a meat alternative.

1917 – An estimated 460,000 acres of soybeans are grown in the United States in 17 states; this is probably double the acreage of 1916 (Oakley 1918, p. 523-25).

1918 early – Morse writes "The soy-bean industry in the United States" in the *Yearbook of the U.S. Department of Agriculture* (p. 101-111). In the section titled "Soy beans for human food," he discusses dried soy beans, green beans [edamame], soy-bean milk, soy-bean cheese [tofu], soy sauce, and soy-bean sprouts. In a separate section: soy bean flour and meal.

1918 July – Morse writes "The soy bean: Its culture and uses," in *Farmers' Bulletin* (USDA) No. 973 (32 p.). For the first time he writes extensively about food uses of soybeans, and the growing interest in soybean foods.

1920 Aug. 31 – Morse writes Prof. Piper from Champaign, Illinois. "My trip this far has been one of the best soy bean trips I have ever experienced. It is remarkable how interest in the soy bean has increased throughout the northern and central states. It is rather gratifying to note how the varieties sent out by our office are taking hold. The Virginia especially is coming into favor… Thursday I leave with Prof. Hackleman by auto for Camden, Indiana, for a visit to the famous soy bean farms of the Fouts Bros. They call it 'Soyland.'"

1920 Sept. 3 – The National Soybean Growers' Association (renamed American Soybean Association in late 1925) is founded at the farm of Taylor Fouts (named Soyland), in Camden, Carroll Country, Indiana. One thousand people from six states are present at the first "Corn Belt Soy Bean Field Day & Conference." W.J. Morse was there, seated on the platform, and was ever after considered one of the founding members. The organization was formalized later that year at a business session held in Chicago, Illinois, during the International Livestock Exposition and the International Hay and Grain Show.

1923 Feb. – *The Soybean*, by C.V. Piper and W.J. Morse (xv + 329 p.) is published by McGraw-Hill Book Co. in New York. This classic is the most important book on soybeans and soyfoods published up to that time. It is impossible to overestimate the significance of this work. It contains a 40-page chapter with 26 photographs from East Asia on soybean products for human food, an additional 20 pages of Western-style soyfoods recipes (developed for Morse by the USDA Office of Home Economics in Washington, DC), and a very valuable bibliography containing 563 entries on all aspects of the soybean, worldwide.

1923 Dec. 6 – W.J. Morse, USDA, is elected president of the American Soybean Association (ASA) for one year (1923-24) at the annual winter meting in Chicago, Illinois. He was also elected chair of the "Soybean nomenclature" committee, and chair of the subcommittee on soybean variety registration He was elected president again in 1925 and in 1931. He was a mainstay of support of the ASA from 1920 until his retirement from USDA in 1949.

1924-1926 – P.H. Dorsett (with his son, Jim) leads a very important agricultural expedition to East Asia, especially China and Manchuria. He "brought together the largest collection of soybean varieties ever made" (*Washington Post*, 11 July 1936). Moreover, several of these varieties became ancestors of the most widely grown U.S. soybean varieties (National Research Council 1972, Chap 13).

1925 Sept. 1-3 – The sixth annual field meting of the American Soybean Association is hosted by USDA at Arlington Experimental Farm in Virginia.

1926 Jan. 20 – Wm. Morse's baby son dies.

1926 Feb. 11 – Dr. Charles Vancouver Piper dies at age 58 in Washington, DC, of kidney failure. He had been an agrostologist at the USDA for 22 years and had been in poor health for two years or more.

1929 Feb. 18 – P.H. Dorsett (age 67) and W.J. Morse (age 45) leave Washington, DC, by train, for a 2-3 year expedition to the Orient. Also on the trip are Morse's wife, Edna, their daughter, Margaret, and Dorsett's adopted daughter-in-law, Ruth. Two of the main goals of the expedition are to collect soybean varieties and soybean products, and learn as much as possible about growing and processing soybeans in Japan, Korea, Manchurian, and China. The group sails for Japan on March 1 aboard the President Grant. They arrive in Tokyo on March 18, set up headquarters there, and spend most of the first year in Japan. At the end of each day they type up their notes and add original photographs to their trip report.

1929 Aug. – They travel to Hokkaido, the northernmost island of Japan and center of soybean production, where they study both soybean cultivation and food uses. In December 1929 they return to Tokyo.

1930 April 1 – They travel to Dairen, Manchuria, to study soybean production and oil extraction in the world's leading center of these activities.

1930 summer – Dorsett leaves Morse in Manchuria and goes to Peiping [Beijing].

1930 Aug. 22 – Morse travels to Korea. On Sept. 29 to Mukden, Manchuria. Then back to Dairen. On Oct. 20 he joins Dorsett in Peiping.

1931 Feb. 17 – The Morse party leaves Tokyo by ship to return to the United States, arriving in San Francisco on March 4. The Dorsett party returns home separately from China. The trip was a huge success and the high point of Morse's career.

Major accomplishments of the expedition:

■ **(1) Soybean varieties**: They collect and send back to the USA 4,451 soybean varieties (PI numbers) of which 986 (22.2%) were still in the USDA germplasm collection in 1981 (R. Bernard, 1981). However none of these are major ancestors of soybean varieties grown in 1972 (National Research Council, 1972, Chap. 13).

■ **(2) Soybean products**: Morse collects, Dorsett photographs, they describe and send back more than 300 soybean products.

■ (3) **Trip report**: The typewritten Log of the Dorsett-Morse Expedition to East Asia, which fills 17 volumes and contains more than 8,818 pages plus about 3,200 glossy black-and-white photo prints, is now at the USDA National Agricultural Library (Beltsville, Maryland), in the Rare and Special Collections.

■ (4) **Vegetable-type soybeans / Edamame**: Morse discovers a new type of soybean. He realizes that Japanese think of vegetable-type soybeans (which are grown by horticulturists and home gardeners, and eaten as a green vegetable – e*damame*) as completely different from regular soybeans *(daizu)*. He collects more than 100 different edamame varieties, and they soon become popular in the United States (Lloyd & Burlison 1939; Cates 1939).

1932 – Morse finishes his book titled *Soybeans – Manchuria* (181 pages). Although never published, it is superb.

1936 – P.H. Dorsett is awarded the prestigious Meyer Medal for distinguished service in plant introduction.

1943 April 1 – P.H. Dorsett dies in Washington, DC at age 80. For more than 45 years he had been associated with USDA's scientific work. He played a leading role in building up six plant introduction gardens throughout the United States.

1946 Sept. – The American Soybean Association., of which Morse was a founder and three times president, awards him an honorary life membership – its highest honor.

1947 Nov. 12 – USDA gives Morse its "Superior Service Award."

1949 Nov. 30 – W.J. Morse retires after 42 years at the USDA. He and his wife retire to Eastchester, New York, where he lives next door to his daughter, Margaret, and her family, writes and (for a hobby) grows green vegetable soybeans for his dinner table.

He plans to use his retirement time to finish a book he is preparing on soybean foods; unfortunately it was never published (*Detroit Free Press.* 1949. Nov. 30. p. 13; *Washington Post*. 1949. Nov. 30. p. 10B).

1959 July 30 – William J. Morse dies at his home in Eastchester, New York, at age 75. He "had better claim than any other man to the title of founder of the soybean industry in the U.S." (*Agronomy Journal*, obituary). In 1958 U.S. soybean production topped 500 million bushels for the first time in history.

ABOUT THIS BOOK

This is the most comprehensive biography of William J. Morse and his work with soy ever published. It has been compiled, one record at a time over a period of 35 years, in an attempt to document the history of his work, as well as that of his co-worker, P.H. Dorsett. 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:

- 51 different document types, both published and unpublished.
- 1092 published documents - extensively annotated bibliography. Every known publication on the subject in every language.
- 702 unpublished archival documents.
- 30 original Soyinfo Center interviews and overviews never before published, except perhaps in our books.

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.

A complete subject/geographical index is also included.

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

HOW TO MAKE THE BEST USE OF THIS DIGITAL BOOK - THREE KEYS

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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 Piper or soy flour.
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.

3. Use the indexes, located at the end of the book. Suppose you are looking for all records about tofu. These can appear in the text under a variety of different names: bean curd, tahu, doufu, to-fu, etc. Yet all of these will appear (by record number) under the word "Tofu" in the index. See "**How to Use the Index**," below. Also:

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, Friedrich Haberlandt, A.A. Horvath, Englebert Kaempfer, Mildred Lager, William 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 or more of 14 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).

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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Document Types: The SoyaScan database contains 130+ different types of documents, both published (books, journal articles, patents, annual reports, theses, catalogs, news releases, videos, etc.) and unpublished (interviews, unpublished manuscripts, letters, summaries, etc.).

Customized Database Searches: This book was printed from SoyaScan, a large computerized database produced by the Soyinfo Center. Customized/personalized reports are "The Perfect Book," containing exactly the information you need on any subject you can define, and they are now just a phone call away. For example: Current statistics on tofu and soymilk production and sales in England, France, and Germany. Or soybean varietal development and genetic research in Third World countries before 1970. Or details on all tofu cheesecakes and dressings ever made. You name it, we've got it. For fast results, call us now!

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History of Soybeans and Soyfoods: Many of our digital books have a corresponding chapter in our forthcoming scholarly work titled History of Soybeans and Soyfoods (4 volumes). Manuscript chapters from that book are now available, free of charge, on our website, www.soyinfocenter.com.

About the Soyinfo Center. An overview of our publications, computerized databases, services, and history is given on our website.

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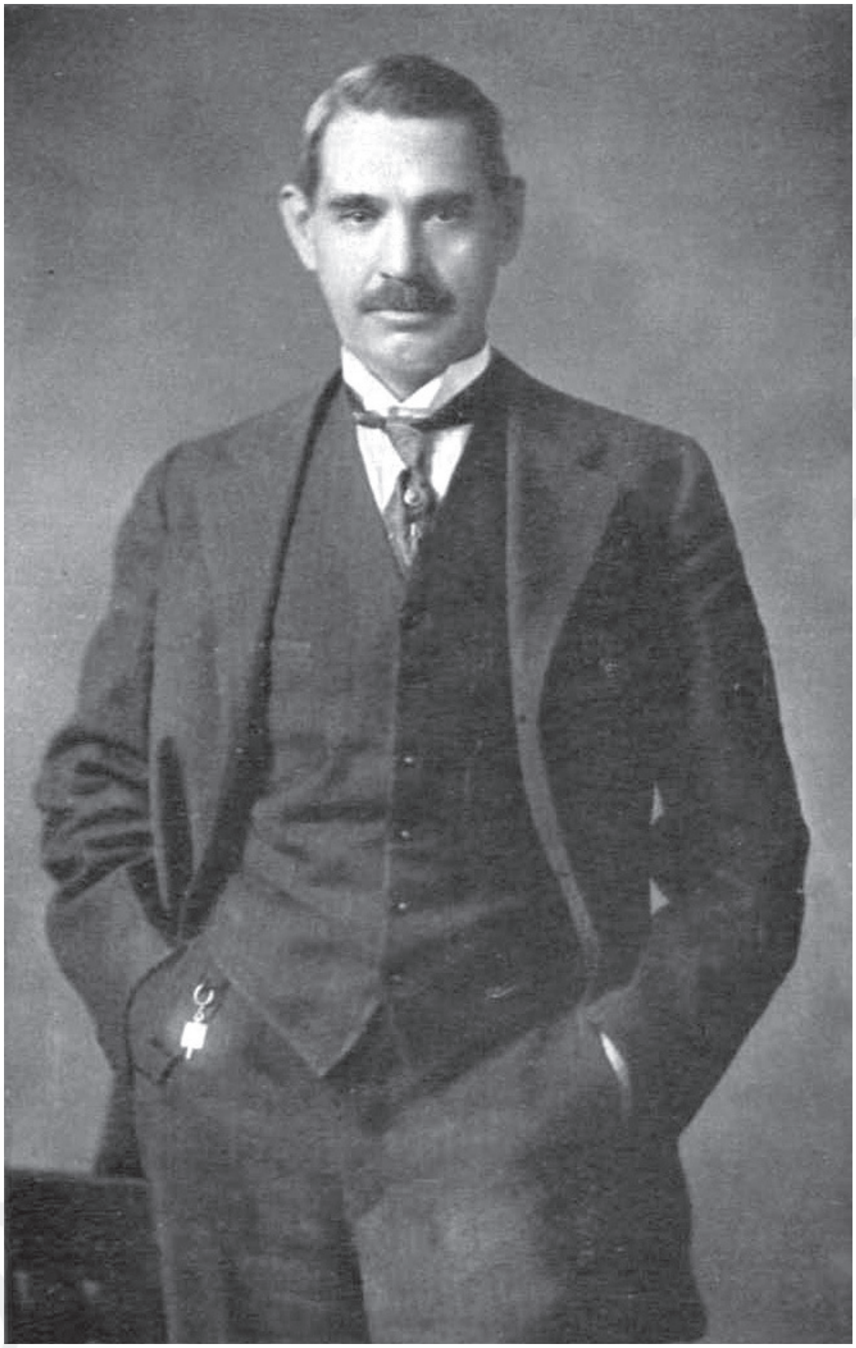

Charles Vancouver Piper

Palemon Howard Dorsett (standing)


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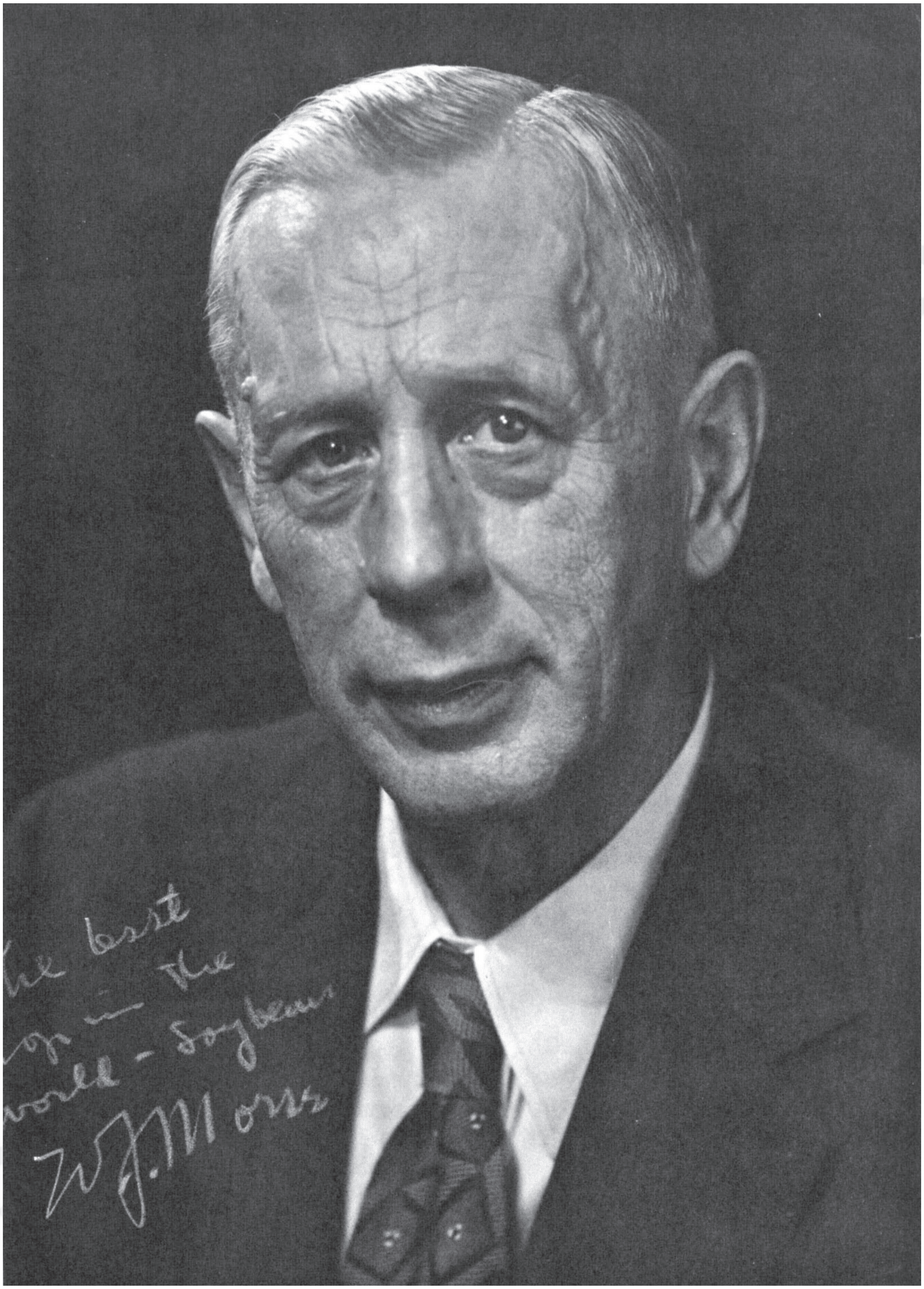

best
in the
- Soybeans
W. J. Morse

William Joseph Morse - History of His Work with Soybeans and Soyfoods (1884-2017)

1. *Lewis County Democrat* (*New York*). 1883. Local matters. May 9. Col. 2, 1/3 down.
• ***Summary:*** "The marriage of Mr. John Morse, one of the proprietors of the Dayan street market, and Miss Lena Kirschner, of Kirschnerville, was consummated at the parsonage of St. Peter's church, in this village Tuesday evening [May 8]. The newly married couple have the congratulations of their many friends."

Note: John Morse and Lena Kirschner were the parents of William Morse, of soybean fame.

2. William Morse at age 3 (Photograph). 1887.
• ***Summary:*** William Joseph Morse was born on 10 May 1884 in Lowville (pronounced LAU-vil), New York. This photo was probably taken in Lowville.

This 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 is the earliest photograph seen of William J. Morse, later of the USDA and often called the "father" of soybeans in the United States.

3. Morse, John B. 1891. Attachment for stove-legs. *U.S. Patent* 449,819. April 7. 3 p. Application filed 31 March 1890. 3 drawings.
• ***Summary:*** "Be it known that I, John B. Morse, a citizen of the United States, residing at Lowville, in the county of Lewis and State of New York, have invented certain new and useful Improvements in Attachments for Stove-Legs."

Note: John B. Morse was the father of William J. Morse, of soybean fame. Address: Lowville, Lewis County, New York.

4. John Baptist Morse and family, including his young son William Morse, in Lowville, New York (Photograph). 1891.
• ***Summary:*** See next page. Left to right: John Baptist Morse (1863-1942). William Morse (front, of soybean fame, 1884-1959). Gladys Helen Morse (William's younger sister, 1887-1969), Lena B. Kirschner (John's wife, 1863-ca. 1942).

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

5. Bureau of Plant Industry, Soils, and Agricultural Engineering–Division of Forage Crops and Diseases. 1899-1928. Correspondence with agricultural experiment stations (Archival collection). Washington, DC. Undated. 28 cm.
• ***Summary:*** Record Group 54–Records of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Records of the Division of Forage Crops and Diseases, Correspondence with State Agricultural Stations–1899-1928 [Label on the box]. Entry No. P.I. 66, Stack No. 170. Begin location 27/26/02. Containers No. 1-41. Sorted by states, so that correspondence with Illinois and Indiana would be in Boxes 10 to 13, under the letter "I." Within each state, the folders are (approximately) in chronological order. This includes letters that William Morse (USDA agrostologist) wrote to and received from these Agric. Exp. stations.

Talk with Jacob Jones. 1998. Aug. Jacob has also seen all of William Morse's correspondence with Purdue University and the University of Illinois (at Urbana). All of Morse's correspondence to Illinois is with Hackleman, with only 1-2 letters between Morse and Burlison–at least until 1928, which is when the boxes ended. He photocopied approximately 400 pages related to soy and either Indiana or

Illinois.

Note: This is the earliest archival collection seen (Oct. 2001) that mentions soy. Address: USDA.

6. U.S. Department of the Interior, Census Office. 1900. William J. Morse (age 16) and his parents in the 1900 U.S. Census in Lowville, New York. Washington, DC. Jan. 20.
• ***Summary:*** State: New York. County: Lewis. Township: Lowville. Town. Unincorporated City: Lowville Village. Supervisor's District: 6. Enumeration District: 63. Census taken on June 7, 1900. Sheet 10. Page 158 A (typed), 3875 or 3871 (hand written). "Shady Avenue, Houses not numbered". 172nd house, and 183rd family enumerated.

John D. Morse, Head of Household. White. Male. Born in December 1862, age 37. Married for 17 years. Born in New York. Parents both born Germany. Occupation: Meat cutter. He has been unemployed for zero weeks during the previous year. Can read, write and speak English. He rents his home.

Lena Morse, Wife of head of household. White. Female. Born in April. 1863. Age 37. Married 17 years and the mother of 2 children, 2 of which are alive in 1900. She was born in New York. Both parents were born in Germany. Lena can read, write and speak English.

Carrie Adams, boarder, White. Female. Born in May, 1843, age 57. Single. Born in New York as were both parents. Occupation: Landlady. Can read, write and speak English.

William J. Morse. Son of Head of Household. White. Male. Born in May, 1884, age 16. Single. Born in New York as were both parents. At school. Attended school for 10 months in the last year.

Gladys Morse. Daughter of Head of Household. White. Female. Born in January, 1887, age 13. Single. Born in New York as were both parents. At school and attended for 10 months in the previous year.

Katie Morse. Daughter of Head of Household. White. Female. Born May 1884, age 16. Single. Born in New York as were both parents. At school and attended for 10 months in the previous year.

Note: Lena had two children (and it is very clearly written), two of which are alive. So who is Katie Morse?

Letter (e-mail) from Joyce Garrison. 2013. May 21. Katie Morse was the cousin of William Morse, the daughter of his uncle William. Therefore she is incorrectly listed in this U.S. census as "Daughter of Had of Household."

7. *Journal and Republican* (*Lowville, Lewis County, New York*). 1902. Academy notes. April 17.
• ***Summary:*** "The Junior class met Wednesday morning and elected the following officers: President, H.C. Radley; vice-president, Leland Brahmer; secretary, Wm. Morse; treasurer, Moggie Doig."

The class is composed of 7 women and 8 men; the surname of each is given.

8. William Morse as a young man (Photograph). 1902.
• ***Summary:*** See next page. This portrait photo shows young Morse in a dress coat buttoned high, bow tie, and hair parted in the middle. This digital photo, with date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

9. William Morse with the Lowville Academy football team (Photograph). 1902.
• ***Summary:*** This photo shows the football team in 1902. William Morse is wearing a high-neck sweater with a large white "L" on the front and his hair parted in the middle.

Note 1. This appears to come from a published document–perhaps the *Journal and Republican* (Lowville, Lewis County, New York). Across the top is written "Old Watertown and vicinity in pictures. No. 742."

Note 2. This same photo appears in the 2 May 2001 issue of the *Journal and Republican* (Lowville, New York).

Note 3. In a scrapbook kept by William Morse, below this photo on the same page is a photo, taken in 1905, of Lowville Academy in Lowville, Lewis County, New York.

10. *Lowville Journal and Republican* (*Lewis County, New York*). 1903. News for Lowville Academy. May 21.
• ***Summary:*** At a meeting of the faculty Tuesday evening the standings of the seniors for the four years of their course were averaged and the commencement honors determined. William J. Morse was selected as valedictorian with a standing of 86, and Herman C. Radley was chosen salutatorian, with a standing of 84.

The article then goes on to list all 12 members of the graduating class of the Lowville Academy.

11. Agronomy class, Agronomy Farm, College of Agriculture, Cornell University, Ithaca, New York (Photograph). 1904. Oct.

• ***Summary:*** Taken at the Cornell agronomy farm, this photo shows William Morse's agronomy class in October 1904. In a scrapbook kept by Morse, he has carefully identified (in a handwritten caption keyed to a number each person) 17 of the 19 people (each wearing a coat, tie and hat) in the photo, including his senior roommate, C.B. Tilson, two international students, three graduate students from India, and Drs. John W. Gilmore (#16) and J.N. Stone (#18), Professors of Agronomy.

W.J. Morse is No. 10, in the back row, center, wearing a white driving cap, with only his head, shoulders and hat visible, just in front of the tall bush.

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

12. Bureau of Plant Industry, Soils, and Agricultural Engineering–Division of Forage Crops and Diseases. 1905-1929. General correspondence: 1905-1929 (Archival collection). Washington, DC. Undated. 28 cm.
• ***Summary:*** National Archives and Records Service–Record Group 54–Records of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Records of the Division of Forage Crops and Diseases, General Correspondence–1905-1929 [Label on the box]. Entry No. P.I. 66, Stack No. 170. Begin location 27/22/04. Containers No. 1-152. In boxes 92 and 93 are 2-3 folders of very interesting correspondence from William Morse; Jacob photocopied about 50 pages. In Box 87 is a folder titled Massey-Harris Harvester Co., Inc. (the combine maker). It contains a letter from Massey-Harris to William Morse dated 19 Dec. 1924, which talks about how the combine demonstration day went about a month earlier in Stonington, Illinois. In this letter is enclosed a testimonial letter from the Garwood Bros. In box 88 is a letter from Charles L. Meharry.

Talk with Jacob Jones, PhD student at Purdue University, Lafayette, Indiana. 1998. Aug. Jacob has just spent several weeks going through this collection. The current finding aid is not annotated due to lack of funding. The older finding aid is somewhat annotated, but that filing system is no longer used. The earliest Morse correspondence is from 1907, when he was a student at Cornell University [Ithaca,

New York] applying for a job. Then comes the document showing that he was hired. One of his jobs was to visit the various agricultural experiment stations. On 22 August 1911, while visiting various southern stations, including the station in North Carolina, he wrote the earliest letter seen in this collection about soybeans.

This archival collection is located (2000/09) at: National Archives #2, Civilian Records Branch, 8601 Adelphi Rd., College Park, Maryland 20740. Phone: 3012-713-7230. Free finding aids are P.I. 66 and N.C. 135. Address: USDA. Phone: 313-764-3482.

13. 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 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.

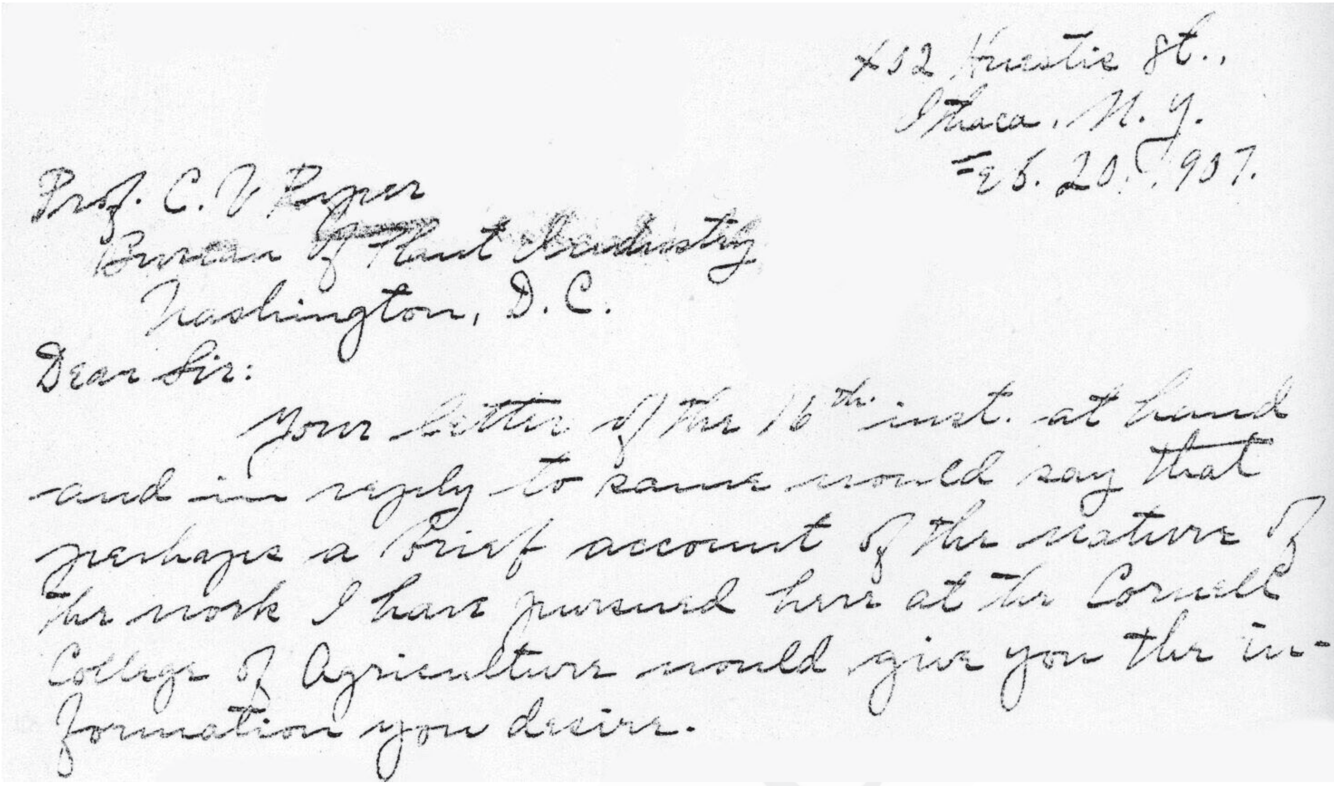
Note: The last three look potentially interesting. Address: USDA. Phone: 313-764-3482.

14. William Morse (Photograph). 1906.

• ***Summary:*** This oval digital portrait photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

15. Piper, C.V. 1907. Re: Job offer at USDA. Letter to Mr. W.J. Morse, 402 Huestis St., Ithaca, New York, Feb. 16. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: Prof. Thos. F. Hunt has recommended you for a vacancy which we have in this office. This position is on Arlington Farm adjacent to the city here and will involve breeding work with the grasses and legumes and also testing of a large number of miscellaneous new forage plants. For the first year the position will pay $900. I shall be very glad if you will write me directly in regard to this matter and would appreciate further information concerning your experience. It will be necessary to have the appointee on the ground by March 15th."

Note 1. This is the earliest document seen (April 2017) concerning William J. Morse and the U.S. Department of Agriculture.


402 Huestis St.,
Ithaca, N.Y.
Feb. 20, 1907.

Prof. C.V. Piper
Bureau of Plant Industry
Washington, D.C.

Dear Sir:

Your letter of the 16th inst. at hand and in reply to same would say that perhaps a brief account of the nature of the work I have pursued here at the Cornell College of Agriculture would give you the information you desire.

Note 2. This is the earliest English-language document seen (Nov. 2003) that uses the word "breeding" (or "breeder," etc.) in connection with soybeans.

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. Folder #1–Morse, W.J.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist, in Charge of Forage-Crop Investigations, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, Washington, DC.

16. Morse, W.J. 1907. Re: Response to job offer at USDA. Letter to Prof. C.V. Piper, Bureau of Plant Industry, Washington, DC, Feb. 20. 2 p. Handwritten, without signature.

• ***Summary:*** "Dear Sir: Your letter of the 16th inst. at hand and in reply to same would say that perhaps a brief account of the nature of the work I have pursued here at the Cornell College of Agriculture would give you the information you desire.

"I received my preparatory training at Lowville Academy [New York], taking the Latin-Scientific course. I entered the agricultural college [at Cornell] in the fall of 1903. Outside of the prescribed course I have taken botany, horticulture and agronomy.

"The courses in botany involved the comparative morphology and physiology of plants; special morphology, taxonomy, and adaptation of higher plants; organography and identification of higher plants...; field crops dealing with the history of production and cultivation, taking practice with growing and dried specimens, including cereals, grasses, clovers and other forage crops..."

"At present am doing thesis work upon the impurities of grass and clover seeds. This work is in such condition now that I will be able to finish it in from two to three weeks. This thesis work is optional..."

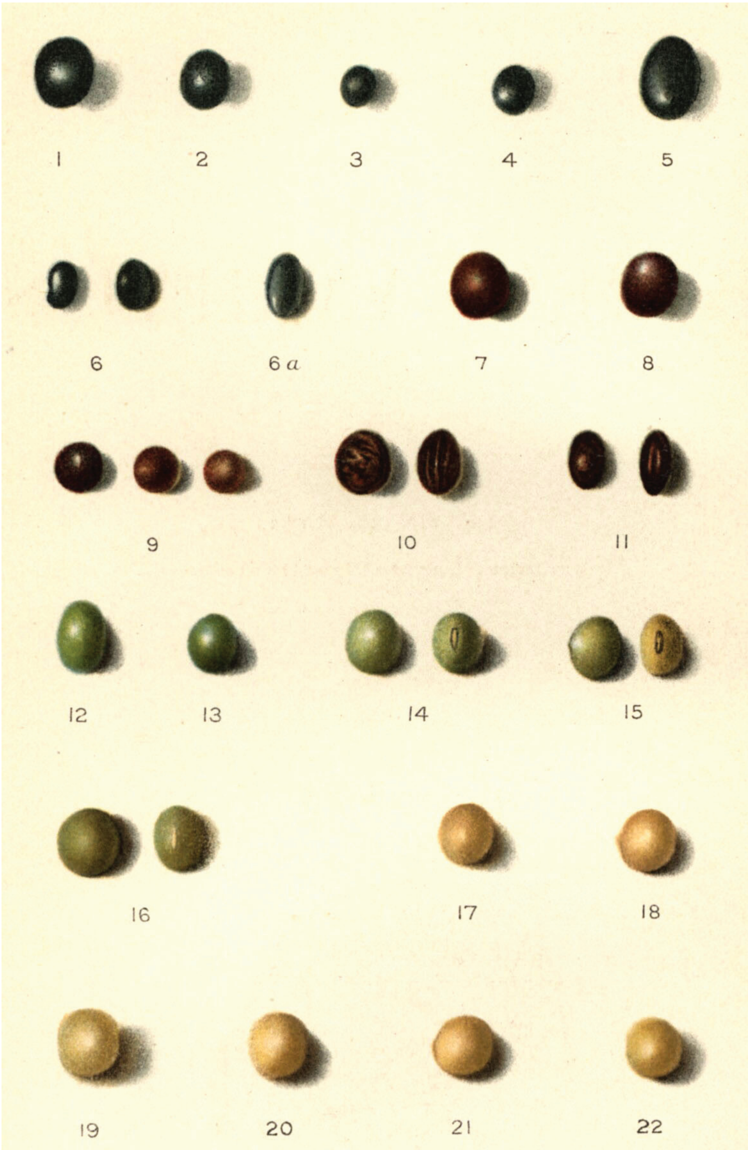
Note 1. Two days after graduating from Cornell with a Bachelor of Science in Agriculture degree, Morse went to work for the U.S. Department of Agriculture (USDA) in the Division of Forage Crops and Diseases, within the Bureau of Plant Industry. It was just at this time that the Bureau was planning to expand its research on soybean cultivation. At the Bureau, Morse, then age 24, was assigned to work under Dr. Charles Vancouver Piper (age 40), who was to have an immense influence on the rest of his life.

Note 2. This is the earliest document seen (April 2012) by W.J. Morse.

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. Folder #1–Morse, W.J.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: 402 Huestis St., Ithaca, New York.

17. Ball, Carleton R. 1907. Soy bean varieties. *USDA Bureau of Plant Industry, Bulletin* No. 98. 30 p. + 5 plates. May 27.



• ***Summary:*** This publication started a new system for naming soybeans, giving them common names such as Buckshot, Ogemaw, and Ito San. Contents: Origin and introduction of the soy bean. Variability. Classification: Key to the varieties. Descriptions of the varieties (23–including the source of the name and the numbers and sources of lots grown, incl. Agrost. No. and S.P.I. No.): Black-seeded group (Buckshot, Nuttall, Kingston, Ebony, Flat King, Riceland), Brown-seeded group (Ogemaw, Eda, Baird, Brownie), Mottled-seeded group (Hankow {with patch or saddle, and usually eccentric lines or stripes outside the patch}, Meyer), Green-seeded group (Samarow, Guelph), Greenish-yellow-seeded group (Yosho, Haberlandt, Tokyo {incl. Best Green}), Yellow-seeded group (Ito San {"It has long and widely sold under the names, 'Yellow,' 'Early Yellow,' 'Early White,' etc."}, Manhattan, Butterball, Amherst, Hollybrook, Mammoth). List of synonyms.

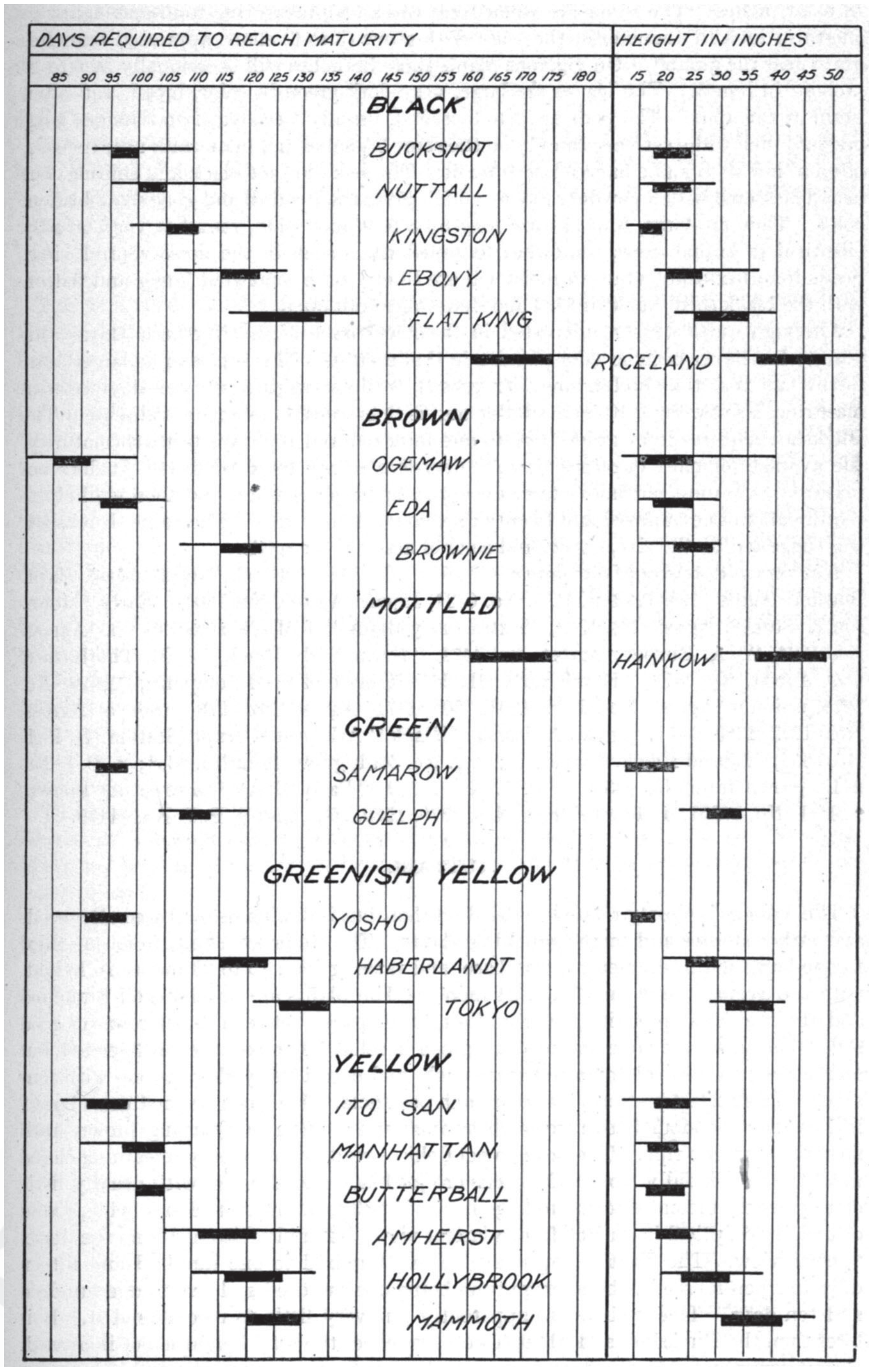
Note 1. This is the earliest document seen (July 2013) containing a list and descriptions of early U.S. soybean varieties. Details on each of the 23 individual varieties discussed by Ball are given in separate records in this database with titles of the format "Buckshot: New U.S. domestic soybean variety" (for Buckshot).

Note 2. This is the earliest document seen (July 2013) which tries to standardize early soybean varietal names / nomenclature to prevent confusion.

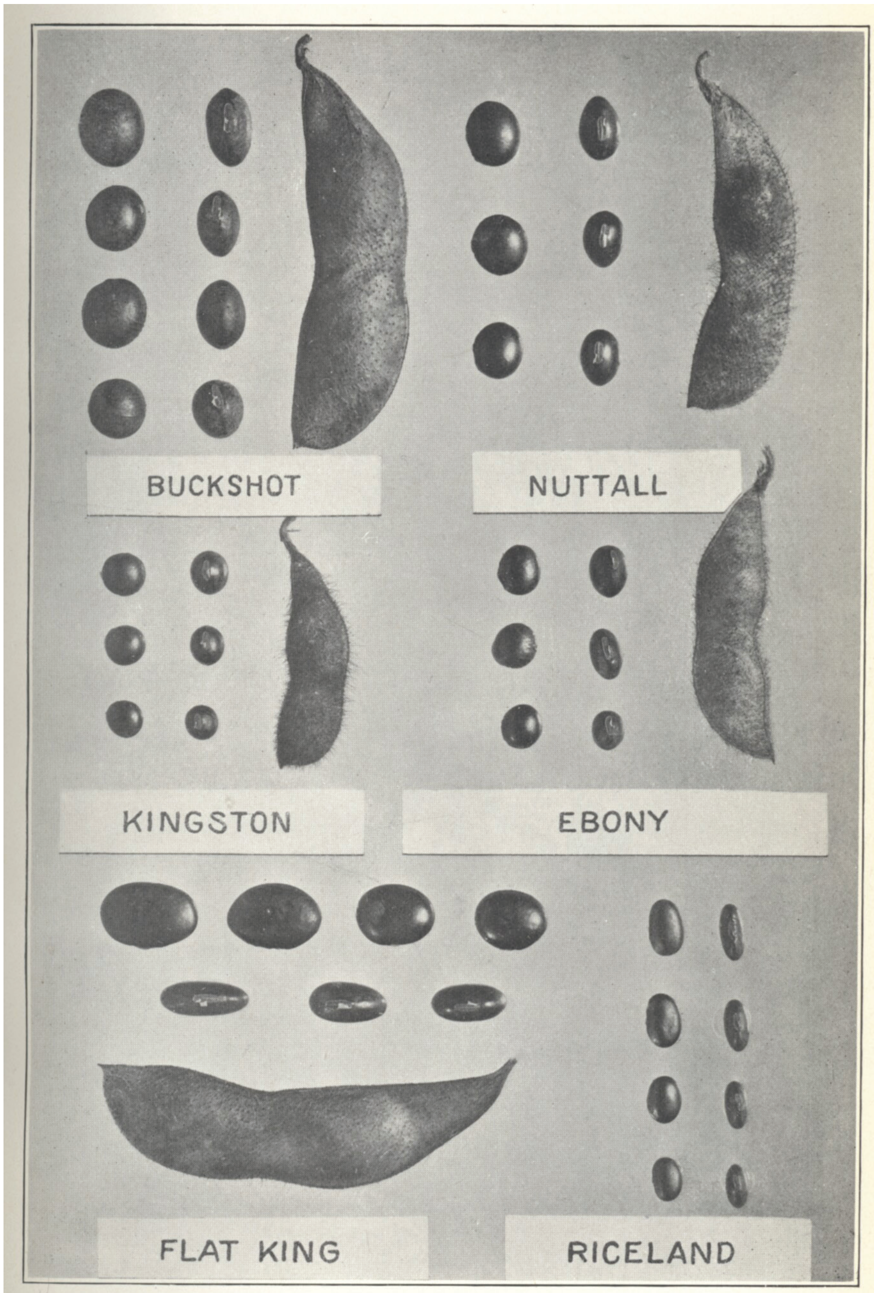
Note 3. This is the earliest English-language document seen (Sept. 2004) that uses the word "mottled" (or "mottling") or the word "stripes" to describe the color of soybean seeds. Note that both the mottled Hankow and Meyer varieties came from China.

"Classification: The first separation of the numerous forms or agricultural varieties of this species will naturally be through the colors of the seeds. The varieties having seeds of the solid colors black and yellow are by far the most numerous and most striking. The greens and browns are much less common and are also very variable in shade. The browns are of various shades of reddish brown and are also closely related to the mottled group. The yellows vary commonly into greenish shades, and any line drawn between the yellow and greenish yellow is only arbitrary. The yellows also vary into paler shades, and some have even been called 'white' in Japan. This is most noticeable in old seeds, but is never carried farther than pale yellow. It seems likely that none of the legumes commonly cultivated in Japan can have pure white seeds, like our navy beans for example, or the term 'white' would never be applied to a pale-yellow form. All yellow soy beans gradually turn paler with age for at least three to four years, although some varieties are originally paler than others. Although the black group shows more variation in the size of the seeds, the yellow is much more variable in color shades... Figure 1 shows an attempt to represent graphically the relationships and importance of the various color groups." Six color groups are recognized and described herein.

Distribution numbers: Part I is "serial numbers under which soy beans were distributed by the former Division of Agrostology, with the name of the variety to which each has been referred." Part II is a "list of the serial numbers under which soy beans have been distributed by the Office of Seed and Plant Introduction and Distribution, with the name of the variety to which each is referred in this bulletin. Several S.P.I. numbers representing soy beans not studied



DAYS REQUIRED TO REACH MATURITY
85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180
HEIGHT IN INCHES
15 20 25 30 35 40 45 50
BLACK
BUCKSHOT
NUTTALL
KINGSTON
EBONY
FLAT KING
RICELAND
BROWN
OGEMAW
EDA
BROWNIE
MOTTLED
HANKOW
GREEN
SAMAROW
GUELPH
GREENISH YELLOW
YOSHO
HABERLANDT
TOKYO
YELLOW
ITO SAN
MANHATTAN
BUTTERBALL
AMHERST
HOLLYBROOK
MAMMOTH



by the writer are not included in the list. 3870–Hollybrook. 4285–Mammoth. 4912–Hollybrook. 4913–Amherst. 4914–Tokyo. 5764–Hollybrook," etc. up to "17852–Meyer." Note 4. One variety was often introduced several different times under different S.P.I. numbers, and that many varieties have an "Agrostology No." [Number] separate from their S.P.I. number. Description of plates.

"Origin and introduction of the soy bean (p. 7-8): The soy bean (*Glycine hispida* (Moench.) Maxim.) is an annual leguminous plant from the Orient. Its native home is said to be from southern Japan southward through eastern China and Indo-China to Java. In China and Japan it has been in cultivation for many centuries, certainly since before the beginning of the Christian era. In those countries it is easily the most important legume grown, and in some provinces it is the most important of all crops. Owing, perhaps, to the almost complete isolation of that part of the Orient, its cultivation spread only slowly to other lands. It is now grown to some extent in India, but its introduction there seems to be of recent date. It reached Europe probably in the latter part of the eighteenth century, and its arrival in England is credited to 1790. For several decades it was grown merely as a curiosity in botanic and private gardens. Investigation of the economic value of this plant began more than thirty years ago in Europe, rather earlier than in this country, but the soy bean has not yet attained any great prominence there.

"The soy bean has been known in the United States for more than three-quarters of a century. In the New England Farmer of October 22, 1829, Thomas Nuttall wrote of its possibilities as a crop for this country. For many years it was grown only in gardens as a curious plant from the Far East. The Perry expedition to Japan in 1853 brought back two varieties, a yellow and a red sort [azuki?], which were tested here in a limited way.

"During the last twenty years the soy bean has been the subject of many experiments to determine its agricultural value and adaptations. The agricultural experiment stations of Kansas and Massachusetts were pioneers in these investigations and seed was imported directly from Japan by both stations. Through these efforts considerable interest was aroused, and two or three varieties soon became available commercially. The number of forms and varieties in this country was further increased by additional importations made by enterprising seedsmen. Since 1898 the Office of Seed and Plant Introduction of the United States Department of Agriculture has secured from seven different countries of the old world no less than 65 different lots of soy bean seeds, representing about twenty varieties."

Page 2 lists the 28 people and divisions in the Bureau of Plant Industry. Beverly T. Galloway is chief of the Bureau. Merton B. Waite and Irwin F. Smith are pathologists. Walter T. Swingle is physiologist in charge of plant life history investigations. Mark A. Carleton is cerealist in charge of grain investigations. David Fairchild is in charge of seed

and plant introduction. Charles V. Piper is agrostologist in charge of forage crop investigations. Palemon H. Dorsett is pathologist in charge of the plant introduction garden, Chico, California.

Note 4. This is the earliest document seen (Aug. 2011) that mentions Palemon H. Dorsett in connection with plant introduction or with soy beans.

List of synonyms (p. 27): Adzuki = Ito San. Black = Buckshot. Brown Eda Mame = Eda. Crossbred No. 6 = Ogemaw. Early Black = Buckshot. Early Green = Guelph. Early Japan = Butterball. Early White = Ito San. Early Yellow = Ito San. Extra Early Black = Buckshot. Green = Guelph. Green Samarow = Samarow. Hollybrook = Hollybrook [sic]. Ito San = Ito San [sic]. Japanese No. 15 = Kingston. Kaiyuski Daizu = Ito San. Kiyusuki Daidzu = Ito San. Kysuki = Ito San. Large Black = Buckshot. Late Yellow = Mammoth. Mammoth Yellow = Mammoth. Medium Black = Buckshot. Medium Early Black = Buckshot. Medium Early Green = Guelph. Medium Green = Guelph, Ogema = Ogemaw. Southern = Mammoth. Yellow = Mammoth. Yellow Eda Mame = Ito San.

A color illustration (frontispiece, facing the title page) shows one or two views of the seeds of 22 different soy bean varieties, lined-up and numbered. Diagrams show: The probable relationships of the different groups of soy beans (block style; p. 10).

The number of days required to reach maturity and the height of the plant in inches, with averages, for each variety of soy bean (graph plot; p. 13).

The 1st plate, facing the title page, showing the seeds of 22 soybean varieties, is in color. Four full-page photos at the end show the pods (side view) and seeds (side and front views) of (typically) five soybean varieties.

Note 5. This is the earliest document seen (Sept. 2013) that mentions the following soybean varieties: Amherst, Baird, Brown Eda Mame, Brownie, Buckshot, Butterball, Ebony, Eda, Flat King, Guelph, Haberlandt, Kingston, Large Black, Manhattan, Meyer, Nuttall, Riceland, Samarow, Tokyo, Yosho.

Note 6. This is the earliest document seen (July 2013) which states that Black, Early Black, Extra Early Black, Large Black, Medium Black, and Medium Early Black are all the same as Buckshot, or that Early Japan is the same as Butterball, or that Brown Eda Mame is the same as Eda, or that Early Green, Green, Medium Early Green, and Medium Green are all the same as Guelph, or that Yellow is the same as Mammoth. Address: Agronomist, Grain Investigations, USDA Bureau of Plant Industry.

18. Meyer, Frank N. 1907. Re: Dorsett, money, Chinese culture, and the new Meyer soy bean variety. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. Typed.

• ***Summary:*** Meyer wrote these letters from Peking, China, to David Fairchild at USDA in Washington, DC.

Page 266 (29 May 1907) "About Mr. Dorsett [his resignation from USDA]: Yes, to say that I am sorry for it is too faint an expression. He is a man of great energy and perseverance, especially in the hard work of establishing a thing and he will be missed more than we think.

"Mr. Dorsett didn't write me his real reason for resigning, but I suspect that the burdensome administration (red tape) has much to do with it."

"No, no, money is surely not everything. You hit the nail on the head. Give me a piece of blue sky, some hazy mountains in the distance, a rippling brook or foaming sea close by and enough of life's needs to get along, even if the fare be sober, and they may keep their millions and their soul-destroying methods of getting them."

Page 411-413 (11 Oct. 1907, from Peking). "Several days and sometimes even weeks pass before one is accustomed again to the sedentary life with its accompanying indoor work. While sitting before the table, my heart yearns for the burning sun and the smell of the mountains.

"Well, before starting any farther let me thank you most cordially for your appreciated letters and for the good things you have said of me and the troubles you took that brought about my promotion. Really, I must confess it is much more than I expected."

"... I will do my very best to show that, although the United States of America hasn't seen fit as yet to adopt me as a citizen, I will risk life and limb and forego a restful home life which sometimes looms up before me, hazy and far away and do all I can to enrich her domain with things good for her people and their households."

These regions are infested with robber bands. The robber men recently killed one Chinaman, apparently with a heavy blunt iron tool. "My men were simply half crazy... I armed my men with a few large knives and an axe. I myself relied upon my automatic pistol which allows me to fire ten shots without reloading.

Page 454 (18 Dec. 1907, from Peking). He thanks Mr. Fairchild for sending the 1907 USDA bulletin titled "Soy Bean Varieties" by Carleton Ball "in which I see that my name has been immortalized already in the christening of a humble, mottled bean [Meyer]; what a joy!"

Page 463 (18 Dec. 1907). "The Chinese are, as a race, the greatest despoilers of nature. There is no use talking about their literary qualities, etc. All these are offset by their enormous crimes in destroying the balance of nature. Every wild tree or shrub is mercilessly cut down, mostly with root and all, every edible bird is trapped and eaten, and every bird of song is caught and kept in captivity, and what is the aspect [result] of all this? Their mountains are barren, stony wastes which let the rains rush off with great velocity bearing with them arable soil and covering their valleys with stony and sandy matter. Their climate gets drier year after year and famines result. Their birds being exterminated, caterpillars

of all descriptions multiply rapidly and destroy whole plantations of pine trees and catalpas and fruit orchards. And they see not what results befall them for their disastrous methods. The lust for greed and immediate gain is so great with them that they mortgage their whole future wealth for it."

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer, China.

19. *Lowville Journal and Republican* (*Lewis County, New York*). 1907. People in print: Morse. June 18. p. 5.
• ***Summary:*** "Mr. and Mrs. John B. Morse and daughter, Miss Gladys Morse, Miss Anna Warner and Miss Katie Morse go to Ithaca [New York] next week to attend the commencement exercises of Cornell university. W.J. Morse, son of Mr. and Mrs. Morse, is a member of the class of '07."

20. Piper, C.V. 1907. Re: Job offer at USDA. Letter to Mr. W.J. Morse, 402 Huestis St., Ithaca, New York, June 18. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: I wish to ask for your immediate appointment to the position in the office concerning which we have had some correspondence. The salary will be $900 [a year] and we desire you to report for duty immediately if possible. Kindly wire me if you will accept the position and if you can report for duty at once. I will then have the appointment made out and wire you to report here. The telegram to me is to be official collect, and addressed to Piper, Agriculture, Washington, D.C."

Note 1. On June 19 Morse sent Piper a handwritten collect telegram via The Western Union Telegraph Company which said: "Will accept. Can report June 22. W.J. Morse." The return telegram (on a USDA form) from Piper to Morse, dated June 20, stated: "Your appointment dated June twenty second. Please report at once."

Note 2. Piper's original job offer to Morse was dated Feb. 16, 1907–about four months earlier. Morse was finishing his senior year at Cornell and it took Piper that long to finalize the new government position.

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: Agrostologist, in Charge of Forage-Crop Investigations, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC.

21. United States Department of Agriculture (USDA). 1907. Mr. W.J. Morse of the state of New York is hereby appointed a scientific assistant in agrostology in the Bureau of Plant Industry. Washington, DC. 1 p. June 21.
• ***Summary:*** See next page. On 21 June 1907 William Morse was appointed to the Bureau of Plant Industry with a salary of $900 a year, to be paid from the fund appropriated "for the Purchase and Distribution of Valuable Seeds." He was appointed for a temporary period, "pending certification of eligibles by the Civil Service Commission."

Note: This appointment took effect the next day, June 22–which was officially Morse's first day of work for the USDA.

22. Piper, C.V. 1907. Re: Tags and string needed at Arlington Farm. Letter (memorandum) to Mr. Ashmore, June 28. 1 p. Typed, with initials on USDA memorandum form.
• ***Summary:*** "Kindly send a supply of tags and string to Mr. W.J. Morse, Arlington Farm [Rosslyn, Virginia] for labeling seed bags. Please send about 500 tags. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist, in Charge of Forage-Crop Investigations, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC.

23. Nielsen, H.T. 1907. Re: Helping Mr. Morse re-arrange the grass garden at Arlington Farm. Letter to Prof. C.V. Piper [Head, Bureau of Plant Industry, USDA], Seattle, Washington, Aug. 10. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Piper: I have been out several days this week to Arlington Farm helping Mr. Morse with the re-arrangement of the grass garden. We are getting started nicely now, but find considerable difficulty in arranging the rows in the rod plots so that there will not be many vacancies. In the grass garden 'J', where we are supposed to put all rod plots, we may have many more orchard grasses than anything else for this division. This will leave a great many vacancies, especially if we do not move the redtops. Mr. Morse informs me that you has advised him not to move the rod plots of redtop selections this fall. It is my opinion that you are [?] isolating these different selections in order to obtain pure seed. Now if there is any probability of the redtop selections cross-pollinating, the seed that we are using on the 1/20 acre plot in Section 'D' will be mixed this year, and it seems to me best that we arrange things so that next year, if we find this to be the case, we will be able to obtain a new lot of seeds which we know to be pure. I imagine, therefore, that it would be much better to move those rod plots over into 'J' this fall, where they could be left permanently and would be isolated enough so that there

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United States Department of Agriculture,

Washington, D. C., June 21, 1907.

Mr. W. J. MORSE - - - - - - - - - - - - - - - - - - , of the State of NEW YORK - , is hereby appointed

A SCIENTIFIC ASSISTANT IN AGROSTOLOGY,

In the Bureau of Plant Industry,

in the United States Department of Agriculture, at a salary at the rate of NINE HUNDRED ($900.00) - - - - - - - - - - - - - - - Dollars per annum - - - on the miscellaneous roll paid from the fund appropriated for For the Purchase and Distribution of Valuable Seeds. "General Expenses, Bureau of Plant Industry:". For a temporary period, pending certification of eligibles by the Civil Service Commission.

The above-named appointee is hereby required to take the Oath of Office immediately and file the same, together with a ~~statement of legal and actual residence and personal record,~~ with the Appointment Clerk in the Department of Agriculture, and report for duty in person - - - to the Chief of the Bureau of Plant Industry, and be subject to the rules and orders of the Secretary of Agriculture. This appointment shall take effect on June 22, 1907.

James Wilson

Secretary of Agriculture.

would be no danger of cross-pollination. This would also enable us to fill out many of the vacancies of these rod plots, and give us the much needed room in Section 'I', the old grass garden, for rod rows of the timothy selections which you made in the Hopkins' varieties... In case you do not care for this, many of the bromes [various species of grasses] could be removed at once, as Mr. Morse has selected seed from most of them, and this would give more room for the rod rows of timothy and brome selections.

"Mr. Butterfield has kindly furnished us with three men, and the work is moving along nicely. Plot 'D' has been plowed, and will be ready for seeding in a week or so. Mr. Morse does not care to remove the redtops without some word from you, so it would be of great advantage for you to let me hear from you on this point as soon as possible.

"Respectfully yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 107.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Head of Bureau.

24. Nielsen, H.T. 1907. Re: Cowpea and soybean work. Letter to Mr. J.M. Westgate [Asst. Agrostologist in Charge of Alfalfa and Clover Introductions], Seed Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC, Aug. 24. 4 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** Nielsen is writing from the Glenmore Hotel in Montgomery, Alabama. "Dear Mr. Westgate: I have spent a very interesting week in my cowpea and soybean work. At Welsh, Louisiana, the weather conditions have been so unfavorable that the riceland [Riceland] soybeans hadn't been planted at all, but Dr. J.F. Naftel's and Mr. J.F. Shoemaker's at Crowley were looking very fine, and both men expressed the belief very strongly that they were going to be valuable for the ricelands. These two varieties also look exceptionally well at Audubon Park, New Orleans. Mr. J.B. Dodson's trial at Crowley had been ruined by a dike springing a leak, and the excessive water had drowned out the plants.

"The only other soy at Audubon Park which looks promising is a black variety [PI] #14952. It is showing up remarkably well, being about 45 inches high and very vigorous. All the other soys are too small growing to be of any value for their conditions.

"Of the cowpeas there are but few of the varieties doing well. The New Era, Iron, Clay and Whippoorwill are doing quite well."

At Auburn: "The Mammoth soybean is also doing very fine." "Yours truly, H.T. Nielsen."

Note: This is the earliest document seen (June 2012) by or about Howard Theodore Nielsen (1879-1959) in connection with soybeans. Nielsen was in charge of cowpeas, soybeans, and forage crops before W.J. Morse arrived.

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 95–Newhouse-Nixon.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012. Address: [Forage Crop Investigations, Bureau of Plant Industry, USDA].

25. United States Department of Agriculture (USDA). 1907. Mr. W.J. Morse of the state of New York is hereby appointed a scientific assistant in agrostology in the Bureau of Plant Industry. Washington, DC. 1 p. Sept. 13.

• ***Summary:*** On 13 September 1907 William Morse was re-appointed to the Bureau of Plant Industry with a continuing salary of $900. He was appointed for "a probationary period of six months," after which he would be officially and fully employed by the USDA.

A second document, also dated 13 Sept. 1907, says essentially the same thing, but in a different format. Both are signed by James Wilson [Iowa], Secretary of Agriculture (1901-1909) under President Theodore Roosevelt.

26. Nielsen, H.T. 1908. Re: Prof. Piper asked me to send you the seeds you requested. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, March 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Duggar: Prof. Piper asked me to have put up for you samples of the Brabham and Macassar cowpeas. I am having put up for your use 4 pounds each of these varieties and hope they will reach you in good condition. I am also having put up for your use 2 pounds each of Acme, Shanghai, Riceland and Barchett soybeans. These soybeans are all the late varieties, and have considerable promise in the South. Acme is the one we are most impressed with, as it seems to be one of the best varieties we have tried.

"I am also sending you seed of Phaseolus calcaratus... I am sending you three lots of these...

"I trust that all of this seed will reach you in goof condition and in ample time for planning your spring work. "Very truly yours, Scientific Assistant."

Note: The "Scientific Assistant" is probably H.T. Nielsen, but could be William Morse.

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.

27. Asst. Agrostologist. 1908. Re: Sending various seeds. Letter to Mr. W.J. Morse, Arlington Farm, Rosslyn, Virginia, April 22. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "My dear Morse: I am sending you the following lots of seed to be used in your breeding work on Section D: These are in one pound lots:

#20471. Orchard grass. #20473. Tall mellow oat grass. #20474 Bromus inermis [smooth brome]. #29475. Bromus erectus [erect brome]. #20472. Festuca pratensis.

#20475. *Poa pratensis.* #19913. Tall fescue. #19914 Meadow fescue. #19915. Timothy. #19916. Orchard grass.

#19919. Orchard grass. #19920. Tall fescue. #19921. Meadow fescue. #19922. Timothy. #19923. Kentucky bluegrass.

#19932. Redtop. #19934. Orchard grass. #19935. Tall fescue. #19936 Meadow fescue.

"In case you do not have room for all of these lots, any of them may be omitted, with the exception of Nos. 20471 and 20476 inclusive. These numbers came from Sweden and we are very anxious to give them a trial. Very truly yours,..."

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: Asst. Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

28. Nielsen, H.T. 1908. Re: Send inoculation soil to Mr. T. Dorsey Mitchell of Maryland. Letter to Mr. W.J. Morse, Arlington Farm, Rosslyn, Virginia, May 2. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "My dear Morse: Mr. T. Dorsey Mitchell, Glencoe, Maryland, expects to grow some soybeans this summer, and to make sure of inoculation we have advised him to use soil from an old soybean field. He is unfortunately located where he cannot secure soil, and I wish you would put up a bag containing a hundred pounds or more of soil from Section C, and have it sent to Mr. Mitchell. It can be sent by freight, and Mr. Mitchell will pay the charges. He is on the Pennsylvania Railroad.

"Also send a bag of soybean soil to Mr. C. L. Goodrich. I am enclosing a tag containing the address of Mr. Goodrich. He is also on the Pennsylvania Railroad as you will notice.

"Kindly have this attended to at your convenience. Very truly yours,..."

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].

29. D.M.M. 1908. Re: OK for Mr. Morse to proceed to Chestertown, Maryland. Letter (memorandum) for Prof. C.V. Piper [Head, Bureau of Plant Industry, USDA], Seattle, Washington, July 3. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "Memorandum for Prof. C.V. Piper: I transmit herewith letter of instructions in favor of Mr. William J. Morse, under letter of authorization No. 4654, authorizing him to proceed to Chestertown, Md. [Maryland], to examine tests of green manure crops."

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, 1905-1929. Piper, C.V. Box no. 107.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Office of Assistant in Charge, USDA Bureau of Plant Industry, Office of Seed and Plant Introduction and Distribution, Washington, D.C.

30. Scientific Assistant. 1908. Re: Sending seed of a new soybean variety from near Shanghai. Letter to Mr. W.J. Morse, Arlington Farm, Rosslyn, Virginia, July 13. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I am having sent you a small amount of seed of a new soybean [variety] coming from the neighborhood of Shanghai, China. I wish you would plant a row of this on Section 'B,' as we are anxious to learn what this soy is. Very truly yours,..."

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: [Bureau of Plant Industry, USDA, Washington, DC].

31. Piper, C.V. 1908. Re: Soybeans at Arlington Farm and W.J. Morse. Letter to H.T. Nielsen, USDA, Augusta, Georgia, July 29. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** Dear Mr. Nielsen:... Yesterday I went over the plots at Arlington Farm. In going over the soybean plots, I was struck with the fact that there are just two colors of flowers, namely, white and red, though in a few rows which I suspected to be mixtures, both colors occur. I have asked Mr. [W.J.] Morse to go over these immediately, and make notes of all the numbers that have red flowers and all that have white flowers, also noting those where there are mixtures in the rows. At least one of the early varieties is now past bloom

so that we will not have the notes on this. I am calling this to your attention because I want you to make the same notes on all the varieties that are still in bloom after you return; many of them have not yet bloomed. I suspect that we will find that the yellow and green seeded ones are for the most part white flowered, while the red flowers are connected with the dark seeded varieties. A few of the earlier varieties of cowpeas all have mature pods. This is especially striking in a few of the varieties of *Vigna sesquipedalis,* and I have asked Mr. Morse to make notes on any of the varieties which are so far along.

"According to your itinerary you expect to be back about August 9th. With the notes that Mr. Morse is now taking this will be a good time so that you will miss but little. It is going to take about all of your time after you return, however, to keep up with the note taking. It will have to be done thoroughly so as to publish on the varieties this fall. I want to spend a few days on it after I get back about the first of September. Be sure that good herbarium specimens of every variety of soybean, of Dolichos and of Phaseolus, also of many of the cowpeas. These specimens will be made by Mr. Schmidt of Mr. Wight's office, but you ought to assist him in the matter so as to be sure he gets first-class specimens... I want to be sure and have a complete set. Yours very truly, Agrostologist.

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 95–Newhouse-Nixon.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012. Address: Agrostologist, in Charge of Forage-Crop Investigations, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC.

32. Nielsen, H.T. 1908. Re: Cowpeas and soybeans. Letter to Prof. C.V. Piper, Seed Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC, Aug. 2. 5 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** Nielsen is writing from Yarborough House hotel in Raleigh, North Carolina. "Dear Prof. Piper: I was very sorry to learn at the Experiment Station of Georgia that they were not doing anything at all with forage crops and seemed to take very little interest in the subject. Their work is with cotton and corn entirely."

"At Blackshear [Georgia], where I visited Mr. E.J. Rankin, there are a lot of legumes grown, peanuts, beggar weed, velvet beans and cowpea... Mr. Rankin's soybeans had been neglected due to an unfortunate accident in his family, his eldest son getting a leg broken. The beans however were looking pretty well and were well tuberculed.

"Mr. Rankin got up a very good meeting of farmers on Thursday and we had a real good time. A number asked a lot of questions and incidentally had read or heard of things they wanted to try, and asked for seed and advice from the Dep't." E.S. Darling wants soybeans for 1909. "These men are all of Blackshear, Georgia, and seem like the right kind of men to work with.

"Things are not looking good around Augusta, Georgia, as it has been awfully dry there. Willet Seed Co. handled only about 250 bu. of soybeans this year and they nearly all went to Louisiana, Mississippi, and Texas."

"It has been exceedingly dry at Monetta, South Carolina, all during July... I will be at the office a week from tomorrow. H.J. Nielsen."

Note: In early 1909 H.T. Nielsen left the USDA in Washington. DC, and moved to Abeline, Kansas. W.J. Morse took his place–in charge of forage crops.

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 95–Newhouse-Nixon.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012. Address: [Forage Crop Investigations, Bureau of Plant Industry, USDA].

33. *Washington Times* (*DC*). 1908. Potomac Juniors win their event: Washington eight beats Baltimore in Middle States Regatta. Sept. 7. p. 1. Col. 1.

• ***Summary:*** Note 1. In 1908 William Morse was Stroke on the Potomac Boat Club's Junior Eight-oared shell that won the gold medal at the Middle States Regatta. The race is described on the front page of this newspaper.

"Morning winners: Junior Eight-oared Shell–Potomac Boat Club."

"The feature event of the day and the winning of which

meant more than any other number on the morning program was the junior eight-oared race between four of the most evenly matched crews that have ever rowed in competition on the Potomac.

"After a grueling struggle with first one and then another taking the lead, the Potomac Boat Club crew, of Washington, by calling into play all their nerve and spurting at a killing pace forged a scant yards ahead of the Arundels.

"Until the four crews reached the bridge all were abreast. The Potomacs were on the south side, the Arundels next, the Ariels next and the Virginia crew on the District side. Coming from under the shadow of the bridge the Potomacs shot ahead but only for a few yards.

"The Virginias increased their stroke from 32 to 33 and made up the difference with the Arundels doing likewise. At the three quarters the Potomacs gained a lead that was never headed, Arundel barely beating the Ariels for the place with the Virginias close up.

"The sport was of the highest class."

Note 2. This clipping plus front and back digital photos of the medal (which measures about 1¼ inches in diameter) were sent to Soyinfo Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (Sept. 2011). They show that William Morse was a strong and athletic young man.

34. William Morse with crew (rowing) (Photograph). 1908.
• ***Summary:*** See next page. Morse is in the front row, far right. This digital photo, undated, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004). Margaret Thalman, Morse's daughter, recalls that Morse rowed with a crew, perhaps while he was at Cornell Univ. [Ithaca, New York] and definitely after he began work with the USDA in Washington, DC–yet before he was married in Sept. 1911.

He won a medal which reads as follows: Front–"Middle States Regatta Assn." Back–"Junior and Oared Shells. 1908. Stroke: W.J. Morse."

35. *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,* round, middle-late bean.'

20011. "From Ko-bau, northern Korea. Received


MIDDLE STATES REGATTA ASS'N


JUNIOR
8 OARED SHELLS
1902
STROKE W. J. MORSE
P.B.C.

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. 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.

36. William Morse's work with soybeans for the USDA (Photographs). 1908-1949.
• ***Summary:*** These photographs, taken from 1908 to 1949, were sent to Soyfoods Center in 2004 by Joyce Garrison of Hartford, Connecticut. They are arranged below in the order in which they appear in William Morse's personal scrapbook (p. 73-91).

37. W.J. Morse and USDA co-workers in 1908 and 1912 (Photographs). 1908.
• ***Summary:*** (1) 1908–W.J. Morse in a field of Piper's African Annual Sudan grass at Arlington Experimental Farm in Virginia.

(2) 1908–W.J. Morse with Virginia soybeans and corn for silage at Arlington Experimental Farm.

(3) 1912 (or 1908)–"First planting of annual Sudan grass obtained by Dr. C.V. Piper from Sudan, Africa."

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).

38. W.J. Morse standing in a field of Virginia soybeans and corn for silage (Photograph). 1908.
• ***Summary:*** "At USDA's Arlington Experimental Farm, Virginia. These two digital photos, with captions and dates, were sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

Note: This is the earliest photo seen (Aug. 2011) showing William Morse with soybeans.

39. *SoyaScan Notes.* 1909. What ever happened to H.T. Nielsen of the Bureau of Plant Industry, USDA? (Overview). Compiled by William Shurtleff of Soyinfo Center 20 June 2012.
• ***Summary:*** The earliest document we have seen concerning the work of H.T. Nielson at USDA is a letter he wrote on 10 Aug. 1907 to Dr. C.V. Piper, his boss at USDA's Bureau of Plant Industry, concerning his work helping Mr. Morse

re-arrange the grass garden at Arlington Farm; the letter does not mention soy beans.

The earliest document we have seen in which H.T. Nielsen mentions soy beans is a letter he wrote two weeks later, on 24 Aug. 1907, to his colleague, Mr. J.M. Westgate (Asst. Agrostologist in Charge of Alfalfa and Clover Introductions, Seed Introduction and Distribution, Bureau of Plant Industry) about his work with cowpeas and soy beans. Writing from the Glenmore Hotel in Montgomery, Alabama, H.T. Nielsen's letter begins: "Dear Mr. Westgate: I have spent a very interesting week in my cowpea and soybean work." At that time Nielsen's title and affiliation were Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C.

The earliest publication we have seen in which H.T. Nielsen is an author is titled "Soy Beans," by Charles V. Piper and H.T. Nielsen. It was published on 7 Oct. 1909 in *Farmers' Bulletin* No. 372. 26 p. This bulletin was a USDA periodical.

Throughout 1907, 1908, and until Feb. 1909, H.T. Nielsen may well have been the most knowledgeable person at USDA concerning both soybeans and cowpeas, with the possible exception of his boss, C.V. Piper. He was almost certainly more knowledgeable than William J. Morse, age 24, who had started work at USDA on 22 June 1907, having just graduated (two days earlier) from Cornell University with a Bachelor of Science in Agriculture degree. See letter from Nielsen to C.B. Williams dated 12 March 1908.

On 15 Jan. 1909 H.T. Nielsen wrote a 5-page "Report of Trip South, December 19 to 25, 1908." The purpose of this trip was to study cowpea varieties, threshing machines and winter legumes.

By 17 Feb. 1909, Mr. Nielsen had left the USDA's Bureau of Plant Industry and Washington, DC for Abeline, Kansas, for on that date Dr. C.V. Piper (USDA Agrostologist in Washington, DC) wrote Mr. Nielsen: "We are shipping you today 60 pounds of Kafir corn, 20 pounds of Sumac sorghum and 20 pounds of Orange. Nielsen appears to be farming. It is not clear why Nielsen left USDA or why he moved to Abeline, Kansas. Yet when he left, W.J. Morse took his place as the USDA's man in charge of soybeans and cowpeas. He also acquired Nielsen's title, "Scientific Assistant" in Forage Crop Investigations at USDA's Bureau of Plant Industry.

The following is a summary of the last 22 pages of documents in the H.T. Nielsen file at the National Archives.

Also on 17 Feb. 1909 Dr. C.V. Piper wrote Prof. C.B. Williams, Experiment Station, West Raleigh, North Carolina, and stated in passing that Mr. Nielsen had "resigned from the Department."

On 22 March 1909 the Assistant Agrostologist (probably Oakley) at USDA wrote Nielsen in Abilene: "While you were still with us you asked that we send you a full set of blue slips as soon as they were received from the printer... I hope that you are having success with your farming proposition so far, and will be glad to hear from you whenever you have an opportunity to write. With very best regards, I am, Very sincerely yours." This confirms that Nielsen is farming, and suggests that he is on friendly terms with Oakley.

On 10 May 1909 C.V. Piper wrote a 2-page typed letter to Nielsen in Abilene, Kansas. "Dear Mr. Nielsen: In going over the soybean seeds for distribution this year, there are several numbers that we could not find that were contained on your list, and we do find a good many numbers that were not on your list. Of the numbers that are missing, the only one of importance is #22381A, the variety that we decided to call Canton. Number 22381 is also missing. I am wondering if you can make any suggestion as to where these seeds might be.

"I have also been struggling to straighten out the group of varieties confused under Hollybrook. In going over your notes and comparing them with those of Professor Mooers of the Tennessee Experiment Station, I find that you arrived at quite different conclusions. I have about decided to get all of their numbers from them and grow [them] alongside of ours again, and get some of the Hollybrook from Woods so as to compare them again this coming season.

"I also want to know the name of the new very late variety that we considered the best. If you can give me the number of name that we applied to this variety, I should very much like to have it. Yours very truly.

On 17 May 1909 in a 2-page handwritten letter to "Prof. C.V. Piper" Nielsen (in Abilene, Kansas), says that he is unable to answer any of Piper's questions. He says he tried "to straighten out the tangle" that the soybean variety Hollybrook is in. He concludes: "I very much doubt if your getting the collection from Mooers and growing [it] alongside the S.P.I. stuff is sufficient to enable you to speak with authority regarding the Hollybrook soybean. I believe you should get it from all the Experiment Stations that have it.

"I am wondering how the Farmers' Bulletin on Soybeans is coming along. It seems to me it should be issued by this time. With kind regards to yourself and the other members of the office force, I am, Very sincerely..."

On 28 May 1909 Piper replied to Nielsen in a 1-page typed letter. "Dear Mr. Nielsen. I have your letter of the 17th instant in reference to the lost packages of soybeans. We have been unable to find these, and I guess they are gone. All we have left is the vial of seed of #22381, and I am having most of this planted again this year."

"I am glad to learn what you say about the Hollybrook... I will endeavor to get all of the different numbers involved in this Hollybrook tangle to grow this year.

In regard to the Farmers' Bulletin, I have revised it very extensively, and hope to send it to the printer within a few days now. Yours very truly..."

On 10 Nov. 1909 Piper wrote Nielsen (in Abilene) a 1-page typed letter. "I understand that you have had a very strenuous season in Kansas this year, and, therefore, that you did not get much out of the legumes [sent free of charge by USDA]. I should be very glad, however, to learn the outcome of your trials, especially in view of the very bad season. If you want to try any of them again, let me know and the seed will be sent. Give my best regards to Mrs. Nielsen. Sincerely yours,..."

On 20 Nov. 1909 Piper again wrote Nielsen (in Abilene) a 1-page typed letter. "Dear Mr. Nielsen. I have your letter of the 16th instant and the interesting report on the adzukis [azuki beans], cowpeas and soybeans. I am sorry to learn that you have had such a disastrous season and that you feel it will be necessary for you to give up the proposition that you have undertaken. I should be very glad to send you seeds of anything we may have next spring, and when you have definitely settled where you will be write me regarding the quantities that you want and I shall be very glad to send them. Give my best regards to Mrs. Nielsen. Yours very truly,..."

On 7 Dec. 1909 Nielsen wrote Piper a 2-page handwritten letter on the letterhead of the Hotel Briggs in Great Bend, Kansas. "Dear Prof. Piper: I am out on a two weeks Farmers' Institute trip for the Kansas Agricultural College and I have found a place here where I think red clover will do well. The country needs the crop and I hope you can arrange to send some seed for trial." He gives the name and address of two farmers in Great Bend. The Kansas Experiment Station has been very successful in Eastern Kansas Canada peas and are also anxious to make a test there with the Tangier pea." Please send seed. He gives more names and addresses in Manhattan and Great Bend, Kansas.

On 9 Dec. 1909 Nielsen wrote Piper a 2-page handwritten letter on the letterhead of the Hotel Larkin in Larned, Kansas ("Steam heat. Electric lights. Rooms equipped with long distance telephones. Rates $2.00; with Bath $2.50"). "Dear Prof. Piper: Remembering our occasional arguments as to what forage crops could be grown in Southwestern Kansas, I am again sending you some names of really good farmers who want to try each an acre of red clover... I case you cannot furnish the seed kindly let me know so I can write the parties. Seed should reach them no later than March 1st. Yours truly,... P.S. I am preaching cowpeas the best I can and find a few have grown them on a small scale with excellent results."

On 15 Dec. 1910 [sic, 1909] Piper wrote Nielsen (in Vesper, Kansas) a 1-page typed letter. "Dear Mr. Nielsen. Immediately after the New Year I am going over to the Philippines on a mission for the War Department, primarily in connection with growing hay for the use of the cavalry horses there... I feel very confident that I can secure you a position there in case you are willing to accept it, at a salary of $2,000 or perhaps as high as $2500. Will you kindly let me know at an early date whether you would consider such a proposition." Nielsen would probably need to leave in the early spring of 1910.

On 20 Dec. 1909 Piper (in Washington, DC) wrote Nielsen (in Abilene, Kansas). "Dear Mr. Nielsen. I have your letter, of Dec. 7th, recommending two farmers who wish to try red clover." Piper will send them clover seed in the spring.

On 27 Dec. 1910 Piper wrote Nielsen (in Vesper, Kansas). "Dear Mr. Nielsen: I have your letter of the 23rd instant, and am very glad, indeed, that you will accept a position in the Philippines." Note: We do not know exactly when Nielsen was in the Philippines, where he probably worked with Piper on forage crops.

On 13 Feb. 1911 Nielsen (in Vesper, Kansas) wrote "Dr." R.A. Oakley (at USDA, Washington, DC) a handwritten letter that begins: "My Dear Oakley: I have some 5000 or 6000 sq. feet of lawn space which is in sad need of some grass. Just at present I can't water the ground but hope to be able to another year." He requests a "good lawn mixture" of seed and any suggestions Oakley might have.

On 15 Feb. 1911 the Acting Agrostologist (Oakley) replies to Nielsen (in Vesper, Kansas) in a 1-page typewritten letter. "I am in receipt of your letter of the 13th instant, and will be very glad, indeed to send you a liberal supply of grass seed suitable to your conditions. I am very much afraid that you will have some difficulty in establishing a satisfactory lawn until you are able to irrigate it by some means... Yours very truly."

Note: This letter is the last in the Nielsen file at NA.

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 95–Newhouse-Nixon.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012.

40. Piper, C.V. 1909. Re: Soybean varieties. Letter to Prof. A.T. Wiancko at Experiment Station, Lafayette, Indiana, April 2. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "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 with these varieties and whether any of them are as promising or more promising under Indiana conditions than the varieties which you had previously been growing."

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–#1.

Note 1. This is the earliest document seen (Aug. 2013) that mentions the soybean variety Austin or the soybean variety Morse.

Note 2. Since Piper sent this list of varieties a year ago, all of them must have been available in about April 1908.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist, in Charge of Forage-Crop Investigations, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, Washington, DC.

41. Piper, C.V. 1909. Re: Mr. Nielsen's vials of 1908 soybean seed numbers. Letter to W.J. Morse, [Arlington Farm], Rosslyn, Virginia, April 22. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I find that Mr. Nielsen put up vials of 1908 seed of the following soybean numbers:" Piper lists 47 numbers, in no apparent order, in 4 columns, starting with the following: 22380. 22882. 22407. 22318. The lowest number is 21757 and the highest is 22927.

"When you are going over the Arlington packets, you need not preserve vials of these numbers. Very truly yours,..."

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: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

42. Piper, C.V. 1909. Re: Adsuki beans. Letter to W.J. Morse, [Arlington Farm], Rosslyn, Virginia, June 7. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I have packed up to plant at Arlington Farm this season the list of adsuki beans indicated on the enclosed list. Where I have sent two pounds of seed I want you to plant one-twentieth of an acre. In all other cases plant an eighth-rod row where the seed is sufficient. Some of these numbers have been planted at Arlington before, but were too late to mature. Nevertheless, I want to try them again. Among these very late numbers are 17231, 21310, 22383, 13384, 13388 and 13406. I would suggest that these be planted just like the soybeans. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

43. Oakley, R.A. 1909. Re: Need specimen of soy bean in flower and fruit. Letter to Mr. W.J. Morse, Arlington Farm, Rosslyn, Virginia, July 26. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: We are anxious to secure as soon as possible a good explanation of soy bean in flower, and fruit in order that we may make a photograph for Prof. Piper's bulletin. Please let me know when the plants are sufficiently far along for this. As soon as you have found a suitable plant it might be well to bring it in to the office and we will have it photographed here. Very truly yours,..."

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: Asst. Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

44. Morse, W.J. 1909. Re: Have excellent soybean plants for photographs. Letter to Mr. R.A. Oakley, USDA, Washington, DC, Aug. 9. 1 p. Typed, with signature on letterhead.
• ***Summary:*** Morse is writing from Arlington Farm, Rosslyn, Virginia: "My dear Oakley: I gave you a memorandum some time ago in regard to alfalfa seed for Mr. Lynn and Mr. Mayer... Both wish the seed for experimental purposes.

"Have some excellent soybean plants for photographs now. What success did you have with the other ones? If you desire any more plants, call me up and I will try to get them over to you as soon as possible. Very truly yours,..."

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: Office of Seed Distribution, Bureau of Plant Industry, USDA, Washington, DC.

45. Piper, C.V. 1909. Re: Kudzu. Letter to W.J. Morse, [Arlington Farm], Rosslyn, Virginia, Aug. 19. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I am sending you today twelve ounces of Kudzu, No. 22341. It is old and will probably germinate pretty low. I should like to have you plant two rows of it say eight rods long so as to see if you can grow large enough plants this fall yet to distribute next spring. Yours sincerely,..."

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: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

46. Piper, C.V. 1909. Re: Photographs to be made at Arlington Farm. Letter (memorandum) to W.J. Morse, [Arlington Farm, Rosslyn, Virginia], Sept. 3. 3 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: In regard to the photographs of forage crops to be made at Arlington Farm this fall, I would suggest as follows:" After a long section on cowpeas, comes a shorter section on:

"Soybeans: Individual plants of soybeans should be photographed in the same manner as individual plants of cowpeas ["... single plants or very short rows of all of the varieties that show striking characteristics. If possible these photographs should be taken so as to permit use in a full page plate, so that four varieties could be put on one plate. In each of these photographs I think the stake should appear alongside the plant, and a short painted stake that will show the height of the plant... The plants should be photographed about the time the pods are full grown.

"Cowpea rows: Wherever it is possible to get two to four rows of cowpeas in the same photograph that will show striking differences in habit, or even striking similarity... It seems to me there are about a dozen photographs which should give a series of very sharp contrasts.

"I would like to have Mr. Crandall make a photographic plate in his laboratory of typical pods of two or three or four varieties of *sesquipedalis* on the same plate, so as to show very striking characteristics"].

"I want the photographs to show clearly the habit of the plant, and, if possible, want it so that it can be reduced so that four plants can be shown on one plate. Photographs should be taken of a sufficient number of varieties to show all of the different habits."

Note: *Vigna unguiculata* subsp. *sesquipedalis,* the yardlong bean, is also known as bora, the long-podded cowpea, asparagus bean, snake bean, or Chinese long bean. It is known as *dau gok* in Cantonese, *jiang dou* in Standard Chinese, *thua fak yao* in Thai, *kacang panjang* in Indonesian and Malay, *sitao* or *sitaw* in Tagalog, *utong* in Ilokano, *bora* or *bodi* in the West Indies and *vali, Borboti* in Bengali, India, *eeril* in Goa, India or *dau dua* (Vietnamese, literally: chopstick bean), *ju-roku sasage* in Japan. Despite the name, the pods are actually only about half a yard long; the subspecies name sesquipedalis (one-and-a-half-foot-long) is a rather exact approximation of the pods' length. (Source: Wikipedia, March 2012).

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: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

47. Piper, C.V. 1909. Re: Cowpea and soybean flowers. Letter to W.J. Morse, Arlington Farm [Rosslyn, Virginia], Sept. 3. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: In regard to cowpeas and soybean flowers, I would like to have you make the following observations:

"Cowpea flowers: How early in the morning are these usually in bloom? At what time of day does the flower close up? (To determine this accurately I wish you would mark a few flowers so as to get exact data).

"Soybean flowers: How early do the flowers open? How long do they remain open? Does the same flower ever open for two days in succession?

"In studying the soybean flowers, I wish you would compare several varieties, as I believe that is some varieties the flowers wither and shrivel in a much shorter time than in other varieties. I shall try to make similar observations at other places. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

48. *Lowville Journal and Republican* (*Lewis County, New York*). 1909. People in print: Morse. May 21.

• ***Summary:*** "Mr. and Mrs. John B. Morse are packing their household goods and expect to leave the present week for Washington [DC], their future home."

Note: Their son, William J. Morse, has just started work with the USDA's Office of Forage-Crop Investigations. Bureau of Plant Industry.

49. Piper, C.V. 1910. Re: Send soy bean seeds to Dr. W.W. Garner. Letter (memorandum) to W.J. Morse [Arlington Farm, Rosslyn, Virginia], April 1. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Will you kindly have packed up for Dr. W.W. Garner, of this Bureau, half-pound lots of the following list of soy beans, of the 1909 crop at Arlington."

Note 1. Dr. Piper lists 50 varieties in two columns. Of these 22 have a number but no name. Those with both a number and name are:

"#14952. Shanghai. #14954. Acme. #16790. Cloud. #17251. Buckshot. #17252. Flat King.

"#17253. Nuttall. #17257. Eda. #17262. Yosho. #17264.

Tokio. #17267. Hope.

"#17269. Medium Yellow. #17273. Butterball. #17275. Amherst. #17280. Mammoth. #17852. Meyer.

"#17861. Jet. #17862. Sherwood. #18227. Chernie. #18259. Pingsu. #19186. Okute.

"#20405. Habaro. #20797. Riceland. #21079. Shingto. #21999. Taha. #22312. Farnham.

"#22333. Baird. #22379. Swan. #25093. Yours very truly,..."

Note 2. On April 19 (about two weeks later), Piper sends Morse another Memorandum on a USDA form: "Will you kindly send a half pound of seed each of No. 17251 and No. 17261 of Arlington 1909 seed to Dr. W.W. Garner of this Bureau. Yours very truly,..."

Note 3: The USDA Memorandum form is 8½ inches wide and 5½ inches from top to bottom; thus exactly half the size of a typical 8½ by 11 inch piece of paper.

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: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

50. U.S. Department of the Interior, Census Office. 1910. John B. Morse, Lena (his wife) and family in the 1910 U.S. Census in Washington, DC. Washington, DC. April 19.
• ***Summary:*** District of Columbia, Washington City, Enumeration District 164, Sheet 6B. Taken on 19 April 1910 by Elizabeth Sherer, Enumerator.

121 V Street, 130th House enumerated. 133rd family enumerated.

John B. Morse. Head of household. Male. White. Age 46, married one time, Married for 26 years. Born New York. Father born Germany, mother born Germany. Speaks English, Occupation: Butcher in a market, Worker (for wages); 0 weeks out of work last year. Owned home. Can read and write. Several codes (5, 2, 3, X) 29–32.

Lena K. Morse. Wife. Female. White. Age 47. Married one time. Married for 26 years. Two children born to her, two alive at time of census. Born New York. Father born in Germany. Mother born in Germany. No occupation. Can read and write.

Gladys H. Morse. Daughter. Female, White, age 23, single, born in New York, Father born in New York, Mother born in New York. Occupation: Teacher in the Public School. She was working on April 13, 1910; she was out of work for 16 weeks in the previous year. Can read and write.

William J. Morse. Son. Male. White. Age 25. Single. Born in New York. Father born in New York. Mother born in New York. Occupation: Agrostologist with the Agriculture Department [USDA]. He was working on April 13, 1910. Can read and write. Code: 676X.

51. Piper, C.V. 1910. Re: Send soy bean varieties to Henry W. Healy. Letter (memorandum) to W.J. Morse [Arlington Farm, Rosslyn, Virginia], May 27. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Will you please send a few varieties of early soy beans to Henry W. Healy, 47 John St., New York City. Prof. Billings says that Mr. Healy has been growing the Guelph soy bean with great success and desires others for comparison."

Note: Henry Wilder Healy was a prominent member of the Heights society set in Brooklyn.

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: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

52. Piper, C.V. 1910. Re: My assistant, Mr. W.J. Morse, will visit you at Knoxville. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Aug. 17. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: My assistant, Mr. W.J. Morse, who has been devoting practically all of his time for three years past to soy beans and cowpeas will visit you at Knoxville about the end of the present month. I may be able to stop off at Knoxville in October but am not yet sure.

Our soy beans at Arlington farm this year are unusually fine and we have by far the largest lot of varieties growing we have ever tested. A majority of them will be discarded with this year's work. If either you or Prof. Morgan can find time to visit here a few days during the latter part of September I think it will be well worth your while.

"Yours sincerely, Agrostologist."

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: Agrostologist, Bureau of Plant Industry, USDA, Washington, DC.

53. Morgan, H.A. 1910. Re: Prof. Mooers and I will be away when your assistant, Mr. Morse, comes. Letter to Prof. C.V. Piper, Bureau of Plant Industry, U.S. Dept. of Agriculture, Washington, D.C., Aug. 23. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Piper: Your letters of the 17th and 19th to Professor Mooers I take the liberty of answering

as Professor Mooers has taken sick this summer and had to leave for the West. He may not be back until late in the fall. I have been under the weather too for a month or so and am leaving tomorrow for a little rest, so that I am sorry both Professor Mooers and myself will be away when your assistant, Mr. Morse comes.

"I wish very much that I could get up to see you next month but I fear I will not be able to do so as my work is a little heavy on account of Professor Mooers' absence. You must try to get to see us in October, a little earlier than that would be better from the soy bean point of view

"With kindest regards,

"Sincerely yours, Director."

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: Director, Tennessee Experiment Station, Knoxville, TN.

54. Oakley, R.A. 1910. Re: Travel permission and instructions. Letter to Mr. W.J. Morse, Arlington Farm, [Rosslyn, Virginia], Sept. 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: I am enclosing a letter of instructions permitting you to visit Blacksburg, Virginia, Knoxville and Jackson, Tennessee, Urbana, Illinois, Lafayette and Plainfield, Indiana, Columbus and Wooster, Ohio, LeRoy and Ithaca, New York, and other nearly places and points en route for the purpose of taking notes on tests of soy beans. You will leave Washington about September 15th and return about September 30th."

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. Folder #1–Morse, W.J.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Acting Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

55. Dorsett, P.H. 1910. Re: Letter from Mr. B.S. Cowen, Mobile Farm Land Co., Mobile, Alabama. Letter (memorandum) to Prof. C.V. Piper [Head, Bureau of Plant Industry, USDA], Washington, DC, Oct. 24. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: The following is a paragraph contained in a letter recently received from Mr. B.S. Cowen, General Manager, Mobile Farm Land Co., Mobile, Alabama:

"'Also kindly give us similar information regarding the Soy Bean, and in both cases, if you could tell us where seed could be secured in case crops are possible in this section, it would be appreciated.'

"I have written Mr. Cowen that this part of his letter has been referred to you, and will be obliged if you will give him what information you can relative to the cultivation of Soy beans.

"Very truly yours, Expert Plant Introducer."

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, 1905-1929. Piper, C.V. Box no. 107.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Expert Plant Introducer, Foreign Seed and Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC.

56. Piper, C.V. 1910. Re: Send soy bean varieties to Dr. E. Von Tschermak. Letter (memorandum) to W.J. Morse [Arlington Farm, Rosslyn, Virginia], Dec. 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: I wish you would send to Prof. Dr. E. Von Tschermak, Hoch Schule [Hochschule] fur Bodencultur, Austria, ten or twenty of our early varieties of soy beans, say half-pound samples of each. In writing, advise him that you are doing it for me. Also in writing, ask him again for seed of all the varieties of soy beans originally introduced into Vienna by Haberlandt. Von Schermak sent us these before, but I think you told me that many of them did not grow. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

57. Piper, C.V. 1910. Re: Work of various men in Office of Forage-Crop Investigations during Piper's absence. Letter (memorandum) to Mr. Wm. A. Taylor, Acting Chief, Bureau of Plant Industry, Washington, DC, Dec. 30. 3 p. Typed, without signature (carbon copy).

• ***Summary:*** "I have prepared the following memoranda regarding the work of the different men in this office while I am away:

"Mr. R.A. Oakley: I have already asked that Mr. R.A. Oakley be designated as Acting Agrostologist during my absence. Mr. Oakley is to have general charge of the office, and will be able also to attend personally to the necessary field work in connection with the Major Project #182–Grass Investigations."

"Mr. W.J. Morse:... has direct charge of the experimental work at Arlington Farm. His field work is principally in

connection with soy beans, and will necessitate some traveling throughout the Southern States."

Others mentioned in the memorandum are: Mr. J.M. Westgate (clovers, alfalfa), Mr. H.N. Vinall (dry land stations, alfalfa), Mr. A.B. Conner (Texas, sorghums), Prof. S.M. Tracy (Mississippi), Mr. Roland McKee (Chico, California; forage crop investigations), Mr. N.W. Evans (Ohio, timothy breeding), Mr. A.B. Cron (alfalfa), Mr. Samuel Garver (South Dakota, alfalfa), Mrs. K.S. Bort (Office records), Mr. Lyman Carrier (Cooperative work at Virginia Experiment Station).

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–#2.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist, Bureau of Plant Industry, Washington, DC.

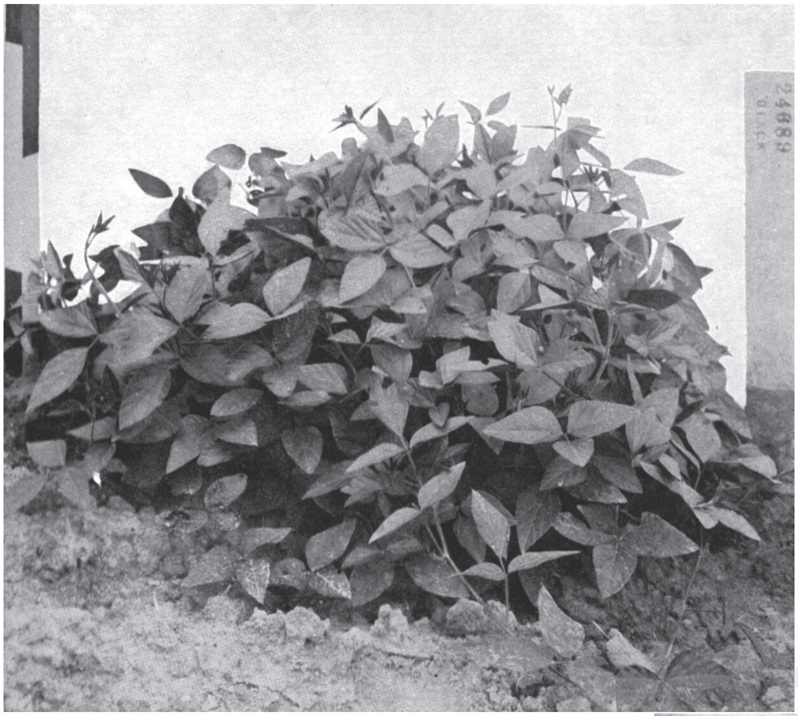
58. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies. *USDA Bureau of Plant Industry, Bulletin* No. 197. 84 p. Dec. 31. Includes 8 plates showing plants, pods, and seeds, and an excellent 6-page index. [27 ref]

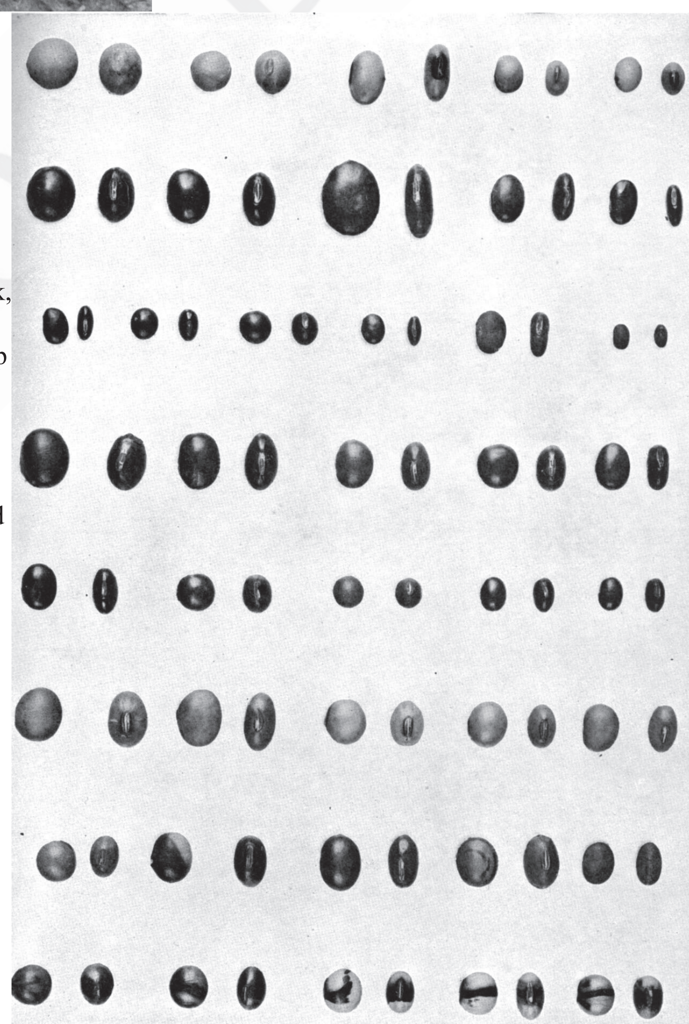
• ***Summary:*** Contents: Botanical history and identity of the soy bean. Botanical classifications of soy-bean varieties. Varietal characteristics of soy beans: Habit of growth, foliage, pubescence, flowers, pods, seeds. Frost resistance. Period of maturity (soybeans were planted at the Arlington Experimental 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.

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.

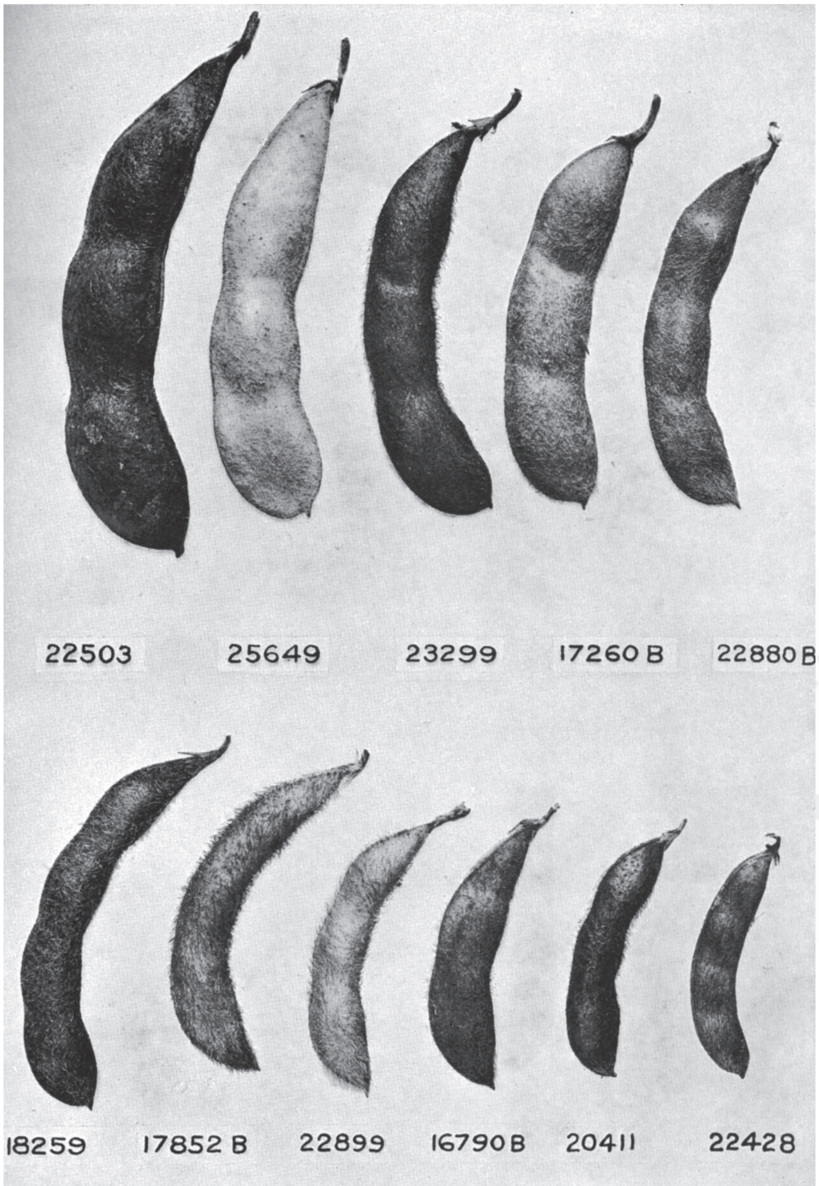
The “Catalogue of soy-bean varieties” (p. 39) is “a complete list of soy beans imported by the United States Department of Agriculture, arranged chronologically in accordance with the sequential S.P.I. (Seed and Plant Introduction) numbers assigned to them by the Office of Foreign Seed and Plant Introduction.” 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,



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 1. 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 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 2. This is the most important document ever published on early soybean varieties in the USA.

Note 3. This is the earliest document seen (Oct. 2010) that uses the word "determinate" in connection with 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.

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."

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."

Note 4. 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 5. 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 6. 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 7. 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.

59. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies: Botanical history and identity of the soy bean (Document part). *USDA Bureau of Plant Industry, Bulletin* No. 197. p. 9-11. Dec. 31.
• ***Summary:*** "The soy bean was first made known to Europeans by Kaempfer, who spent three years, 1690 to 1692, in Japan. Kaempfer (Amoenitatum Exoticarum, 1712, p. 837) gives the Japanese name 'Daidsu Mame' and describes it as an erect bean, with the pod of a lupine and the seeds like a large white pea. Linnaeus (Flora Zeylanica, 1747, p. 534) describes the plant briefly under 'Dolichos' and states that it is cultivated in Ceylon. This last statement is probably an error. He also cites the descriptions of Kaempfer. In 1753 Linnaeus repeats the description of the Flora Zeylanica and formally names the plant *Dolichos soja,* giving its habitat, however as India. What Linnaeus's Ceylon or India plant may be is not certain, as will appear.

"Moench in 1794 rechristened the Linnaean plant *Soja hispida.* Savi in 1824 called the Japanese soy bean *Soja japonica.* Miquel in 1855 named a narrow-leafed form from Java *Soja angustifolia,* and Maximowicz in 1873, using Moench's specific name, published the soy bean as *Glycine hispida,* which name has been generally adopted. Siebold and Zuccarini had previously (1843) named a plant from Japan *Glycine soja,* supposing it to be the *Dolichos soja* of Linnaeus. This plant, however, was not the soy bean cultivated by the Japanese but the wild plant later described as *Glycine ussuriensis* by Regel and Maack. Under existing botanical rules, the soy bean, which is known only as cultivated, has been called *Glycine hispida* (Moench) Maximowicz, and its nearest relative *Glycine soja* Siebold and Zuccarini (*G. ussuriensis* Regel and Maack). Maximowicz considered that the soy bean was probably derived from the latter by cultivation, but this idea has not generally been accepted.

"Glycine soja, as heretofore known, differs from *G. hispida* in its more slender and more vining stems, in being less hairy, in bearing smaller pods and seeds, and especially in having smaller flowers. The flower is 3 to 5 mm. long, while that of *G. hispida* is 6 to 7 mm. The structure of the flower is the same in both, but the calyx lobes are usually longer in proportion to the tube in *G. hispida* than in *G. soja.* It is apparent, therefore, that the fundamental differences between the species are slight. The smaller flower we regard as the best single character to separate *G. soja* from *G. hispida,* but using this as a criterion *G. soja* is also a cultivated species."

Note: This is the earliest English-language document seen (Nov. 2002) that uses the word "vining" in connection with soybeans–in this case *Glycine soja,* the wild soybean.

"Among numerous lots of seeds received from India (S.P.I. Nos. 24672 to 24693 inclusive) representing seven varieties, there are at least two (see Nos. 24675 and 24682) which have very small flowers, 3 mm. long, indistinguishable from those of the wild *G. soja* that we have grown. Typical plants of *Glycine soja* obtained from the Botanic Garden, Tokyo, Japan (S.P.I. No. 22428), and from Soochow, Kiangsu, China (S.P.I. No. 25138), have been grown three seasons. The India plants are coarser stemmed, less vining, and bear somewhat larger pods and seeds, but the flowers are much smaller than those of any variety of *G. hispida* and precisely like those of *G. soja.* Other numbers from India are probably *G. hispida,* but the flowers are somewhat smaller than the Japanese varieties and the pods and seeds as small as any variety of *G. hispida.* It is therefore apparent that both *G. soja* and *G. hispida* are cultivated in parts of India, if we accept the flower character as decisive. This fact makes it doubtful which of the two plants Linnaeus named *Dolichos soja.* There seems no good reason why *G. hispida* may not have been derived from *G. soja* by cultivation, the smaller flowers of the latter being the principal difficulty to explain. In all other respects the two supposed species seem to merge completely. The identity of the plant cultivated in India has been commented on by Watt (Dictionary of the Economic Products of India, 1890, p. 509)...

"Prain apparently does not apply the size of the flower as

a critical character. Applying this, however, two of the Indian varieties (see No. 24675 and 24682) are certainly *Glycine soja* [the wild annual soybean] but the plants are stouter and less twining, and the pods and seeds larger than the wild form from Japan. Three other varieties (Nos. 24672, Khasi Hills [in today's Indian state of Meghalaya], and 24673 and 24674, Darjiling [Darjeeling in West Bengal, India]) we would refer to *G. hispida* [the domesticated soybean] though the flowers are somewhat smaller than the Japanese and Chinese varieties. The first is erect and bushy, but the other two are procumbent and vining. A variety from Taihoku, Formosa, No. 24642, is very similar to the two varieties from Darjiling. On the whole, we are therefore inclined to believe that there is but one botanical species, which has been profoundly modified by cultivation."

Note: This is the earliest document seen (Oct. 2010) that contains the word "procumbent" in connection with the soybean.

To summarize: In most botanical works the soybean is named *Glycine hispida* (Moench) Maximowicz. By a few writers it is named *Soja hispida* Moench. The use of either of these names is based on the idea that the wild soybean *Glycine soja* Siebold & Zuccarini or *Glycine ussuriensis* Regel & Maack is a different species. Piper and Morse (above) have shown that this view is untenable, the wild and cultivated plants representing but one species. Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

60. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies: Early agricultural history in the United States (Document part). *USDA Bureau of Plant Industry, Bulletin* No. 197. p. 26-27. Dec. 31. [14 ref]
• ***Summary:*** "The first mention of the soy bean in American literature is by Thomas Nuttall, in the New England Farmer, October 23, 1829. Nuttall grew a variety with red flowers and chocolate-brown seeds in the botanic garden at Cambridge, Massachusetts.

"In the same journal two years later, November 23, 1831, is an account of the successful culture of the plant at Milton, Massachusetts, the seed having been obtained from Nuttall. No further mention of the plant in American literature appears until 1853, when a brief account appeared under the name 'Japan pea,' by A.H. Ernst, Cincinnati, Ohio...

"In the following year, 1854, the Perry expedition brought back two varieties of 'soja bean' from Japan, one 'white' seeded, the other 'red' seeded. These, together with the Japan pea, were distributed by the Commissioner of Patents in 1854, and, thereafter, frequent references to the plant occur in agricultural literature under such names as Japan pea, Japan bean, and Japanese fodder plant. Most of these articles speak of the plant as the Japan pea, none of them as the soy or soja bean. It is apparent from the early accounts that there were at least two Japan peas, one early enough to mature in Connecticut (Patent Office Report, 1854, p. 194), the other very late (American Agriculturist, 1857, vol. 16, p. 10). Judging from all the accounts, we suspect that the early Japan pea may be the Ito San variety, which, however, has red flowers, while the late variety may be the Mammoth. The Ito San is still occasionally called the Japan pea, while the introduction and source of the Mammoth has never been definitely determined. From these early accounts the Mammoth may well be the 'white-seeded' soja bean obtained by the Perry expedition. The 'red-seeded soja bean' was perhaps, the Adsuki [azuki] bean (*Phaseolus angularis*), as no red-seeded soy bean is known.

"Prof. G.H. Cook, of New Brunswick, New Jersey, obtained seed of the soy bean at the Bavarian Agricultural Station in 1878. In the same year Mr. James Neilson obtained seeds of several varieties at Vienna, Austria. Both of these gentlemen planted the seeds and gathered crops of the different varieties in 1879. These varieties were without doubt those grown and distributed through Europe by Professor Haberlandt, of Vienna.

"A yellow-seeded soy bean was grown at the North Carolina Agricultural Experiment Station in 1882 and reported on in some detail. The source of the variety is not given, but by implication it is the same as the variety stated to be grown by a number of persons in the State, and is probably the Mammoth.

"Two varieties, one black seeded, the other with white seeds, were grown at the Massachusetts Agricultural Experiment Station in 1888. In 1890 Prof. C.C. Georgeson secured three lots of soy beans from Japan which were grown at the Kansas Agricultural Experiment Station in 1890 and subsequently. Prof. W.P. Brooks, of Amherst, Massachusetts, brought with him from Japan in 1889 a number of soy-bean varieties, including the Medium Green or Guelph, and the Ito San. It is quite certain that other importations of soy beans from Asia were made by others, but no definite records have been found. [Note: The Guelph variety was NOT developed in Canada.]

"Since 1890 most of the agricultural experiment stations have experimented with soy beans and many bulletins have been published dealing wholly or partly with the crop." Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

61. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies: Soy-bean varieties described and indexed in this publication (Document part). *USDA Bureau of Plant Industry, Bulletin* No. 197. p. 79-81. Dec. 31. [27 ref]
• ***Summary:*** Named soy-bean varieties described and indexed in this publication, listed alphabetically below with

the color of their seeds, are: Acme (straw yellow), Amherst (straw yellow), Arlington (black), Auburn (black), Austin (olive yellow), Baird (brown), Barchet (dark olive brown), Black Beauty (black), Brindle (brown and black), Brooks (straw yellow), Brown (brown), Brown Eda Mame (brown), Brownie (brown), Buckshot (black), Butterball (straw yellow), Chadaidzu (brown), Chernie (black), Chestnut (brown), Cloud (black), Columbia (chromium green), Daidsu Mame (yellow), Dwarf Brown (brown), Early Black (black), Early Brown (brown), Early Japan (straw yellow), Early White (yellow), Early Yellow (yellow), Ebony (black), Eda (brown), Eda Mame (yellow), Edward (straw yellow), Elton (straw yellow), Etampes (yellow), Extra Early Black (black), Fairchild (black), Farnham (straw yellow), Flat King (black), Flava (straw yellow), Giant Yellow (yellow), Green Samarow (green), Guelph (or Medium Green) (green), Habaro (straw yellow) [From Khabarovsk, Siberia, Russia 1907], Haberlandt (straw yellow), Hankow (brown banded with black), Hansen (brown), Hollybrook (straw yellow), Hongkong (black), Hope (olive yellow), Ito San (straw yellow), Jet (black), Kingston (black), Kiyusuke Daidzu (yellow), Large Black (black), Late Yellow (yellow), Lowrie (olive yellow), Mammoth (straw yellow), Manhattan (straw yellow), Medium Black (black), Medium Early Black (black), Medium Green (Guelph) (green), Medium Yellow (straw yellow), Merko (brown), Meyer (black and brown), Morgan (olive yellow), Morse (olive yellow), Natsu (straw yellow), Nemo (olive yellow), Nielsen (olive yellow), Nigra (black), Nuttall (black), Ogemaw (Ogema) (brown), Okute (olive yellow), Peking (black), Pingsu (black), Riceland (black), Samarow (green), Sedo (deep brown), Shanghai (black), Sherwood (straw yellow), Shingto (olive yellow), Southern (yellow), Stuart (olive yellow), Swan (straw yellow), Taha (black with olive saddle), Tashing (chromium green), Tokyo (olive yellow), Trenton (brown), Vireo (olive yellow), Wilson (black), Wisconsin Black (black), Yamagata Cha-daizu (brown), Yellow (yellow), Yellow Eda Mame (yellow), Yellow Etampes (yellow), Yellow Riesen (yellow), Yosho (olive yellow).

Note 1. This is the earliest document seen (Sept. 2013) that mentions the following soy-bean varieties: Acme, Auburn, Arlington, Barchet, Black Beauty, Chernie, Columbia, Elton, Fairchild, Farnham, Flava, Lowrie, Morgan, Natsu, Nemo, Nielsen, Nigra, Okute, Peking, Sedo, Stuart, Swan, Taha, Trenton, Vireo.

Note 2. This is the earliest document seen (Sept. 2013) by Piper or Morse that is mainly about soybean varieties.

Note 3. This is the earliest document seen (Aug. 2013) which states that Black Beauty is a synonym of Ebony (see p. 43).

Note 4. This is the earliest English-language document seen (Sept. 2004) that uses the word "banded" (or "banding" or "bands") (with Hankow), or the term "olive brown" or "dark olive brown" (with Barchet) to describe the color of soybean seeds. Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

62. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies: Varieties introduced into the United States independently of the Department of Agriculture or previous to 1898 (Document part). *USDA Bureau of Plant Industry, Bulletin* No. 197. p. 27-31. Dec. 31. [14 ref]

• ***Summary:*** "Early agricultural history in the United States: The first mention of the soy bean in American literature is by Thomas Nuttall, in the *New England Farmer,* October 23, 1829. Nuttall grew a variety with red flowers and chocolate-brown seeds in the botanic garden at Cambridge, Massachusetts, and from his observations wrote a brief account concerning it. He writes:

"'Its principal recommendation at present is only as a luxury, affording the well-known sauce, soy, which at this time is only prepared in China and Japan.

"In the same journal two years later, November 23, 1831, is an account of the successful culture of the plant at Milton, Mass., the seed having been obtained from Nuttall.

"No further mention of the plant in American literature appears until 1853, when a brief account appeared under the name 'Japan pea,' by A.H. Ernst, Cincinnati, Ohio, as follows:

"'The Japan pea, in which so much interest has been manifested in this country for a year or two past, from its hardihood to resist drought and frost, together with its enormous yield, appears to be highly worthy of the attention of agriculturists. This plant is stated to be of Japan origin, having been brought to San Francisco about three years since, and thence into Illinois and Ohio. Its habit of growth is bushy, upright, woody, and stiff, branching near the ground, and attaining a height of three or four feet. The leaflets are large, resembling those of an ordinary bean, occurring in sets of three, with long quadrangular stems. The flowers, which are small and white, but rather inconspicuous, sometimes having purple centers.'

"In the following year, 1854, the Perry expedition brought back two varieties of 'soja bean' from Japan, one 'white' seeded, the other 'red' seeded. These, together with the Japan pea, were distributed by the Commissioner of Patents in 1854, and, thereafter, frequent references to the plant occur in agricultural literature under such names as Japan pea, Japan bean, and Japanese fodder plants. Most of these articles speak of the plant as the Japan pea, none of them as the soy or soja bean. It is apparent from the early accounts that there were at least two Japan peas, one early enough to mature in Connecticut (Patent Office Report, 1854, p. 194), the other very late (*American Agriculturist,* 1857, vol. 16, p. 10). Judging from all the accounts, we suspect that the early Japan pea may be the Ito San variety,

which, however, has red flowers, while the late variety may be the Mammoth. The Ito San is still occasionally called the Japan pea, while the introduction and source of the Mammoth has never been definitely determined. From these early accounts the Mammoth may well be the 'white-seeded' soja bean obtained by the Perry expedition. The 'red-seeded soja bean' was perhaps, the Adsuki bean (*Phaseolus angularis*), as no red-seeded soy bean is known.

"Prof. G.H. Cook, of New Brunswick, New Jersey, obtained seed of the soy bean at the Bavarian Agricultural Station in 1878. In the same year Mr. James Neilson obtained seeds of several varieties at Vienna, Austria. Both of these gentlemen planted the seeds and gathered crops of the different varieties in 1879. These varieties were without doubt those grown and distributed through Europe by Professor Haberlandt, of Vienna.

"A yellow-seeded soy bean was grown at the North Carolina Agricultural Experiment Station in 1882 and reported on in some detail. The source of the variety is not given, but by implication it is the same as the variety stated to be grown by a number of persons in the State, and is probably the Mammoth.

"Two varieties, one black seeded, the other with white seeds, were grown at the Massachusetts Agricultural Experiment Station in 1888.

"In 1890 Prof. C.C. Georgeson secured three lots of soy beans from Japan which were grown at the Kansas Agricultural Experiment Station in 1890 and subsequently.

"Prof. W.P. Brooks, of Amherst, Mass., brought with him from Japan in 1889 a number of soy-bean varieties, including the Medium Green or Guelph, and the Ito San. It is quite certain that other importations of soy beans from Asia were made by others, but no definite records have been found.

"Since 1890 most of the agricultural experiment stations have experimented with soy beans and many bulletins have been published dealing wholly or partly with the crop."

"Varieties introduced into the United States independently of the Department of Agriculture or previous to 1898.

"Enumeration: Previous to the numerous introductions by the United States Department of Agriculture beginning in 1898, there were not more than eight varieties of soy beans grown in the United States, namely, Ito San, Mammoth, and Butterball, with yellow seeds; Buckshot and Kingston, with black seeds; Guelph or Medium Green, with green seeds; and Eda and Ogemaw, with brown seeds." The history of and information about each of these eight soybean varieties is given in great detail.

U.S. seedsmen or seed companies which have carried these soybeans include: Mr. E.E. Evans, West Branch, Michigan (1901); J.M. Thorburn & Co. (1901); W.A. Burpee (1902); Hammond Seed Co. (1903); Johnson & Stokes (1902); W.T. Wood & Sons, Richmond, Virginia (1889).

Foreign seedsmen include: Vilmorin-Andrieux & Co., Paris, France (1901); Haage & Schmidt, Erfurt, Germany (1908); Dammann & Co., Naples, Italy (1908).

Note: This is the earliest document seen (June 2003) stating that soybeans were being sold by W.A. Burpee (1902). Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

63. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies: Pollination and hybridization (Document part). *USDA Bureau of Plant Industry, Bulletin* No. 197. p. 20-23. Dec. 31.

• ***Summary:*** "The soy-bean flower is completely self-fertile, bagged plants setting pods as perfectly as those in the open. This was tested at the Arlington Experimental Farm [Virginia] in 1909 by bagging 30 plants representing 10 varieties. In no case did the bagged individuals fail to produce as well as neighboring unbagged plants. Ten plants were also inclosed in box screens with similar results.

"The flowers are much visited by bees, mainly for the pollen, as but a very small quantity of nectar is secreted. Cross-pollination would be a frequent occurrence were it not that the abundant pollen of each flower covers the stigma almost as soon as the flower opens.

"Previous to 1907 the remarkable uniformity of the plats at the Arlington Experimental Farm, except for occasional and evident admixtures, had led to the belief that natural hybrids of the soy bean did not occur. In that year the occurrence of certain oddly colored seeds, smoky green, smoky yellow, brown and yellow, etc., in the bulk seed was noted. These were carefully saved and the resultant rows in 1908 gave diverse progeny, showing that some of the seeds at least were hybrids. In 1908 more than a hundred single-plant selections of supposed hybrids were made and planted in 1909. Some of the results are indicated in Table V (p. 22). Titled "Variations is hybrid soy-bean plants and their progeny at the Arlington Experimental Farm, 1908-1910," it has the following columns: Serial No., Hybrid: Color of pubescence, color of seed. Progeny: Total number of plants, color of pubescence, color of flower, color of seed.

"It is evident from the diversity of the progeny that the parents were hybrids in all the cases listed. The number of plants grown in each case is too small to secure definite proportions, but it is clear that the color of the pubescence and the color of the seed behave in Mendelian fashion. The same is probably true of the flower color, which was counted in only one case.

"There is thus furnished a clear explanation of the origin of many of the new varieties at the Arlington Experimental Farm that were at first mistaken for accidental admixtures. It also accounts for the diversity of the population exhibited in many introduced varieties notwithstanding the apparent uniformity of the seed.

"It must not be supposed from the foregoing account that hybrids are common in soybeans. At Arlington the test rows are grown contiguously, so that there is a great opportunity for cross-pollination. Nevertheless, the percentage of hybrids that occur is very small, perhaps not one individual in two hundred.

"Thus far the hybrid plants have been detected mostly by the color of the seed. In a number of cases none of the progeny has seed similar to the parent; or, in other words, the color of heterozygote seeds is often unstable. Among the most striking of such heterozygote seeds (Pl. VIII) are yellow with a single narrow transverse band of brown; yellow or green, with an irregularly star-shaped brown or black figure centering at the hilum; and green or yellow more or less suffused with a smoky color. Some of the last breed true, but most of them do not."

Note 1. This is the earliest document seen that describes soybean hybrids.

Note 2. This is the earliest English-language document seen (June 2010) that uses the word "pubescence" to refer to the fine short hairs on the stem and leaves of the soybean plant.

Note 3. This is the earliest English-language document seen (March 2015) that uses the word "hybridization" in connection with soybeans. Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

64. Morse, W.J. 1911. Re: Send soybean varieties to Dr. Karl Kellerman. Letter to Mr. Chas. W. Lee, Arlington Farm, Rosslyn, Virginia, Jan. 14. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Lee: Will you kindly put up for Dr. Karl Kellerman of this Bureau one ounce packets of the following varieties of soy beans:

"14954 Acme; 16790 Cloud; 17252 Flat King; 17252 C. Edna; 17253 Nuttall;

"17254 Ebony; 17263 Austin; 17264 Tokyo; 17267 Oak; 17268 Ito San;

"17268 Duggar; 17271 Haberlandt; 17278 Hollybrook; 17852 Meyer; 17852 B, Poking;

"17861 Jet; 18227 Churney; 18259 Pingau; 19183 Wilson; 20854 Tashing;

"21079 Shingto; 21079 A, Auburn; 21999 Taha; 22899 Arlington; 23232 Barchet.

"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–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.

65. Morse, W.J. 1911. Re: Send soybean varieties to Mr. Vinall. Letter to Mr. Chas. W. Lee, Arlington Farm, Rosslyn, Virginia, Jan. 19. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Lee: Enclosed you will find order for soybean seeds for Mr. Vinall. Will you kindly reserve the amounts of seeds? 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–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.

66. Morse, W.J. 1911. Re: Send soybean varieties to Mr. W.A. Orton and Mr. H.A. Allard. Letter to Mr. Chas. W. Lee, Arlington Farm, Rosslyn, Virginia, Jan. 19. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Lee: Will you kindly send over at the first opportunity two pounds of soy bean variety 20405 to Mr. W.A. Orton of the Bureau of Plant Industry. Also send to Mr. H.A. Allard of Tobacco Investigations two packets of the soy bean variety 21755, one packet of which was of June first sowing, the other packet of May 15th sowing. These two packets, I think, have the date of sowing marked on the label.

"In regard to the large lots of cow peas now at the farm, I wish you would get the weights of these and send them to me as soon as possible. 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–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.

67. Morse, W.J. 1911. Re: Send soybean varieties to Mr. J.P. William & Bro., Heneragoda, Ceylon. Letter to Mr. R.A. Young [USDA], Feb. 18. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Young: In regard to the varieties of soy beans to be sent to Mr. J.P. William & Bro., Heneragoda, Ceylon, I have selected the following numbers and will send out at an early date six ounces each of the same.

"No. 17263 Austin. No. 17271 Haberlandt. No. 17278 Hollybrook. No. 17268 Ito San. No. 17852 Peking.

"No. 23232 Barchet. No. 21999 Taha. No. 17267 Hope.

"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–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.

68. Morse, William. 1911. Re: Glad to send soybean seed for testing. Letter to Prof. F.D. Stevens, Experiment Station, Uniontown, Alabama, March 16. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: Replying to your letter of February 28th, I am taking pleasure in sending you ten pounds of each of the following varieties of soy beans:

"No. 16790–Cloud.

"No. 17252–Flat King

"No. 17263–Austin

"No. 17267–Hope

"No. 17268C–Duggar

"No. 17271–Haberlandt

"No. 17852–Meyer

"No. 17852B–Pekin

"No. 23232–Barchet

"I regret to say that our supply of seed of No. 23236 is exhausted, We have, however, a strain of this variety which is about ten days earlier, I am sending you ten pounds of this number, 23232. The number of Riceland is 20797, which is identical with No. 23337.

"In regard to the Florida velvet bean and the Lyon bean, I am sending you one pound of each.

"Very truly yours, 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–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 [USDA].

69. Morse, W.J. 1911. Re: Soybean varieties for Mr. Howard Newport. Letter to Mr. R.A. Young [USDA], April 19. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Young: Regarding your memorandum of April 14 concerning soy bean varieties for Mr. Howard Newport, I would say that we have none of the Hankow or Riceland varieties. We have, however, varieties identical to these except for the color of the seed. We can send six ounces each of three or four such varieties in place of those Mr. Newport mentions. Very truly yours,..."

Note: Handwritten by Morse at the lower left of the Memo are: "17278–Hollybrook. 17852B Peking. 23232 Barchet. 30205 Mammoth."

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, Seed Distribution, Bureau of Plant Industry, USDA, Washington, DC.

70. Morse, W.J. 1911. Re: Substituting soy bean varieties for the Hollybrook and Mammoth. Letter to Mr. R.A. Young [USDA], April 25. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Young: Referring to the attached letter, I am substituting the six following varieties of soy beans for the Hollybrook and Mammoth:

"No. 17278–Hollybrook. No. 23232–Barchet. No. 25118–Black. No. 25135–Green. No. 25438–Green.

"No. 24675–Black.

"We have sent seed of these varieties to places in the same latitude as the Maltese Islands and have received very good reports. This seed was put up by me yesterday morning and given to Mr. Knight.

"Very truly yours,..."

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, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

71. Oakley, R.A. 1911. Re: George W. Carver at Tuskegee Institute desires cooperative forage crop work. Letter to Mr. W.J. Morse [Bureau of Plant Industry, USDA], May 23. 1 p. Typed, with initials on letterhead.

• ***Summary:*** "Dear Mr. Morse: The Director of the Experiment Station at Tuskegee Institute, Alabama, is desirous of taking up some cooperative forage crop work with us. I have written with regard to the matter and have sent seed of alfalfa and the Lyon bean. I have indicated that you would furnish him with some varieties cowpeas and soy beans if possible. If you can send some seed, address George W. Carver, Tuskegee Normal and Industrial Institute, Alabama. I think it will be unnecessary to write him. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Acting Agrostologist, Forage-

Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

72. Young, R.A. 1911. Re: Thanks for sending seeds to Mr. F.H. Hope. Letter to Mr. W.J. Morse [Bureau of Plant Industry, USDA], June 17. 1 p. Typed, with initials (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Your memorandum of June 16 has been received, and I wish to thank you heartily for your attention to my request for seeds of soy beans, cow peas and sorghum for Mr. F.H. Hope."

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: Acting Agrostologist, Bureau of Plant Industry, USDA, Washington, DC.

73. Meyer, Frank N. 1911. Re: Soybean cake and oil. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. See p. 1402, 1405. Letter of 22 July 1911 from Omsk, Siberia, to David Fairchild of USDA.
• ***Summary:*** "I see you obtained some good soy beans from Mr. E.C. Parker in Mukden [Manchuria]. In connection therewith I enclose a clipping from the 'Peterburger Herald' in which it is stated that in one case the butter coming from cows fed with soybean cake had a decided oil taste. Please turn this clipping over to the specialist in charge of these problems. I also read somewhere that in Marseilles [France] they have made some very good soap from soybean oil."

A subsequent letter of 21 Aug. 1911 (p. 1424) states: "I am also enclosing a number of clippings. Some are quite interesting, although old in years. There is one on Soy bean oil manufacture in Odessa [Ukraine], for the specialist on soy beans" [William Morse].

Note: This is the earliest English-language document seen (Aug. 2016) that contains the term "soybean oil." But it is a letter written by a man whose native tongue is Dutch, not English–although he speaks and writes good English.

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer.

74. Morse, W.J. 1911. Re: Report on trip to Monetta, South Carolina. Letter to Mr. R.A. Oakley, USDA, Washington, DC, Aug. 15. 3 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** "My dear Oakley: Spent Monday with Mr. Jos. [Joseph] M. Johnson at Monetta [South Carolina] and thought I would write you concerning the condition of our experiments there. You will no doubt recall that soybeans grown previously at Monetta were failures and an examination of the plant roots gave no evidence of tubercles. The plants last year reached a height of about 16 inches. In sending seed of the best soy beans, that is those found most resistant to wilt and root-knot [nematodes] last year, soil was sent from the soybean plat at Arlington Farm [Virginia]. The soy beans this year at Monetta are excellent. The plants of the two best varieties are three feet high. The plants are vigorous, have an abundant growth and a very extensive root system. The roots are covered with nodules of all sizes, some as large as a small-sized marble. Not a variety is less than two feet high. A very striking contrast to the previous year.

"The other crops are doing fairly well, except the adzuki beans. The wilt has played havoc with the adzuki and mung beans. As yet there has been very little wilt in the soys and no evidence of root-knot." "With best wishes,..."

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: The Albion [hotel], S.J. Newcombe managing director, Augusta, Georgia.

75. Morse, W.J. 1911. Re: Report on travels. Letter to R.A. Oakley, Forage Crop Investigations, Washington, DC, Aug. 22. 4 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** "My dear Oakley:..." Morse says he plans to visit the state experiment stations in North Carolina, then Urbana, Illinois, then Lafayette, Indiana [Purdue]. He can get more information on crops this way than by visiting farmers. "This was the case at the Florida and Alabama stations... I think I gathered quite a little valuable information on soybeans and cowpeas in addition to other forage crops." Mentions Prof. Duggar.

"The soybean question in Florida, I think, is much the same as that of South Carolina, namely, that of inoculation. In Alabama soybeans make an excellent growth and should prove an excellent forage crop for that state."

Note: This is the earliest letter seen (Aug. 2011) concerning travel plans written by William Morse. However his earliest trip behalf of soybeans was apparently to Florida and Alabama.

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. Folder #1–Morse, W.J.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: The Southern [hotel], Mrs. J.H. Day, Proprietress, Jackson, Tennessee.

76. *Washington Post.* 1911. Licensed to marry. Sept. 21. p. 3.
• ***Summary:*** "William J. Morse, 27, and Edna B. Siggers,

27." By the Rev. E.M. Mott.

Note: Since the Rev. was mentioned, we assume it was the announcement of the marriage, not just a license. According to William Morse's daughter (20 Dec. 2012) the marriage took place on 20 Sept. 1911 at The Church of the Advent in Washington, DC.

This announcement also appeared on the same date in *The Washington Herald* (p. 2) and in *The Washington Times* (p. 17).

77. Young, R.A. 1911. Re: Soy beans sent to Kamerunga State Nursery, Australia. Letter to Mr. W.J. Morse [Bureau of Plant Industry, USDA], Dec. 22. 1 p. Handwritten, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Please note this letter of Oct. 17, from the Kamerunga State Nursery, re soy-beans sent them. Can you supply samples of seed grown in very hot localities?"

Morse replied to Young on Dec. 27 (typed with signature on USDA BPI Forage Crop Investigations letterhead): "As our supply of 1911 seed is now on hand, I will be able to supply you with a number of varieties that no doubt will prove of promise.

"Referring to the letter of October 19th to Mr. Fairchild concerning the poor growth of the varieties of soybeans, it might be that this was due to lack of inoculation. It might be well to send a small amount of inoculated soul along with the variety. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Foreign Seed and Plant Introduction, Bureau of Plant Industry, USDA [Washington, DC].

78. *J. of the Royal Horticultural Society* (*London*). 1911. Notes and abstracts: Soy-bean, history and varieties of [by C.V. Piper and W.J. Morse, Dec. 1910]. 37:480. Dec. [1 ref]
• ***Summary:*** A brief summary of this article.

79. *Washington Post.* 1911-1917. Where did WJ Morse and his wife Edna live in DC during this time? *
• ***Summary:*** Did they rent an apartment at 158 U St.? Or 158 You St.?

80. Moore, L.H. 1912. Re: Can you furnish us with soy bean seed for testing. Letter to Prof. W.J. Morse, U.S. Department of Agriculture, Washington, DC, Jan. 18. 1 p. Handwritten, with signature on letterhead.
• ***Summary:*** Dear Sir: Can you furnish us with about one quart, or pint–of Soy Bean No 23232, "Barchet"–the one that we had last-year was planted so late that they did not mature seed. Thanking you in advance for your favor, we are,

"Yours truly, Canebrake Agl. Exptl. Sta."

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: Director and Secretary, Canebrake Agricultural Experiment Station, Uniontown, Alabama.

81. Morse, William. 1912. Re: Sending Barchet soybean seed for testing. Letter to Mr. L.H. Moore, Director, Canebrake Experiment Station, Uniontown, Alabama, Jan. 27. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: Replying to your letter of January 18th requesting a small quantity of the Barchet soy bean No. 23232. As yet our supply of this variety is not available. As soon as the seed arrives from our [Arlington] experimental farm in Virginia, I will be glad to send you a quantity of the variety.

"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–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 [USDA].

82. 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 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.

83. Hegnauer, Leonard. 1912. Re: Soybean varieties at Illinois station. Letter to W.J. Morse, Scientific Assistant, Bureau of Plant Industry, USDA, Washington, DC, Feb. 16. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "I am sorry that we are not able to meet with your request. There is only one variety among the group which we have had, namely the 'Ogema,' but we have no seed of that now. We have among the black, the Ebony, but I do not think that is the one that you have in mind when you say 'Early Black.' Soy beans are not very well distributed thru our state, those that are comprise a very few varieties, such as the early medium yellow, Ebony, and Green.

"If at any time we can be of service to you, do not hesitate to call upon us. I am sorry indeed that we could not help you out at this time."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#1.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crop Production, Agric. Exp. Station, Urbana, Illinois.

84. Morse, William. 1912. Re: Sending Barchet soybean seed as promised. Letter to Mr. L.H. Moore, Director, Canebrake Experiment Station, Uniontown, Alabama, Feb. 20. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: In accordance with previous promise I am taking pleasure in sending you for pounds of seed of Barchet soy bean #23232. Should this variety prove of promise under your conditions, I would suggest you save the seed produced this for establishing the crop in your locality. I shall appreciate it very much if you will report as to the promise of this variety.

"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–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 [USDA].

85. Morse, W.J. 1912. Re: Your request for varieties of soy beans and cowpeas. Letter to Mr. G.W. Shaw, College of Agriculture, Experiment Station, Berkeley, CA, March 20. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of March 5th requesting varieties of soy beans and cowpeas for experimental work at the Stockton Experiment Station. I am taking pleasure in sending you one pound each of the following varieties of these crops:

"Mammoth soy bean #31867
"Swan soy bean #22379
"Duggar soy bean #32890
"Auburn soy bean #32909
"Peking soy bean #32907
"Austin soy bean #32891
"Ito San soy bean #17268
"Taha soy bean #21999
"Meyer soy bean #17852
"Cloud soy bean #16790
"Early Red cowpea #25808
"Groit cowpea #32862
"Red Whippoorwill cowpea #17374
"Groit cowpea #32862
"Early Clay cowpea #29282
"Holstein cowpea #29309
"Brabham cowpea #32887
"Peerless cowpea #25314

"We are enclosing our blue slips giving information on the culture of these crops, and ask that you report results to us at the close of the season.

"The portion of your letter concerning Garbanzas [Garbanzo beans] is being referred to the proper office for attention.

"Yours very truly, Scientific Assistant. (Enclosures–2)"

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. Ala.–Calif. Box no. 2.

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.

86. Dorsett, P.H. 1912. Re: Mr. Edward Frohner of Ohio requesting information on Soya Bean and Soya Bean Oil. Letter to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, March 21. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Professor Piper: I am sending you herewith a copy of a letter dated March 14, 1912, from Mr. Edw. Frohner, Chemist, Standard Oil Cloth Co., Youngstown, Ohio requesting information regarding Perilla Oil and Soya Bean and Soya Bean Oil.

"The request for information regarding Perilla Oil has been referred to Dr. True for attention. Kindly send Mr. Frohner whatever information you have regarding Soya Bean and Soya Bean Oil.

"Mr. Frohner has been advised of this reference. "Very truly yours, Expert Plant Introducer."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Expert Plant Introducer, Foreign Seed and Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC.

87. Scientific Assistant. 1912. Re: Send soy bean varieties to Rev. C.N. Field, Foxboro, Massachusetts. Letter (memorandum) to Mr. W.J. Morse [Arlington Farm, BPI, USDA], April 26. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Some months ago Rev. C.N. Field, St. Augustine's Farm, Foxboro, Mass. [Massachusetts] requested from Mr. [David] Fairchild some soy beans, and Mr. Fairchild asked that the varieties named below be sent to him. Through an oversight the matter has not been brought to your attention sooner. Can you send a pound or less of each of the following varieties?

"Ogemaw, Early Brown, Vireo, Chernie, Auburn, Merko.

"Very truly yours,..."

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, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

88. Morse, W.J. 1912. Re: Wish to obtain a sample of the Medium Yellow soy bean. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, April 27. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I wish to obtain a sample of the Medium Yellow soy bean, and will appreciate it very much if you will send me about four ounces of this seed in the enclosed bag. I also enclose a franked tag which may be used, without postage, in sending the seed to me.

"Yours very truly, Scientific Assistant. (Enclosures)"

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.

89. Piper, C.V. 1912. Re: Adzuki beans and cowpeas. Letter to W.J. Morse, Bureau of Plant Industry, [Arlington Farm, Rosslyn, Virginia], April 30. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: I am sending to Arlington Farm today one-half pound of Adzuki beans No. 17847 and of Groit cowpea No. 32862. I have had these seeds picked over so they should be perfectly pure.

"I want you to grow at Arlington Farm four one-rod rows of each of these, thinning out the plants to a uniform distance of six inches in the rows. Of one row of each of these I desire the seed saved and enough of the other row cured to make a half pound sample of hay at the time when the first pods are yellowing. The data I desire kept with these are as follows:

"1. Date of planting. 2. Date of germination. 3. Date of blooming. 4. Date first pod ripens. 5. Date all of most of the pods are ripe.

"Also please notice carefully whether all of the plants behave uniformly or whether there are any variations. In this case make careful note of the variations.

"These same things are being grown at New London, Ohio; Chico, California, and Chillicothe, Texas, the idea

being to determine whether there is any local effect of the soil or climate which affects the chemical character of the seeds or of the hay. The experiments are to continue at least three or four years, interchanging the seed each year between the different places.

"Very truly yours,..."

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: Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

90. Morse, W.J. 1912. Re: Sending soy beans you requested. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, May 18. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Duggar: Your letter of May 9th to Prof. C.V. Piper with regard to obtaining varieties of soy beans, has been handed to me for attention. Of the list submitted by you we will be able to supply you with one quart of all except the Barchet and Ebony. Of the Ebony I think we can spare you one half pound. This seed will be sent to you in the next few days.

"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–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.

91. Morse, W.J. 1912. The soy bean; a valuable leguminous crop for the North. *Tribune Farmer* (*New York*) 11(553):1-2. June 6. [2 ref]

• ***Summary:*** This is the earliest article about soybeans seen written by William Morse alone; his very first was with C.V. Piper in 1910. Contents: Introduction. Adaptation of varieties. Preparation of the soil. Feeding to stock.

"The soy bean is a native of Southeastern Asia... Although introduced into the United States a number of years ago, it has made practically no progress in the farming systems of the Northeastern states. No doubt the chief reason for this is that reliable concerning its adaptation, culture, and use has not been available in practical form. The soy bean is now generally grown in the Southern and Middle states, and is also grown successfully in Illinois, Michigan, Wisconsin, New York, New Jersey, Pennsylvania, Rhode Island and Massachusetts... The soy bean promises to become one of our important legumes in the North."

"The inoculation can be most practically done by taking soil from an old soy bean field, scattering from 300 to 500 pounds of it an acre on the field to be planted, and harrowing in at once. The inoculated soil may also be screened and a peck mixed with the seed in the drill box and fed out with the seed." Photos show: (1) A mature soy bean plant, at the proper stage for cutting for seed. (2) A comparatively cheap but efficient gas power sprayer on the farm of M.G. Keenan near Oneonta, New York. (3) A fine specimen of a soy bean plant at the Arlington, Virginia, experimental grounds. Address: United States Department of Agriculture, Washington, DC.

92. Piper, C.V. 1912. Re: Please ship soybeans to Curacao, Dutch West Indies. Letter to Mr. William Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, July 18. 1 p. Typed, with signature on letterhead.

• ***Summary:*** Dear Mr. Morse: Will you kindly arrange to have shipped to G.B. Dussel, Esq., Agricultural Superintendent, Colonie Curacao, D.W.I., one bushel of soy beans, which may consist of two or three varieties, and 500 pounds of alfalfa soil for inoculation.

"Yours very truly, Agrostologist."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist, USDA Bureau of Plant Industry, Forage Crop Investigations.

93. *Agricultural J. of Egypt.* 1912. The soya bean. 1(2):114-15. Summarized by the Bulletin of the Imperial Institute. 1912. p. 668.

• ***Summary:*** "In part I of this Journal (p. 17) we drew attention to the value of the Soya bean and to its suitability for cultivation in Egypt. Since then it has been grown experimentally at the Horticultural Division, Giza, by Mr. [Thomas] Brown, whose report on the subject is here printed in full, as it shows the possibility of the successful cultivation of the Soya bean in Egypt; the experiment was, however, not made under field conditions, being manured and watered more than would otherwise be possible, and the are planted was too small to justify forming definite conclusions."

"'The Soya beans were dried and threshed. They were sown on June 24th [1911] and removed from the ground on September 30th. They occupied the ground 99 days. They were sown in packets 30 cm. apart on the sides of ridges about 70 cm. apart. Three to four seeds were sown in each pocket about 3 cm. deep. The young plants were thinned so as to leave only two at each point. Quantity of seeds used:– Eltum [sic, Elton], 15.5 kilos. per feddan. Morse, 16.5 kilos.

per feddan. Medium Yellow, 9.5 kilos. per feddan. In the case of the last named the seed is smaller in size than in the case of the others. Soil, rather heavy black loam." The actual area sown of each variety was 162 square meters and the actual quantity produced was: Medium Yellow 16 kg, Morse 14.5 kg, Eltum 13.5 kg. "The trial shows that the plant will succeed as a summer crop."

Note: This is the second earliest document seen (April 2004) concerning soybeans in Egypt, or the cultivation of soybeans in Egypt–the earliest was 1858. This document contains the second earliest date seen for soybeans in Egypt, or the cultivation of soybeans in Egypt (24 June 1911).

94. 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."

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.

95. Madson, B.A. 1913. Re: Most varieties of Soy beans froze before maturing. Letter to Mr. W.J. Morse, Bureau of Plant Industry, Washington, DC, Feb. 13. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I am enclosing the cards which you sent to Dr. Shaw for the record of the Soy beans. With most of these varieties the stand was very poor, and all of them froze before maturity, so that our record is very incomplete.

"Very truly yours, B.A. Madson (M/B.)"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

96. Morse, W.J. 1913. Re: We are desirous of obtaining the names of soybean growers. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Feb. 13. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Mooers: We are desirous of obtaining the names of growers who are likely to have quantities of different varieties of soy beans for sale.

"We will appreciate it very much if you will kindly give us what information you can concerning the growers and the varieties they handle.

"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.

97. Mooers, C.A. 1913. Re: Unable to give you the names of growers of soy beans seed. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Feb. 17. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: I am sorry to say that we are unable to give you the names of growers of soy beans seed. Our farmers are very much interested in [?] but have not paid special attention to the seed proposition.

"Mr. W.P. Ridley, R.D.1, Columbia, Tennessee has been advertising of the Haberlandt [?] variety of soy beans, but whether he has any seed left for sale I am unable to say.

"You might write to the Koger Pea and Bean Thresher Company at Morristown, Tennessee for information in regard to the growers of soy bean seed.

"Very truly yours, C.A. Mooers."

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.

98. Morse, W.J. 1913. Re: Article in *Country Gentleman.* Letter to Mr. E.S. Ritter, Pottstown, Pennsylvania, Feb. 20. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir:–Your letter of February 1st has been referred to this office for attention.

"Concerning your request for information of an article published in 'The Country Gentlemen' regarding an experiment with soybeans, I regret to say that I have not read this article, thus am unable to make any comments on it. I would appreciate it very much if you would give the date and publication of the article whereby I might look it up and write to you further."

"I am taking pleasure in enclosing our blue slip giving brief information on the soy bean and am sending you under separate cover Farmers' Bulletin 372 which will give you much more complete information. Yours 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Scientific Assistant, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

99. Madson, B.A. 1913. Re: Request for more varieties of Soja bean seed to test again. Letter to Mr. W.J. Morse, Bureau of Plant Industry, Washington, DC, March 27. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I would like to know if it would be possible for us to secure small amounts of Soja bean seed for variety trials this season. You will doubtless remember that the varieties sent out here last year were killed by frosts, but this may be accounted for from the fact that they were planted at least one month too late. They would probably do much better if seeded at an earlier date, about the middle of May. I am enclosing a list of the varieties which we had last year and would like to know if we can secure small samples of as many of them as you have on hand.

"Hoping to hear from you regarding this matter, I am

"Yours very truly, B.A. Madson.

Note: On a 2nd sheet of paper is a list of S.P.I. Nos. and soybean variety names, the same varieties that were sent to Berkeley in 1912 but in a different order.

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

100. Morse, W.J. 1913. Re: Your request for varieties of Soy beans. Letter to Prof. B.A. Madson, College of Agriculture, Experiment Station, Berkeley, CA, April 4. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: I have your letter of March 27th advising that you desire to secure if possible small amounts of a number of varieties of Soy beans for a varietal trial this season. I am taking pleasure in sending you today one pound each of the following varieties:

"Auburn #32909
"Cloud #16790
"Ito San #17268
"Taha #21999
"Swan #22379
"Mammoth #31867
"Peking #32907
"Guelph #17261
"Virginia #32906
Haberlandt #34924

"With regard to the list of varieties enclosed by you I regret to say that I was unable to supply the Meyer, Duggar, and Austin varieties as our supply is exhausted.

"Yours very truly, Scientific Assistant. (Enclosure)"

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. Ala.–Calif. Box no. 2.

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.

101. Piper, C.V. 1913. Re: Dr. E.V. Wilcox of Hawaii wants soy bean varieties. Letter to W.J. Morse, [Arlington Farm. Rosslyn, Virginia], April 9. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Dr. E.V. Wilcox, Director of the Hawaii Experiment Station, Honolulu, Hawaii, wants to get seed of soybean varieties suitable for forage. Will you send seed of not to exceed 8 or 10 varieties. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge, [Bureau of Plant Industry, USDA, Washington, DC].

102. Madson, B.A. 1913. Re: I have just received the

Soja bean seed. Letter to Mr. W.J. Morse, Bureau of Plant Industry, Washington, DC, April 15. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I have just received the Soja bean seed which was sent to us from your Department.

"Thanking you very much for the same, I beg to remain, "Very truly yours, B.A. Madson"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

103. Morse, W.J. 1913. Re: Soy bean hybrids, mottling, and cross pollination. Letter to Mr. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, April 29. 2 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "Dear Sir: Your letter of April 24th and sample packages of three varieties of soy beans sent to Professor C.V. Piper have been handed to me for attention.

"The variation in color of the seeds or rather mottling is due to cross pollination. Until about six years ago it was generally supposed that natural hybrids of the soy bean did not occur. About that time it was noted in the bulk seed gathered at Arlington Farm [Virginia] that there occurred mottled colored seeds such as smoky green and smoky yellow, brown and yellow, black and yellow, black and green, etc. These seed are carefully saved and sown the next year. The result was rather a diverse progeny showing that the seed were of hybrid origin."

Morse then refers Cromer to: 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. There (p. 20-21) "you will find the matter of pollination and hybridization of the soy bean taken up briefly." The soy bean flower is completely self fertile; cross pollination–which is quite infrequent–is brought about by bees and other insects that visit the flowers.

"With regard to the Ito San variety being a sport of the Early Brown variety, I will say that the Early Brown is a selection out of the Early Yellow which is another name for the Ito San. The Early Brown was originally obtained by your station from Mr. E.F. Diehl, Leesburg, Indiana, who made the Brown selection out of the Early Yellow."

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–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

104. Piper, C.V. 1913. Re: Mr. Murray of the Bureau of Statistics. Letter (memorandum) to W.J. Morse, [Arlington Farm, Rosslyn, Virginia], June 2. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Mr. Murray of the Bureau of Statistics has been collecting data from farmers on the rate of seeding Soy beans. His data bother him somewhat as he evidently has rates both on seeding in rows and broadcast. Will you kindly prepare a memorandum for Mr. Murray giving him concrete information as to the best rate of seeding this crop both in cultivated rows and broadcast?

"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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge, [Bureau of Plant Industry, USDA, Washington, DC].

105. *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 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.'

"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.'

"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.

106. Oakley, R.A. 1913. Re: Mr. G.H. King of Leedstown, Virginia. Letter (memorandum) to W.J. Morse, [Arlington Farm, Rosslyn, Virginia], Aug. 27. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. G.H. King of Leedstown, Virginia, is having considerable experience with soy beans. Mr. King tells me that his land will no longer grow cowpeas satisfactorily on account of wilt, and that he is endeavoring to grow soy beans in order that he may add a little nitrogen to his soil. He states that he has tested the two crops and finds that soy beans are no where near as valuable for adding nitrogen to soil as are cowpeas. His method in brief is to sow the beans broadcast in the spring as early as weather conditions will permit, and mow them off for hay; after removing the beans the ground is disked and prepared for wheat. Mr. King seems to be a very intelligent farmer and it might be well for you to get in touch with him.

"Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

107. Morse, W.J. 1913. Re: Soy bean roots and nodules from Monetta, South Carolina. Letter to Prof. C.V. Piper, Washington, DC, Aug. 28. 1 p. Handwritten, with signature on letterhead.
• ***Summary:*** Morse is writing from Augusta, Georgia. "Dear Prof. Piper: I sent you to-day from Monetta, South Carolina, a number of samples of soy bean roots. These roots show about the best nodules I ever saw on the soy bean. The varieties of soy beans at Monetta are most promising, ranging anywhere from 3 to 6 feet in height. Not only have they made an enormous growth but will also give an excellent seed yield.

"The station at Raleigh, N.C. [North Carolina] has a very good test of Lyon x Yokohama [velvet bean] hybrids. If you happen in that vicinity it will pay you to visit them. Very truly yours,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

108. Piper, C.V. 1913. Re: Mr. N.L. Willet wants to buy soy bean seeds. Letter (memorandum) to W.J. Morse, [BPI, USDA], Oct. 31. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. N.L. Willet has written in, asking if we can give him names of parties who have seeds of any of the new varieties of soy beans for sale. Will you kindly write him directly, giving him all the information that you may have on this subject, so long as it does not conflict with our getting the supplies that we may want. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

109. Morse, W.J. 1913. Re: Recipe for making muffins with soy flour. Letter to Mr. J.C. Beavers, Associate in Soils and Crop Extension, Purdue University, Lafayette, Indiana, Nov. 13. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "During my visit at your station in September, you advised me that you were very much interested in the food value of the soy bean. At that time I promised to send you a recipe for making muffins from soy bean flour. I am taking pleasure in enclosing this recipe."

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–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

110. Morse, W.J. 1913. Re: We desire to obtain a supply of the Tokyo variety of soy beans. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Dec. 17. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: We desire to obtain a supply of the Tokyo variety of soy beans. During my visit at your station in the fall of 1912, you advised me that one of your former students was to grow a considerable acreage of the Tokyo variety the season of 1913. I would appreciate it very much if you would send me the name of this grower or any other grower who might happen to have seed of this variety for sale.

"Very truly yours, 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.

111. Mooers, C.A. 1913. Re: This season was disastrous so far as corn or soy beans were concerned in this section. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Dec. 20. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: I am very sorry to say that the former student who was to supply us with Tokio soy beans is unable to do so. This season was disastrous so far as corn or soy beans were concerned in this section. The only seed that I know of in the State will be needed here for use the coming season.

"Very truly yours, Chemist and 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.

112. *Agricultural J. of Egypt.* 1913. The soya bean. 2:91-93. Summarized by the Bulletin of the Imperial Institute. 1913. p. 526.
• ***Summary:*** "The following has been communicated by Mr. Thomas Brown, Director of the Horticultural Section, Department of Agriculture, Cairo [Egypt].

"The trials in the cultivation of Soya beans, which were commenced in the year 1911, have been continued during the present season.

"The crop was sown on May 13 [1912], and the method of sowing adopted was the same as that followed last year. The three American varieties, Eltum [sic, Elton], Morse, and Medium Yellow, were again tried, in addition to the common yellow kind imported from Manchuria."

The seeds were sown in heavy black loam soil. A part of the crop was cut on August 1 and used for fodder, the yield being nearly 6 tons per acre. It was found that cattle, sheep, and goats ate the fodder, but that donkeys and mules would not do so. The remainder of the crop was harvested on August 31, the following yields of dry seed in lb. per acre being obtained from the different varieties: Manchurian [Manchuria?], 1,257; Medium Yellow, 1,596; Eltum, 1,061; Morse, 1,486. Yields are also given in ardebs per feddan. An ardeb is 148 kg and a feddan is an Egyptian unit of area equal to 1.038 acres. These results are better than those obtained in 1911, and may be due to the fact that the seed was sown six weeks earlier, or because the land had borne a crop of peas during the previous winter.

A full-page black-and-white photo (p. 93), titled "Soya beans grown at Giza," shows a farmer standing in a large field of the beans.

113. Morse, W.J. 1914. Re: Smooth varieties of soy beans cultivated in Japan. Letter to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Jan. 21. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Piper: During the last summer I was

advised by a Japanese student who was visiting at Arlington Farm that there are four or five smooth varieties of soy beans cultivated in Japan. He also advised me that the growing of the soy beans in Japan was affected to a considerable extent by weevil attack and the only varieties immune to the weevil attack were the smooth ones.

"Thus far we have obtained only one smooth variety, No. 22876, in our introductions, and that one from Japan. I wonder if it would not be possible for you to obtain some of the smooth varieties from some of your correspondents in Japan.

"Very truly yours,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

114. Morse, W.J. 1914. Re: Smooth varieties of soy beans. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Jan. 21. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Piper: During the past summer, I was advised by a Japanese student who was visiting at Arlington Farm that there are four or five smooth varieties of soy beans cultivated in Japan. He also advised me that the growing of the soy bean in Japan was affected to a considerable extent by weevil attack and the only varieties immune to the weevil attack were the smooth ones.

"Thus far we have obtained only one smooth variety, No. 22876, in our introductions, and that one from Japan. I wonder if it would not be possible for you to obtain some of the smooth varieties from some of your correspondents in Japan.

"Very truly yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

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.

115. Piper, C.V. 1914. Re: Send soy beans to Prof. W.R. Dodson in Louisiana. Letter to W.J. Morse, [BPI, USDA], Feb. 16. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Kindly send 20 varieties of soy beans to Prof. W.R. Dodson, Louisiana Experiment Station. Send him enough seed that he can grow 1/10 acre plot of each, and send him varieties which you think most likely to be valuable. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

116. Oakley, R.A. 1914. Re: Mr. Oran T. Moore of Silver Springs, Maryland. Letter (memorandum) to W.J. Morse, [Arlington Farm, Rosslyn, Virginia], April 4. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Mr. Oran T. Moore, R.F.D. No. 3, Silver Springs, Maryland, a friend of C.J. Brand, is very anxious to conduct a preliminary test with cowpeas and soy beans on his farm in Maryland. I shall be glad to have you get in touch with him by correspondence and arrange to send him two or three varieties. Very truly yours,..."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

117. Oakley, R.A. 1914. Re: Mr. C.J. Van Valkenburg of Laurel, Indiana. Letter (memorandum) to W.J. Morse, [Arlington Farm, Rosslyn, Virginia], April 4. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Please send to Mr. C.J. Van Valkenburg, Laurel, Indiana, small lots of soy beans and cowpeas for testing. In correspondence with Mr. Edgar Brown, Mr. Van Valkenburg has indicated a desire to test these crops. Very truly yours,..."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

118. Piper, C.V.; Evans, Morgan W.; McKee, Roland; Morse, W.J. 1914. Alfalfa seed production: pollination studies *Bulletin of the U.S. Department of Agriculture* No. 75. 32 p. April 8. [15+ ref]

• ***Summary:*** "For a number of years past it has been a conspicuous fact that in sections where alfalfa seed is grown commercially the yield varies greatly from season to season. Particularly striking examples of this variation in yield have occurred in the Milk River Valley of Montana, where in some seasons yields of 10 to 12 bushels per acre have been obtained, while in other years the crop was almost a complete failure. It has been generally supposed that the visit of certain insects to the flowers is absolutely necessary in order to effect pollination. In accordance with this belief, some have held that small crops of alfalfa seed were due to an unsatisfactory number of pollinating insects, while others have suggested that thrips or other destructive agencies might be accountable.

"In view of the importance of the matter to alfalfa seed growers, investigations of this subject were undertaken, beginning with the season of 1906. These investigations have been conducted during subsequent seasons at various stations and have resulted in the accumulation of a mass of data which throw new light on the subject. Incidentally they have revealed the fact that the problem is much more complex than had been anticipated, and there is need of much further work, especially in the careful correlation of climatic data, as well as the abundance of insects, with the seed yields from season to season. The facts herein set forth substantiate the previous belief in the importance of insect visitors, but also show that, under certain climatic conditions, automatic self-pollination of the flower takes place. The amount of self-pollination varies from season to season and with individual plants." Address: 1. Agrostologist in Charge; 2-4. Scientific Assistants. All: Forage-Crop Investigations, USDA [Washington, DC]USDA Bureau of Plant Industry.

119. Piper, C.V. 1914. Re: Mung beans and adsuki beans. Letter to W.J. Morse, [Arlington Farm, Rosslyn, Virginia], April 29. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Evidently somebody has been writing an article on the mung bean in one of your papers. I would suggest that you send to each of the correspondents a package of adsuki beans, and if we have them to spare also a small package of mung beans.

"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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge, [Bureau of Plant Industry, USDA, Washington, DC].

120. Piper, C.V. 1914. The name of the soy bean: a chapter in its botanical history. *J. of the American Society of Agronomy* 6(2):75-84. April. Includes long letter by Sir David Prain. [4 ref]
• ***Summary:*** Note 1. This is the earliest document seen (June. 2017) that gives the soybean the name *Soja max.* It shows conclusively that the oldest specific name for the soybean is *Phaseolus max* L. and indicates that because all but one of the original species of the genus *Glycine* L. having been removed from the genus, the generic name *Soja* should be taken up.

It contains a lengthy analysis of the evolution of soybean taxonomy and of the name, starting with Linnaeus' early classifications of *Phaseolus max, P. radiatus,* and *P. mungo,* and including a lengthy elucidation by Sir David Prain, director of the Royal Botanic Gardens, Kew, of how and why Linnæus had initially confused the soybean and mung bean, then later corrected his confusion. Linnæus eventually realized that the plant he had described as *Phaseolus max* was the same as the one he had named *Dolichos Soja.*

Prain noted: "'It is very fortunate that Linnæus's specimen of *P. max* came from *Hortus Cliffortianus* because it so chances that this is one of the Cliffortian plants of which there is no example in the British Museum. The record that the plant was grown in *Hort. Cliffort.* from seed secured in Virginia is one as to which I must leave you to decide upon the accuracy of. All that I know is that whether the plant was raised from seed secured in Virginia or not Linnæus was perfectly well aware that the species in question is a native of the old world.'"

"'As regards *P. mungo L.* the fact remains that whatever may have been the origin of the plant he describes, no specimen appears ever to have been added by Linnæus to his herbarium and all that we are justified, by the evidence available, in assuming is that Linnæus, in 1767, as already in 1753 deemed *Mungo* the precise equivalent of *Max.* If this be so, it may very fairly be asked why, in 1753, did Linnæus use *Max* in preference to *Mungo* and why in 1767 did he drop *Max* and use *Mungo* instead?

"'The answer in both cases seems to me self evident. Of the two synonyms *Mungo* and *Max,* clearly *Max* was the oldest because *Mungo* occurs for the first time in Garcia del Huerto while *Max* goes back to Avicenna. Linnæus chose *Max* because of its greater age.

"'In the other case Linnæus in all good faith supposed that "Buncæ" of Hermann and the plant he saw in Clifford's Garden were the same thing as Mungo and Max, at the time he wrote the Flora Zeylanica. He had no suspicion that the plant he had described was different from the plant who name he had adopted when he published the first edition of the Species Plantarum in 1753. He was still unconscious of the extraordinary blunder he had committed when he published the second edition in 1763. But some time after he had published the second edition of the Species Plantarum he obtained from some one seeds of the plant he had described in 1753 as *Dolichos Soja.* He raised plants from these seeds at Upsala [Uppsala, Sweden] and put specimens into his

herbarium some time before 1767 when he for the first time recorded its existence in his collection.

"Linnæus was at last in a position to see that the plant he had described as *Phaseolus max* was the same as the one he had named *Dolichos Soja* and that the Mung crop (*Mungo* or *Max*) was still without a name. It may be that in putting matters right Linnæus felt that to continue for the "Mungo" or "Max" crop the name *Max* might lead to confusion and that to obviate this confusion it was desirable to substitute the other name *Mungo...*

Piper concludes: "The fact that the name *Phaseolus max* belongs to the soy bean makes it necessary to revise the botanical designation of the latter plant. Inasmuch as the specific name *max* as applied to the soy bean appears on a previous page to the name soja, it has priority according to all botanical codes and hence must be adopted as the specific botanical name of the soy bean.

"In most botanical works the soy bean is called *Glycine hispida* (Moench) Maximowicz. By a few writers it is named *Soja hispida* Moench. The use of either of these names is based on the idea that the wild soy bean *Glycine soja* Siebold and Zuccarini or *Glycine ussuriensis* Regel and Maack is a different species. As Piper and Morse (*Bureau of Plant Industry, Bulletin* 197), have shown, this view is untenable, the wild and the cultivated plants representing but one species. The cultivated plant was first named *Dolichos soja* L. (Species Plantarum, 2:727, 1753), but as the specific name soja was used later by Siebold and Zuccarini for the wild plant, it has since been generally used in that sense. With the recognition of the fact that there is but one species and not two the name *Glycine soja* (L.) Siebold and Zuccarini designates the cultivated as well as the wild plant. But the specific name soja must now give way to that of *max.*

"Unfortunately there is also question as to the proper generic name to be attached to the soy bean. Nearly all botanists have used the name *Glycine* for the genus containing the soy bean and related species, but a few have used *Soja. Soja* was proposed by Moench in 1794 and included only the soy bean."

Page 84: The article concludes with this sentence: "Following this interpretation the soy bean must be named *Soja max.*"

Note 2. This document contains the earliest date seen for soybeans in Sweden, or the cultivation of soybeans in Sweden (by 1767). The source of these soybeans may have been Clifford's Garden in the Netherlands. Address: U.S. Dep. of Agriculture, Washington, DC.

121. Morse, W.J. 1914. Re: Sending you soy beans for testing. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, May 19. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Duggar: Your letter of May 13, to Professor Piper, requesting one or two quarts of seed of several soy bean varieties, has been handed to me for attention.

"I am taking the pleasure in sending you to-day four pounds of the following varieties, and am stating in each case the States in which the seed was grown:

"Haberlandt–1453–New Jersey.
"Mammoth–1457–North Carolina.
"Edward–14953–North Carolina.
"Black Beauty or Ebony–17254–Virginia.
"Austin–17263–Virginia.
"Arlington–22899–Virginia.
"Barchet–23232–Virginia.
"–225188–South Carolina.
"–23135–South Carolina.
"Chiquita–27707–Virginia.
"Virginia–32906–Virginia.

"I regret that we have no seed of Hollybrook, Wilson, Baird. or Chinese varieties at the present time. You will note from the list that the Black Beauty and Ebony are the same variety.

"Very truly yours, 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–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.

122. *Washington Post.* 1914. Departmental notes of interest to Uncle Sam's army of employes [sic, employees]. Aug. 2. p. ES3.
• ***Summary:*** "W.J. Morse, bureau of plant industry, will leave this week for points in Virginia, the Carolinas, Georgia, Alabama, Mississippi, Louisiana, Tennessee, and Kentucky to inspect experiments in the culture of cowpeas, soybeans, and other forage plants."

123. Morse, W.J. 1914. Re: Report on trip to Virginia, North Carolina, South Carolina, and Georgia. Letter to Prof. C.V. Piper, Washington, DC, Aug. 8. 4 p. Handwritten, with signature on USDA letterhead.
• ***Summary:*** Morse is writing from Rome, Georgia. "Dear Prof. Piper: The past week I have been at Norfolk, Virginia, Raleigh, North Carolina, Monetta, South Carolina, Augusta, Georgia, Jackson, South Carolina, and Cave Spring, Georgia.

"The forage crops at Norfolk, mostly soy bean varieties, are fine (the Virginia and Arlington among the six best). At Raleigh, N.C., the tests are rather poor, the conditions bringing about a late planting, and rather bad weather conditions after that. Prof. [C.B.] Williams [at Raleigh] thinks well of our plans for the soy bean and cowpea work and would like to try the experiments at four different places

in N.C.

"At Monetta, S.C. the soy beans are not looking as well as the previous two years. The crops were not sown until June 17. The cowpea hybrids, part of those Iron-Brabham, and other variety crosses are looking great. Crosses of the Brabham-Early Buff strains will have mature pods in sixty days, the first pods will no doubt be mature the end [?] of this coming week. Several others look quite promising.

"I had quite a long talk with Mr. Willet [Millet?] in Augusta and found him much worried over the vetch and crimson clover seed question. Prof. Williams at Raleigh was at a loss where to obtain of both these crops for his experimental work. Mr. Willet gave me a letter to Mr. R. Bates, Jackson, S.C., whom I visited the same day. Mr. Bates spends about all of his time experimenting with the different fruits, vegetables, in fact all sorts of plants. As I wrote in my other letter Mr. Bates has only about 50 of the Blue Couch [?] plants which are growing in a tub. He was very careful in obtaining soil to sow the seed so that if the seed germinated he would know that the plants were Blue Couch. If you desire some of the plants to grow in the greenhouse, Mr. Bates will be glad to send you some. It will not be essential to send him franks as he has some franked boxes from the department. I found him a very interesting man, a careful experimenter. He is especially anxious to try out new things and I feel that anything you might send him would receive the best of care and would get good reports.

At Cave Spring, Georgia, the Virginia variety of soy beans is far ahead of the other varieties. The Virginia will average at least 4½ feet [in height] and is well fruited. The Peking comes next but is quite inferior to the Virginia. Received a rather thorough soaking going about the plantation. Was caught in sort of cloudburst and had no shelter.

"It might be of interest to you that Mr. Alexander has about 100 acres of alfalfa. He has the skill in curing the hay for I never saw better alfalfa hay–green and very few leaves lost. Mr. Alexander raises a number of horses, mules and hogs. He is pasturing alfalfa in the fields of which there is a goodly amount of Johnson grass.

"For this week I shall be in Auburn, Alabama, Monday, Aug. 10–Biloxi, Mississippi a part of Tues. and Wed. New Orleans, Louisiana (Anderson Park [?]) Thurs. Baton Rouge, La. Friday. Very truly yours,..."

Note: This is the earliest document seen (Dec. 2016) that mentions C.B. Williams of North Carolina in connection with soybeans.

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

124. Morse, W.J. 1914. Re: Report on continuation of trip to Alabama, Mississippi, and Louisiana. Letter to Prof. C.V. Piper, Washington, DC, Aug. 17. 3 p. Handwritten, with signature on Mississippi Agricultural and Mechanical College letterhead.

• ***Summary:*** Morse is apparently writing from Mississippi. "Dear Prof. Piper: On Monday, Aug. 9, I was at the Alabama Experiment Station and found the forage crops in general rather poor due to the extreme drouth. A few of the soy bean varieties showed up rather promising where the planting was made a little early. The adzuki beans are a failure this year. Of the cowpeas the Buff catjang 22888 looked very promising. The amount of growth being good, very prolific, and the pods about all mature. Some late plantings of varieties of cowpeas also were making good growth. The Sudan grass us very much of a failure, very poor stands in all plantings and very little growth.

On Wed. I was at Prof. Tracy's, Biloxi. Soy bean varieties 23211 and 23232 appear very promising and look like good varieties for Louisiana and Mississippi. Buff catjang of which Prof. Tracy has two lots looks very promising, giving a good plant growth, a good yield of seed and about 90% mature (sown June 2). I made some crosses between *Vigna lutea* and *V. Catjang* (22888). *Vigna lutea* is of rather a prostrate habit...

"On Saturday I was at the Louisiana Experiment Station, Baton Rouge. Although they have had a very dry spell there the soy bean varieties look very good. Some of the best at Monetta, South Carolina last year shown by the largest growth at this station though they are rather late. The buff catjang 22888 again shows up remarkably well... It looks very promising and all of the station people look to its use for their conditions. The station plans to do quite a little work with the soy bean as a silage crop. The adzuki beans show up very well here, both as to amount of fruit and plant growth.

"This week I expect to be at the following places:

"Monday, Aug. 17. Starkville, Mississippi.

"Tuesday, Aug. 18. Jackson, Tennessee.

"Thurs. Aug. 19. Columbia, Tennessee.

"Friday, Aug. 20. Knoxville, Tennessee.

"Sat. or Monday. Aug. 21 or 23. Lexington, Kentucky.

"Very truly yours,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

125. 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.

126. Morse, W.J. 1914. Re: Report on trip to Wisconsin, New York, Ohio. Letter to H.H. Vinall [USDA], Washington, DC, Sept. 14. 3 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** "My dear Vinall: Have been spending the day with Prof. Delwiche at the Junction regarding the soy bean work in Wisconsin. Most of the work is at Spooner, Wisconsin. Prof. Delwiche is going down with me to-morrow to go over the work. He is especially anxious to make some selections of the Manchurian varieties we have sent him.

"Was rather pleased with the variety test at Ithaca [New York]. A few of the varieties showed up quite promising as grain varieties. Others of the test gave promise as hay and silage varieties.

At New London, Ohio, the same varieties as grown at Ithaca are showing up very well. Some of the numbers quite superior to the same ones at Ithaca.

"Spent Sat. at St. Paul, Minnesota, where I had the same varieties as at Ithaca and New London. Well sir, could hardly believe they were the same numbers. At. St. Paul they had lodged quite badly. All of them made a very large growth, were very heavily set with pods and in a few cases were beginning to mature.

"Am taking quite detailed notes on all of these nos. [numbers] and am very well pleased with the showing thus far.

Expect to be in Spooner, Wisconsin, Tues. Sept. 15; Redfield, South Dakota, Thursday, Sept. 17; Columbia, Missouri, Sat. Sept. 19; Urbana, Illinois, Mon., Sept. 21; Lafayette, Illinois, Sept. 23.

"I appreciated the news letter sent by Miss Brown very much."

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: Knight Hotel, Charles H. Clark, Ashland, Wisconsin.

127. Morse, W.J. 1914. Re: Sending you Bulletin 197 on "The Soy Bean." Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, Sept. 25. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: Your letter of September 15, to Professor Piper, requesting a copy of Bulletin 197 on "The Soy Bean," has been handed to me for attention.

"I regret very much that the supply of bulletins of this number is entirely exhausted. We had until recently a few extra supplies in the office, but requests from stations have exhausted this supply also.

"Very truly yours, 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–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.

128. *Washington Post.* 1914. Departmental notes of interest to Uncle Sam's army of employes [employees]. Oct. 4. p. ES3.
• ***Summary:*** In the section titled "Agriculture": "W.J. Morse, scientist in forage crop investigations, bureau of plant industry, has gone to Vineland, New Jersey, for a ten days' stay investigating soy bean and cowpea fields in furtherance of the work of the bureau."

129. Morse, W.J. 1914. Re: Package of soy flour and recipe for making muffins. Letter to Mr. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, Dec. 2. 2 p. Typed, without signature (carbon copy). [1 ref]
• ***Summary:*** "I am taking pleasure in sending you to-day a package of soy bean flour made by the Bureau of Chemistry of this Department. You will no doubt recall that during my visit at La Fayette this season we had a talk regarding the uses of the soy bean as a food. At that time I promised to send you a sample of the flour that you might test it.

"Enclosed is a recipe for making muffins from this flour. The flour may also be used in making griddle cakes and bread, if three-fourths soy bean flour and one-fourth wheat flour are used.

"I would appreciate it if you would write me regarding your opinion of products made from the flour."

Note: Cromer wrote Morse on 24 Feb. 1915 that he used the soy bean meal [flour] at Christmas to make some "soybean muffins." He found them to be "most delicious," especially topped with maple syrup. His mother thought that the "receipt" [recipe] needed a little more milk.

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–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

130. Morse, W.J. 1914. Re: Sending you a package of soy bean flour. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, Dec. 3. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Duggar: In accordance with a promise made the past summer, I am taking pleasure in sending you to-day a package of soy bean flour. Enclosed is a recipe for the making of soy bean muffins. The flour may be used to make bread and griddle cakes by using three-fourths soy bean flour and one-fourth wheat flour.

"I will be glad to hear from you with regard to your opinion on the flour as a food.

"Very truly yours, 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–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.

131. Morse, W.J. 1914. Re: Soy beans in North Carolina. Letter (memorandum) to Prof. C.V. Piper, Forage Crop Investigations, Bureau of Plant Industry, Washington, DC, Dec. 4. 3 p. Typed, with signature on USDA letterhead.
• ***Summary:*** "Dear Professor Piper:... During my trip to the soy bean district of eastern North Carolina this past fall, I learned that the Southern Cotton Oil Mill, of Elizabeth City, North Carolina, conducted experiments in the fall of 1913 with soy beans as an oil proposition. I was not able to learn further than that the experiment was successful. No doubt by getting in touch with the mill at Elizabeth City, Mr. Dillon could obtain complete information on the experiment.

Note: This is the earliest document seen (May 2017) that describes experimental crushing of soybeans in North Carolina or on the East Coast of the USA. This letter also contains the earliest date seen for crushing of soybeans grown in the USA (fall 1913).

"The soy bean section of eastern North Carolina includes Tyrrell, Hyde, Beaufort, and Currituck Counties. More beans are grown in Hyde County than perhaps all of the others. On inquiring from growers and buyers, the 1914 crop was placed at from 100,000 to 185,000 bushels in Hyde

County alone. The acreage devoted to soy beans on farms ranges from about 10 to 50 acres, though in a few cases the planter had over 150 acres. The yields average about 25 bushels to the acre, though some obtain as high as 35 bushels. The price ranges from $1.00 to $1.40 per bushel. It is quite likely that the beans will be higher this winter, as many of the farmers, knowing of the cotton situation, look forward to better prices than before. Seedsmen have been able to contract for $.80 to $1.00 per bushel. If the oil mill people desire to take up the matter with the farmer I think they will find no trouble in getting contracts for growing an immense acreage of beans. Inquiry brought out that the farmers are quite willing to increase their acreage of soy beans and grow them under contract at a reasonable price.

"The soy bean can be grown throughout the Cotton Belt. If the farmer can be brought to realize the possibilities and value of the crop not only as a cash crop, but the value to his land, the oil mills will not lack for a cotton-seed substitute. In my opinion, the matter of obtaining sufficient beans for a profitable industry may be brought about by methods used by canning factories; that is, placing contracts with farmers for a sufficient acreage.

"The paint companies who have been experimenting with soy oil for the past few years would be glad, no doubt, to cooperate with the oil mills and perhaps the soap manufacturers would be interested in the soy oil industry."

Note: This is the earliest English-language document seen from the USA (Sept. 2006) that contains the term "soy oil."

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. Folder–Morse, W.J.–#1 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

132. Morse, W.J. 1914. Re: Soy bean oil. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Dec. 4. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: With reference to the letter of Mr. N.E. Dillon, regarding a substitute for cotton seed for oil mills, the attention of Mr. Dillon should be called to the soy bean.

"In 1909, the Bureau of Manufactures, Department of Commerce and Labor, published special consular reports 'Soya Bean and Products' on investigations made of the production and use of soy bean and its manufactures. These investigations were conducted not only in the Far East but also in European Markets to learn to what extent the soya bean and its products compete with cotton-seed products. I am sending herewith a copy of the publication, together with Farmers' Bulletin No. 372, on soy beans, and our blueslip.

"During my trip to the soy bean district of eastern North Carolina this past fall, I learned that the Southern Cotton Oil Mill, of Elizabeth City, N.C., conducted experiments in the fall of 1913 with soy beans as an oil proposition. I was not able to learn further than that the experiment was successful. No doubt by getting in touch with the mill at Elizabeth City, Mr. Dillon could obtain complete information on the experiment.

"The soy bean section of Eastern North Carolina includes Tyrrell, Hyde, Beaufort, and Currituck Counties. More beans are grown in Hyde County than perhaps all of the others. On inquiring from growers and buyers, the 1914 crop was placed at from 100,000 to 125,000 bushels in Hyde County alone. The acreage devoted to soy beans on farms ranges from about 10 to 50 acres. The yields average about 25 bushels to the acre, though some obtain as high as 35 bushels. The price ranges from $1.00 to $1.40 per bushel. It is quite likely that the beans will be higher this winter, as many of the farmers, knowing of the cotton situation [and the boll weevil?], look forward to better prices than before. Seedsmen have been able to contract for $.80 to $1.00 per bushel. If the oil mill people desire to take up the matter with the farmer I think they will find no trouble in getting contracts for growing an immense acreage of beans. Inquiry brought out that the farmers are quite willing to increase their acreage of soy beans and grow them under contract at a reasonable price.

"The soy bean can be grown throughout the Cotton Belt. If the farmer can be brought to realize the possibilities and value of the crop not only as a cash crop, but the value to his land, the oil mills will not lack for a cotton-seed substitute. In my opinion the matter of obtaining sufficient beans for a profitable industry may be brought about by methods used by canning factories, that is, placing contracts with farmers for a sufficient acreage.

"The paint companies who have been experimenting with soy oil for the past few years would be glad, no doubt, to cooperate with the oil mills and perhaps the soap manufacturers would be interested in the soy oil industry.

"Very truly yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

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.

133. Morse, W.J. 1915. Soy beans in the cotton belt. *Special* (*USDA Office of the Secretary*) 6 p. Jan. 12 [No. 21]. Later

issued on 10 March 1917 under the same title, but slightly revised and expanded, as USDA Cooperative Extension Work in Agriculture and Home Economics, States Relations Service No. A 85. S.R.S. Doct. 43. Ext. S.

• ***Summary:*** Contents: Introduction. Adaptations. Soil preparation. Fertilizers. Inoculation. Seeding and cultivation. Rotations. Mixtures. Varieties. Soy beans for hay. Soy beans for pasture. Soy beans for soiling. Soy beans for ensilage. Soy beans for seeds. Storing soy beans. Value for human food. Soy-bean oil and cake.

"The soy bean, also called the soja bean and the Manchurian bean, is an erect, rather hairy, leguminous plant, resembling somewhat the common field or navy bean... It will succeed in the United States wherever corn or cotton are cultivated. It is especially adapted to the cotton belt...

"The use of commercial fertilizers is recommended where sandy soil predominates or the soil is of low fertility. Where fertilizers are used, good results have been obtained by using a dressing of stable manure of 200 to 300 pounds of acid phosphate and 100 pounds of muriate of potash... Lime has been found almost invariable to increase the yield... Inoculation may be almost certainly secured by applying soil from an old soy-bean field...

"Varieties: At the present time about 15 varieties of soy beans are handled commercially by seedsmen, the important of which are Mammoth (late), Hollybrook (medium late), Haberlandt (medium late), Medium Yellow (medium), Ito San (early), Guelph (medium), Barchet (late), Ebony (medium late), Peking (medium late), and Wilson (medium late). All of these varieties, with the exception of Barchet, are suitable for hay and seed production. The Barchet is especially adapted for hay and green manure in the Gulf States. For seed production alone the Mammoth, Hollybrook, and Haberlandt are to be recommended, while the Wilson, Peking, and Ebony are better adapted for hay" (p. 4).

"Soy beans for seed: Thus far soy beans have been a very profitable crop when grown for seed, but the industry has been developed mainly in a few in sections, such as eastern North Carolina... For feeding to animals the seed is ground and used with some less concentrated feed. Experiments comparing soy-bean meal and cottonseed meal indicate that soy-bean meal is superior to cottonseed meal both for milk and butter production" (p. 5).

"Value for human food (p. 6): Although soy beans have attracted attention from time to time in the U.S., thus far they have been but little used. The beans contain but a trace of starch and they are highly recommended as a food for persons suffering from diabetes. The numerous ways in which the soy bean can be prepared as human food should encourage its use.

"The green bean when three-fourths to full grown has been found to compare favorably with the butter or Lima bean. The dried beans are used like the field or navy bean in baking or in soups. When prepared in either of these ways the beans require somewhat longer soaking and cooking. The soy bean has been sold in this country to some extent as a coffee bean. When roasted and prepared it makes an excellent substitute for coffee.

"Soy-bean meal or flour may be used as a constituent of biscuits, muffins, and bread; in fact, in any recipe where corn meal is used. In the various preparations three-fourths soy flour or meal and one-fourth wheat flour are recommended." Note 1. Subsequent publications by Morse show that one-fourth soy flour or meal and three-fourths wheat flour are recommended"

"The oil is utilized to a great extent in Europe and the United States for culinary purposes, as a paint oil, in soap manufacture, and in many other industries" (p. 6).

Note 2. This is the earliest document seen (June 2009) in which William Morse refers to what are now called green vegetable soybeans; he uses the term "green bean" and compares them with the "butter or Lima bean." This is also the earliest document seen (June 2009) in which William Morse refers to "soy-bean flour," or to the use of roasted soy beans as a coffee substitute.

Note 3. This is the earliest English-language document seen (Sept. 2016) that uses the term "soy-bean meal" to refer to ground, defatted soybeans. Address: Scientific Asst., Forage-Crop Investigations, USDA Bureau of Plant Industry, Washington, DC.

134. Morse, William J. 1915. Soy bean (*Soja max*). *USDA Bureau of Plant Industry, Forage Crop Investigations,* [*Office Circulars*] No. 19. Jan. 13. 4 p.

• ***Summary:*** "The soy bean, called also soja bean, Manchurian bean, and stock pea (eastern North Carolina), is an erect, rather hairy, leguminous plant. It is grown extensively in China and Japan, principally as human food, but also for forage and as green manure. Within the past few years the crop has become of special importance because of the large importations of beans, oil, and cake from Manchuria to Europe and America. The soy bean has a wide adaptation as to soil and climatic conditions, the northern limit being that of corn and the southern limit that of cotton. Rabbits are exceedingly fond of the young plants and sometimes cause serious injury where the plat [sic] is small, especially in semiarid regions. Although the soy bean is decidedly drought resistant, it is able to withstand a greater amount of moisture than corn or cowpeas. The soy bean is a valuable crop in many ways and has many points of superiority over the cowpea. As a forage it has higher value, the seed is easily harvested, and the seed is weevil proof. One of its most common uses is for hay, which is comparable to alfalfa and red clover in feeding value. The average yield of hay is about 2 tons to the acre. The soy bean is valuable as pasture for all kinds of stock, but especially profitable with hogs and sheep. As a soiling crop the soy bean is of value, yielding from 5 to 10 tons of green forage to the acre.

Satisfactory results have been obtained by mixing soy beans and corn as ensilage, using three parts of corn to one part of soy beans. It is better to grow the two crops in separate fields and mix them in cutting. The soy bean is an excellent green-manure crop, greatly increasing the supply of humus and nitrogen in the soil. Excellent results have been obtained in feeding the grain as meal to dairy cows, substituting it for cottonseed meal or oil meal in the dairy ration. It is also a very profitable crop to grow for seed, as the supply seldom equals the demand. Under ordinary conditions the best varieties yield from 20 to 30 bushels of seed to the acre. On account of its erect growth and uniform maturity the soy bean is easily harvested by machinery. As a food the soy bean may be used as a green vegetable, the dried beans used in baking or in soups, and, when roasted, as a substitute for coffee. Soy-bean flour or meal may be used as a constituent of muffins, bread, or, in fact, in any dish where corn meal is used. In addition to their forage and food value soy beans contain a valuable vegetable oil utilized in various industries.

"Inoculation: Soy beans when well inoculated add much nitrogen to the soil. Natural inoculation occurs quite generally throughout the Southern States, the proper bacteria seeming to be widely distributed. In localities where this crop has not been previously grown, however, it is advisable to inoculate. The inoculation of a new field may be most certainly secured by applying soil from an old soy-bean field, using about 300 pounds of soil to the acre or dusting the seed with some of the soil.

"Culture: Soy beans succeed best on a thoroughly prepared seed bed. If the soil is low in fertility, an application of 300 pounds of acid phosphate and 100 pounds of muriate of potash to the acre or a dressing of stable manure will give the best results. As a rule, soy beans should be planted about the same time as corn. For seed production, planting in rows 30 to 48 inches apart is the best method, while for hay, soiling, or green manure a broadcasted or drilled crop furnishes a better quality of forage. Planted in rows, from 20 to 30 pounds of seed to the acre have been found satisfactory, and if broadcasted or drilled, from 60 to 90 pounds to the acre. An ordinary grain drill may be used in planting. By covering the feed cups not in use, different widths of rows can be adjusted. The cotton planter or corn planter can also be used to advantage. For small areas the ordinary grain drill does well. The planting should be shallow, not exceeding 2 inches in depth.

"Harvesting: The matter of harvesting depends primarily on the use to be made of the crop. For hay, soy beans may be cut at any time from the setting of the seed until the leaves begin to turn yellow. The crop is best fitted for hay when the pods are well formed. When grown for grain alone, the cutting may be delayed in the case of most varieties until nearly all of the leaves have fallen. The harvesting can be done best by a mower with a bunching attachment or by a self-rake reaper. The early varieties can be harvested with a bean harvester to advantage. The later and taller growing varieties can be satisfactorily harvested with a self-binder. If only a small area is grown, the plants may be cut with a sickle, or pulled, tied in bundles, and flailed out when thoroughly dry. In thrashing, the ordinary grain separator does very satisfactory work if run at moderate speed and some of the concaves are removed. Special thrashers for soy beans and cowpeas are now in the market and do excellent work.

"Varieties: At the present time there are about fifteen varieties of soy beans handled commercially by seedsmen. More than 500 distinct varieties are known and have been grown by the Department of Agriculture on its testing grounds. Several of these have proved very promising in various sections of the country and are now either on the market or ready for distribution. The varieties are largely distinguished by the color and size of seed, though they differ in maturity, habit of growth, etc. Variety is a matter of prime importance with the soy bean. Soy-bean seed should be selected with the idea of getting a variety suitable to the locality where it is to be grown, not growing the early varieties in the South nor the late ones in the North. Following are brief notes on the more important varieties:

"Mammoth (seeds, straw yellow).–This is the standard commercial late variety, more extensively grown at the present time than any other. The Mammoth yields well and is satisfactory for both grain and forage. It can not be expected to mature north of Tennessee and Virginia.

"Hollybrook (seeds, straw yellow).–A variety about two weeks earlier than the Mammoth, which can therefore be grown farther north. The seeds and plants are very nearly identical with those of the Mammoth. The Hollybrook is not especially desirable for hay, but is a good grain producer.

"Ito San (seeds, straw yellow).–This variety is also called Yellow, Dwarf Yellow, Early Yellow, Medium Yellow, and Early White. It will mature in about 100 days and can be grown well in the Northern States. The Ito San is very satisfactory for forage and also produces a good yield of grain.

"Guelph (seeds, green).–This variety is also known as Medium Green, Medium Early Green, and Large Medium Green. It is about two weeks later than the Ito San. The Guelph is grown to a considerable extent in the Northern States. It is esteemed for its forage, and although it gives a good yield of grain it shatters badly before all of the seed is mature.

"Haberlandt (seeds, straw yellow).–This variety is about a week later than the Guelph. The Haberlandt is one of the most satisfactory varieties for grain production, but is not especially desirable for hay.

"Medium Yellow (seeds. straw yellow).–This variety, sometimes sold as Ito San and Hollybrook, appears identical with the Mongol and the Roosevelt. It matures about the same time as the Guelph and is satisfactory both for hay and

seed production.

"Wilson (seeds, black).–This variety matures about the same time as the Haberlandt. It gives a good grain yield, but is most satisfactory for hay.

"Peking (seeds, black).–This variety has small, flat seeds and matures in about 120 days. The Peking not only gives a good yield of grain, but is most excellent for hay.

"Tokio (seeds, olive yellow).–This variety is about a week earlier than the Mammoth. The Tokio has rather a stocky growth for forage, but gives a heavy grain production.

"Manchu (seeds, straw yellow).–An early variety obtained from northern Manchuria, maturing a few days earlier than the Ito San. The Manchu gives an excellent production of forage and seed, excelling the Ito San in both respects. Excellent results have been obtained with this variety in the Northern States.

"Black Eyebrow (seeds, black and yellow).–An early variety obtained from Manchuria, maturing about the same as the Manchu. The Black Eyebrow is very satisfactory for both hay and seed production. It is most suitable as a grain variety for the Northern States.

"Barchet (seeds. brown).–This variety requires rather a long season, maturing about 10 days later than the Mammoth. The Barchet makes a good growth, has fine stems, and is especially desirable for hay and green manure in the Gulf States." Address: Scientific Assistant, Bureau of Plant Industry, USDA.

135. Piper, C.V. 1915. Re: Send soy bean varieties to Mr. N.E. Winters in Texas. Letter to W.J. Morse, [USDA], Jan. 19. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Will you kindly send seed at once to Mr. N.E. Winters in Texas, Experiment Station, Angleton, Texas, as follows:

"Mammoth, Barchet, and Biloxi soy beans, each sufficient for two 1/10 acre plots in rows. Send full instructions for planting and have the seed of the Biloxi variety forwarded to Professor Tracy [Biloxi, Mississippi]. A copy of your letter to Mr. Winters should be sent to Director Youngblood, College Station, Texas. Very truly yours,..."

Note: This is the earliest document seen (July 2013) that mentions the soybean variety Biloxi.

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: Agrostologist in Charge, [Bureau of Plant Industry, USDA, Washington, DC].

136. Morse, W.J. 1915. Re: Send Biloxi soy bean varieties to Mr. N.E. Winters in Texas. Letter to Prof. S.M. Tracy, Biloxi, Mississippi, Jan. 23. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Tracy: In a recent memorandum, Professor Piper advised that I write you to have two pounds of Biloxi soy bean sent to Mr. N.E. Winters, Experiment Station, Angleton, Texas. Very truly yours,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

137. Piper, C.V. 1915. Re: Please send soy bean seed at once to Texas. Letter (memorandum) to Mr. William Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, Jan. 23. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Will you kindly send seed at once to Mr. to Mr. N.E. Winters, Experiment Station, Angleton, Texas, as follows:

"Mammoth, Barchet, and Biloxi soy beans, each sufficient for two 1/10 acre plots in rows. Send full instructions for planting and have the seed of the Biloxi variety forwarded to Professor Tracy [Biloxi, Mississippi]. A copy of your letter to Mr. Winters should be sent to Director Youngblood, College Station, Texas.

"Very truly yours, Agrostologist in Charge."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist, USDA Bureau of Plant Industry, Forage Crop Investigations.

138. Piper, C.V. 1915. Re: Please send soy bean seed to Dr. Thomas Stark, Thibodaux, Louisiana. Letter (memorandum) to Mr. William Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, Jan. 27. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Please send 3 or 4 varieties of soy beans and 3 or 4 varieties of cowpeas–enough to plant ¼ acre–and write letter concerning it, to Dr. Thomas Stark, Thibodaux, Louisiana.

"C.V. Piper."

Note: At the lower left are written the names of the varieties and the amount of each sent. The soy beans appear to be Barchett, Tokio, and Peking–but the handwriting is hard to read.

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist, USDA Bureau of Plant Industry, Forage Crop Investigations.

139. Morse, W.J. 1915. Re: Sending you another package of soy bean flour. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, March 9. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Duggar: In accordance with a previous promise, I am sending you a package of soy bean flour. We have found that this flour may be utilized in the same manner as corn meal, using from one-half to three-fourths wheat flour. In the making of soy bread, griddle cakes, and muffins about one-fourth to one-third soy flour gives very good results.

"We would be very glad to hear of the results you obtain with this flour.

"Very truly yours, 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–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.

140. Piper, C.V. 1915. Re: Please send seed of cowpea and soy bean varieties to Mrs. A.C. Ritchie, Catonsville, Maryland. Letter (memorandum) to Mr. William Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, April 28. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Please send Mrs. A.C. Ritchie, Catonsville, Maryland, four or five varieties of cowpeas enough for a quarter of an acre of each, and the same number of varieties of soy beans, also for a quarter of an acre each. Please also advise her where she can get good Whippoorwill cowpeas and Mammoth soy beans.

"C.V. Piper."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist, USDA Bureau of Plant Industry, Forage Crop Investigations.

141. *Country Gentleman.* 1915. Soy beans for all climates. 80(21):919. May 22.

• ***Summary:*** "After testing some 500 varieties of soy beans the Federal Department of Agriculture is enthusiastic over this legume as a crop of many uses for various sections of the country. Though it is decidedly drought resistant the soy bean can thrive under a greater amount of moisture than corn or cowpeas; it make an excellent forage crop; the seed is weevil proof; it makes valuable pasture and is a good soiling crop, making from five to ten tons of green forage to the acre."

"'Variety is a matter of prime importance with the soy bean,' says W.J. Morse of the Federal Division of Forage-Crop Investigations. 'Early varieties should not be grown in the South nor late ones in the North. At the present time there are about fifteen varieties of soy beans handled commercially by seedsmen. Of the 500 varieties tested by this Department several have proved very promising in various sections of the country and are now either on the market or ready for distribution.'"

Some of the more important varieties are: Mammoth, Hollybrook, Ito San, Guelph, Haberlandt, Medium Yellow, Wilson, Peking, Tokio, Manchu, Black Eyebrow, and Barchet. Details are given on each variety, including seed color, early vs. late, best for seed vs. forage.

Note 1. This is the earliest document seen (July 2013) that mentions the soy bean variety Black Eyebrow.

Note 2. This is the earliest document seen (July 2013) which uses the spelling "Tokio" rather than "Tokyo" for this variety.

Note 3. This is the earliest document seen stating that the USDA has tested about 500 varieties of soy beans.

142. Morse, W.J. 1915. Re: Chinese soy beans instead of Chinese velvet beans for testing. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, June 16. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: Referring to your letter of the 10th instant, stating that you desired Chinese soy beans instead of Chinese velvet beans, I am taking pleasure in sending you one pound of the Barchet variety. This is a twining variety a without doubt is the one to which you refer as the Chinese soy bean. We had a fair quantity of this seed earlier this season but at this time our supply is very low.

"Very truly yours, 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–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.

143. Morse, W.J. 1915. [Variations in soy bean inoculation]. *J. of the American Society of Agronomy* 7(3):140. June.

• ***Summary:*** In 1910 Mr. S.A. Robert of the West Tennessee

Experiment Station at Jackson observed that the Acme and Tokio varieties of soy beans lacked root nodules, while the Mammoth variety, planted under the same conditions, produced many of them. In 1911, the next season, the Mammoth, Acme, and Tokio were planted in a field where the Mammoth had been grown in 1910, and where it was well supplied with nodules. In late September the writer examined a large number of plants of these three varieties and in no case were nodules found on plants of the Acme and Tokio varieties, while roots of the Mammoth variety plants had numerous nodules.

In varietal tests conducted for a number of seasons at the Arlington Experimental Farm [Virginia], the variety Haberlandt was as well supplied with nodules as most of the other varieties. Address: USDA, Washington, DC.

144. Voorhees, John H. 1915. Variations in soy bean inoculation. *J. of the American Society of Agronomy* 7(3):139-40. June.

• ***Summary:*** During the summer of 1913, "nitrogerm" and "farmogerm," two commercial inoculation products, were tested on a variety of soy beans in New Jersey. "One-acre plats were sown to each of the following varieties: Mikado, Peking, Haberlandt, Tarheel Black (Black Shanghai, S.P.I. No. 14952), Brown (Trenton, S.P.I. No. 24610), and Auburn." "In observations made June 25 the plants of all varieties bore root nodules except the Haberlandt, which seemed to lack them entirely... It is the writer's opinion that different varieties of the same legume bear different and definite powers of resistance to association with symbiotic bacteria."

A long footnote by W.J. Morse at the bottom of p. 140 states: "Some similar results concerning variation in soy bean inoculation were noted at the West Tennessee Experiment Station at Jackson, in the season of 1911. In 1910 Mr. S.A. Robert, superintendent of the station, observed that the Acme and Tokio varieties of soy beans lacked root nodules, while the Mammoth, planted under the same conditions, produced many of them. The next season, 1911, the Mammoth, Acme, and Tokio were planted in a field where the Mammoth had been grown in 1910 and where it was well supplied with nodules. In the latter part of September the writer had occasion to examine a large number of plants of these three varieties and in no case were nodules found on plants of the Acme and Tokio varieties, while the plants of the Mammoth had numerous nodules. In the varietal tests conducted at Arlington Experimental Farm, Virginia, for a number of seasons, the Haberlandt was as well supplied with nodules as most of the other varieties."

Note 1. This is the earliest document seen (July 2013) that mentions the soybean variety Tarheel Black.

Note 2. This is the 2nd earliest document seen (July 2010) that mentions "nitrogerm," a bacterial culture used for inoculating legumes. Unfortunately, the name and location of the manufacturer of nitrogerm is not given. By 1916 two different companies were making an inoculum named "Nitrogerm." Address: New Jersey Agric. Exp. Station, New Brunswick, New Jersey.

145. *Washington Post.* 1915. In Uncle Sam's government departments. July 25. p. RE3.

• ***Summary:*** In the section titled "Agriculture": "W.J. Morse, scientific assistant in forage crop work of the bureau of plant industry, will be away until the middle of August inspecting experiments with cow peas, soy beans and other forage crops in North Carolina, Georgia, Alabama, Louisiana, Texas, Arkansas, Tennessee, and Missouri."

"Prof. C.V. Piper, agrostologist in charge of the forage crop investigations of the department, spent last week at New London, Ohio, inspecting cultural experiments in timothy and other forage crops."

146. Morse, W.J. 1915. Re: Report on trip to North Carolina, Georgia, Alabama, Mississippi, and Louisiana stations. Letter to Prof. C.V. Piper, Washington, DC, July 27. 4 p. Handwritten, with signature on USDA letterhead.

• ***Summary:*** Morse is writing from Baton Rouge, Louisiana. "Dear Prof. Piper: Thus far in my trip I have been over soy bean and cowpea experiments at the North Carolina, Georgia, Alabama, Mississippi, and Louisiana stations.

"At the North Carolina station they were growing the Mammoth, Wilson, Virginia, Peking, and Haberlandt on a field scale. The Virginia is by far the best, making a much better forage growth than the Mammoth. Most of the soy bean and cowpea work is at the other stations in the state, which I plan to visit later in the fall.

Am very much pleased with the cowpea hybrids at Monetta, South Carolina. A large number of the selections of the Groot x Brabham are very promising. Took what notes I could and if possible will try to get down at Monetta later on for a friend notes [?] and selections.

"Dr. Labrach [?] and Prof. [C.K.] McClelland were very much pleased with the soy bean variety test and would like to increase cooperation work the coming year. All of the soy beans appeared very promising here again, however the Virginia was best. Some of the velvet beans looked quite good. Prof. McClelland had a row of mung bean, the seed of which he brought back from Honolulu. This crop made a very heavy growth of forage and seems quite promising for hay and green manure.

"At the Alabama Station the soys were looking fine but the cowpeas were planted rather late and were not showing up much.

"Only small tests were being conducted at the Mississippi Station. The Barchet, Virginia, Jet, Arlington, and Shanghai appear the best. Some of the velvet beans have made excellent growth, the Early Florida, Chinese, and Lyon.

"Today I spent at the Louisiana station going over

the forage crop work. Of the cooperation [?] my bean and cowpea work, I am afraid only the cowpea results will amount to anything. New land was rented for this work and the soys got the worst end of the deal. Soys on the station ground proper appear excellent. Of the cowpeas, the Early Buff and Catjang (22558) show up best. Those varieties planted June 1st stand about 3 feet high and are beginning to mature. Prof. Carr [?] here is very much pleased with both. The Sudan is especially fine; two cuttings having been made of the early plantings.

"I plan to leave for New Iberia and Crowley with Prof. Dodson tomorrow. New Iberia was not in my itinerary but Prof. Dodson wished that I go with him and as it will not make any real change in my plans I decided to go with him.

"It will be, perhaps, Saturday before I reach Chillicothe, Texas. Very truly yours,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

147. Morse, W.J. 1915. Re: Report on trip to Experiment Stations in Connecticut, Rhode Island, New Hampshire, Vermont, and Massachusetts. Letter to Prof. C.V. Piper, Washington, DC, Aug. 28. 3 p. Handwritten, with signature on USDA letterhead.

• ***Summary:*** Morse is writing from Lowville, New York, where he was born and raised. "Dear Prof. Piper: During the past week I have been at the Experiment Stations in Connecticut, Rhode Island, New Hampshire, Vermont, and Massachusetts. The Manchurian varieties, which were sent from the office this spring to these stations, in my opinion were doing very nicely. A number of them should mature at the stations and appear very promising as early grain strains. Others appear to be of promise as forage strains being finer and more suitable for hay. I found the men at the stations much interested in securing the early grain variety. The Manchu, Black Eyebrow, and 36653 appear to be the earliest and I think all three will mature with possibly a few other numbers. No other variety except the Ignotum (a variety from E.E. Evans, West Branch, Michigan) approached ours in earliness. The Guelph and Ito San are at least two weeks later. The station men appeared very much interested in the test.

As yet I have not looked into the soybean factory at Clayville, but after leaving here Monday expect to look into that matter. From Clayville, I expect to go to East Lansing, Michigan, and then to Battle Creek, Michigan. I do not think I shall stop at Elysia for I have given [Mr. E.E.] Evans our note books to take fall notes. I think I can put my time in better other places.

"I have been here since Thurs. and expect to leave here Mon.

"Have had a very pleasant time here the past few days. Had a rather heavy frost here last night. Very truly yours,..."

Note: This is the earliest document seen (March 2012) that mentions the soybean variety Ignotum–which was later thought to be the same as Ogemaw.

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

148. Piper, C.V. 1915. Re: Need for bulletin concerning important new soy bean varieties. Letter to W.J. Morse, [USDA], Sept. 4. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: I think it will be very desirable to prepare for publication as a bulletin data concerning the important new varieties of soy beans under some such title as 'Improved New Varieties of Soy Beans.' Somewhat later we will also prepare a similar publication in regard to cowpeas."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

149. Morse, W.J. 1915. Re: Report on visits to makers of soy products. Letter to Prof. C.V. Piper, Forage Crop Investigations, Bureau of Plant Industry, Washington, DC, Sept. 5. 2 p. Handwritten, with signature.

• ***Summary:*** "Dear Professor Piper:... At Clayville, New York, I looked up the soy bean factory recently started for the manufacture of flour and milk. I had a visit with the man in charge, a Mr. Spring/Sjurning (?) of Cussville (?), New York. The establishment is under the name of Spring (?) Corporation Co. and in addition to the soy products are to put out different kinds of breakfast food. The soy beans were to be purchased from (?) and Indiana growers, but Mr. Spring is going to get in touch with growers in eastern North Carolina... They have a patent process for making the milk called an emulsifier. The beans are crushed, put in the emulsifier with water, the mass churned about and the liquid drawn up. The bean mass is then dried and ground into flour. The milk is all to be sold to chocolate manufacturers while

some biscuit concerns agree to take a certain amount of the flour.

"At Battle Creek, Michigan, the Kellogg concern are interested in trying out the soy bean both as a flour and as a substitute for coffee. Mr. Kellogg would like to have us send him about a bushel of the Mammoth Yellow for experiments. He will give us the results and furnish us some of the products made from the beans." He is at the Toasted Corn Flake Co. in Battle Creek.

Note: This is the earliest document seen (Dec. 2013) that mentions Mr. [W.K.] Kellogg or his Toasted Corn Flake Co. in connection with soybeans.

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. Folder–Morse, W.J.–#1 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: St. Paul, Minnesota: Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

150. Pieters, A.J. 1915. Re: Letter from Elmer S. Johnson, Stryker, Ohio. Letter (telegram) to Mr. W.J. Morse [USDA], Experiment Station, Lincoln, Nebraska, Sept. 8. 1 p. Typed, on USDA telegram form.

• ***Summary:*** "Letter from Elmer S. Johnson, Stryker, Ohio, stating soy beans will be at best in about a week. Inform him when you will visit Stryker."

Note: Morse is apparently travelling in Nebraska.

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: Bureau of Plant Industry, USDA, Washington, DC.

151. Morse, W.J. 1915. Re: All soy beans harvested at Savannah [Georgia] and Raleigh [North Carolina]. Letter [telegram] to Prof. C.V. Piper, Washington, DC, Oct. 30. 1 p. Typed, with signature on USDA received telegram letterhead.

• ***Summary:*** Morse is writing from Raleigh, North Carolina. His telegram appears to mean that all soybeans have been harvested in these two locations.

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: Bureau of Plant Industry, USDA, Washington, DC.

152. Morse, W.J. 1915. Re: Trying to collect data concerning the culture and varieties of soy beans. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Nov. 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: We are trying to collect data concerning the culture and varieties of soy beans in a number of States. It will be greatly appreciated if you will send us a list of soy bean growers in your State using the crop either as forage or for seed purposes.

"Very truly yours, 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.

153. Morse, W.J. 1915. Re: Interest in the culture and varieties of soy beans in a number of States. Letter to Prof. J.F. Duggar, Experiment Station, Auburn, Alabama, Nov. 17. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Duggar: We are trying to collect certain data concerning the culture and varieties of soy beans in a number of States. It will be greatly appreciated if you will send us a list of soy bean growers in your States using the crop either as forage or for seed purposes.

"Very truly yours, 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–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.

154. Piper, Charles V.; Morse, W.J. 1915. The bonavist, lablab, or hyacinth bean. *U.S. Department of Agriculture Bulletin* No. 318. 15 p. Nov. 18. [19 ref]

• ***Summary:*** "Introduction: The bonavist is a native of India and has been cultivated since ancient times. In tropical and subtropical countries it is generally grown for human food, the young pods of some varieties being used after the manner of string beans. In India, China, and, formerly at least, the West Indies, the dried seeds of certain varieties are also used as food. In temperate countries it is more commonly known as an ornamental plant, especially the purple-leaved floriferous varieties, which are often used to

grow over trellises or porches. To some extent the bonavist has also been used for forage and as a green-manure crop. Judging from the reports of early writers its use for such purposes in the Southern States was formerly common, but the plant is now rarely used there as a field crop." Address: 1. Agrostologist in Charge; 2. Scientific assistant. Both: Forage-Crop Investigations [USDA Bureau of Plant Industry].

155. Mooers, C.A. 1915. Re: Growers of soy beans for seed in this state. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Nov. 19. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: I am sorry to say I am unable to give you very much information as to growers of soy beans for seed in this State. Mr. W.A. Bell of Powells Station, Tennessee, is growing some, and Mr. W.P. Ridley, Columbia, Tenn., has grown Haberlandt in particular. These are the only two seed growers that I can recall. For forage purposes beans are being grown extensively all over the State. I have no special list of growers. I may be able to get you some further information through the Extension Division, to whom I will refer your letter.

"Yours very truly, Chemist and 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.

156. Duggar, J.F. 1915. Re: This Station has no list of farmers in Alabama who grow soybeans. Letter to W.J. Morse, Forage Crop Investigations, U.S. Dep. of Agriculture, Washington, DC, Nov. 22. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir:–In reply to your recent inquiry I would say that this Station has no list of the large number of farmers [in Alabama] who grow small areas of soybeans.

"I think that probably Mr. C. Kirkpatrick, Cahaba, Alabama, and Mr. W. Howard Smith, Prattville, Alabama, may grow larger areas than do most farmers of the State.

"Yours very truly, Director."

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: Director and Agriculturist, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

157. *Advance* (*The*) (*Elizabeth City, North Carolina*). 1915. Expect experts to visit mill: both state and federal departments interested in soy bean possibilities. Dec. 10. p. 1.
• ***Summary:*** J.M. [sic, J.W.] Morse of the United States Department of Agriculture and C.B. Williams of the Experiment Station at Raleigh will be in the city on next Thursday, December 16th as the guests of the Elizabeth City Oil and Fertilizer Company.

"Mr. Williams is known here as a native of Camden County, the son of R.J. Williams of this city, and also in his official capacity of the division of agronomy of the State Department of Agriculture. His friends in this section have observed with interest his recent efforts to get manufacturers, especially the cotton mill men, interested in the possibilities of extracting the oil from the soy bean on a commercial scale, and of marketing both the oil and the by-products.

"The Elizabeth City Oil and Fertilizer Company had already conducted some experiments in the matter of extracting the oil; but they were not sure that at the prices which the beans command they would be able to extract the oil and market it at a profit. On recent visits to this city Mr. Williams has conferred with their representatives and has now induced the company to undertake the manufacture of soy bean oil and by-products on an extended scale.

"By next Thursday, December 16th the new work will be well under way and Mr. Williams and Mr. Morse will both be on hand to observe the results. The Oil and Fertilizer Company also invite the farmers of the section to visit their plant on this day and see for themselves a process which in time may become as familiar as ginning cotton."

158. *Advance* (*The*) (*Elizabeth City, North Carolina*). 1915. Farmers day at oil mill. Dec. 14. p. 1.
• ***Summary:*** "Thursday afternoon, December 16th will be farmers day at the plant of the Elizabeth City Oil and Fertilizer Company, that corporation is already stated in the columns of this paper, having issued the farmers of this section who are interested in soja bean a special invitation to come at that time and watch the manufacture of Soja bean oil and other soja bean products. The farmers will also have opportunity of meeting Prof. Williams of the Division of Agronomy at Raleigh and also Mr. W.J. Morse of the United States department of Agriculture. The occasion promises to be an interesting one, and farmers who attend will no doubt find it profitable as well.

"The Elizabeth City Oil and Fertilizer Company are now in the market for beans and those who have any to offer for sale will do well to get the mill's price before selling."

159. Morse, W.J. 1916. Soy beans profitable to cotton states: Expert of the Department of Agriculture gives thorough

lesson on soy beans, which have greater feeding value than cottonseed meal. Crop would thrive in Louisiana. *Item Farmer* (*New Orleans, Louisiana*) 4(42):8. Jan. 22.
• ***Summary:*** Contents: Introduction. Adaptations. Soil preparation. Fertilizers. Inoculation. When to sow. Rotations. Mixtures. Many varieties. Soy beans for hay. Soy beans for pasture. Soy beans for soiling. Soy beans for ensilage. Soy beans for seed. The feeding value. Storing soy beans. Value for human food. Address: Scientific Assistant, Bureau of Plant Industry, USDA.

160. Cromer, C.O. 1916. Re: Yields determined on various soybean strains. Letter to W.J. Morse, Scientific Assistant, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, Feb. 8. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "My dear Morse: I have gotten the yields determined on the soybean strains which you sent me last spring, as well as the cowpeas, and transmit herewith the results." A table lists 18 strains by their S.P.I. numbers, with a yield for each in bushels/acre. The top yield was 30.5 bushels (#30600), followed by 28.6 (#36847). The lowest yield was 19.4 (#36576). "The Manchu is 24.2 and 30744 is 20.2. I am not aware whether this last named variety is the same as Black Eyebrow or not."

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–#5.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Associate in Crops, Purdue Univ., Lafayette, Indiana.

161. Piper, C.V. 1916. Re: Mr. A.T. Powell of Brookeville, Maryland. Letter to W.J. Morse, [USDA], Feb. 15. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. A.T. Powell of Brookeville, Maryland, was in to see me a few days ago. He grew a large area of soy beans last year, a crop in which he is much interested. He thought he had the Peking variety, but he tells me the seed were yellow, and I expect to receive a sample from him within a few days. In view of the work he is doing I think it desirable to send him enough seed to plant an acre of five or six of the best varieties, namely, Haberlandt, Peking, and such others as you think are the best for his immediate locality.

"Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

162. Piper, C.V. 1916. Re: Mr. A.T. Powell of Brookeville, Maryland. Letter (memorandum) to Mr. William Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, Feb. 15. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Mr. A.T. Powell, of Brookeville, Maryland, was in to see me a few days ago. He grew a large area of soy beans last year, a crop in which he is much interested. He thought he had the Peking variety, but he tells me the seed were yellow, and I expect to receive a sample from him within a few days. In view of the work he is doing I think it desirable to send him enough seed to plant an acre of five or six of the best varieties, namely, Haberlandt, Peking, and such others as you think are best for his immediate locality.

"Very truly yours, Agrostologist in Charge."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist, USDA Bureau of Plant Industry, Forage Crop Investigations.

163. Morse, W.J. 1916. Re: Regarding soybean variety 19981. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Feb. 18. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: Your letter of February 10 to Professor Piper, regarding soybean variety 19981, has been handed to me for attention.

"This variety was obtained from the Yokohama Nursery Company, Yokohama, Japan, in 1907. No name has been assigned to it as yet. Perhaps either the name 'Knoxville' or 'Tennessee' would be a good one to give it, or if you would not care to assign either of these names, 'Yoko' would be a suggestion. Since this variety has proved to be so promising at your station, we would prefer to leave the naming of it to you, with the suggestions noted herein. We would be glad to have you let us know the name you give this variety so that we may include it in our records.

"During the winter of 1914 the Department obtained through the Office of Foreign Seed and Plant Introduction over three hundred introductions of soybeans from Manchuria, Japan, China, and Korea. This number included a very large number of new things, some of which have proved quite promising in our trials at Arlington. We wonder if you would not care to take twenty-five or thirty of the very best to place in your variety trials at Knoxville.

"As you will recall, the Brownie and Baird gave very promising results at your station and have been grown for a number of years. In this list of new things just mentioned, a number of varieties of the Brownie type were obtained having yellow seed. These yellow-seeded varieties were very prolific and made an excellent growth of forage.

"If you desire to obtain these best introductions, please let me know in the near future so that the seed may be reserved for you.

"Very truly yours, 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. Cromer, C.O. 1916. Re: List of farmers in Indiana who have grown soybeans during the past year. Letter to W.J. Morse, Scientific Assistant, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, Feb. 23. 1 p. Typed, with signature on letterhead.

• ***Summary:*** On 10 Nov. 1915 Morse wrote Prof. Cromer: "We are trying to collect certain data concerning the culture and varieties of soy beans in a number of States. It will be greatly appreciated if you will send us a list of soy bean growers in your State using the crop either as forage or for seed purposes."

In this response, Cromer sends Morse a list of 20 farmers "who have grown soybeans during the last year in Indiana or nearby, as follows: Geo. D. Gilbert, Goshen, Ind. D.L. Trout, Chicago, Illinois. Otto S. Jones, Greenfield, Ind. B. Wilson, Muncie, Ind. R.R. #4. E.R. Kenney, Lafayette, Ind. R.R. #8. E.B. Bentley, Charlestown, Ind. Stacy Brant, Shelbyville, Ind. W.F. Lamport, Indianapolis, Ind. Fountain Sq. Station. D. McCarver, Edwardsport, Ind. W.G. Wilson, Brookville, Ind. Fred E. Allen, Bedford, Ind. L.T. Hurst, Bainbridge, Ind. Fred Bachman, Jr., Acton, Ind. Virgil Sears, Lapel, Ind. Harry E. Wheeler, Darlington, Ind. I.C. Scharf, New Albany, Ind. W.E. Stevens, Boonville, Ind. H.K. Kirkpatrick, Lafayette, Ind. Samuel L. Mitchell, Battle Ground, Ind. Oran A. Province, Franklin, Ind.

Note: Neither the Fouts Brothers nor Adrian Parsons are mentioned.

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–#5.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Associate in Crops, Purdue Univ., Lafayette, Indiana.

165. Mooers, C.A. 1916. Re: I would like to get as many of the promising new varieties as you care to send us. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Feb. 23. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: In reply to your letter of February 18th, I wish to say I will be very much pleased to get as many of the promising new varieties of soy beans as you care to send us. In the past, I have tested everything that Prof. Piper thought worthwhile for us to try. We have both found the work interesting and profitable.

"I read with interest your suggestion in regard to a name for 19981. If you think well of it we will call the new variety 'Yokoten'. Prof. Morgan thought the 'ten' would help it.

"Prof. Bain recently spoke to me about trying some red clover seed which you have from Italy, I believe it was. I will be glad to get some of the seed, but would prefer not to sow it until late summer. Of course it could be sent any time it is convenient to you.

"I will be very glad to try something else you think of. I hope you will be able to make us a visit some time, Trust there will be enough grown here to attract you this way.

"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.

166. Morse, W.J. 1916. Re: Yokoten and red clover seed. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, March 3. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter for February 23 advising that the varietal name 'Yokoten' has been applied to S.P.I. No. 19981. I think the addition that Professor Morgan made to the name suggested in my letter a very good one. I am listing your name to receive a number of the most promising of the new varieties of soybeans which we have obtained within the past two years.

Concerning the red clover seed which we have obtained from Italy, I am referring your letter to Dr. A.J. Pieters, of this office, who is in charge of clover investigations.

" I thank you for your kind invitation regarding a visit to your place and trust that during the coming summer I may be able to stop at Knoxville to look over the soybean work.

"Very truly yours, 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.

167. Mooers, C.A. 1916. Re: W.J.G. Webster of Raleigh, Tennessee, and Yoko-Tenn new soy bean variety. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., March 17. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I have a request from W.J.G. Webster of Raleigh, Tennessee, for a small amount of Nuttal [sic, Nuttall] soy bean seed. He has tried this variety and likes it, but has been unfortunate in losing his seed the past year. If you can spare him a quart we will appreciate it.

"We have another idea on the Yokoten variety of soy bean and have thought that it would be better to spell it 'Yoko-Tenn'. Prof. Morgan in particular thinks it desirable to change it in this way. Hoping this will be agreeable to you, I am

"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.

168. Morse, W.J. 1916. Re: We have no seed of the Nuttall variety of soybeans. Yoko-Tenn soybean variety. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, March 24. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: Replying to your letter of March 17, I will say that at the present time we have no seed of the Nuttall variety of soybeans. I think, however, it will be possible for us to obtain a small amount from one of our experiment stations with whom we are conducting variety tests. I will be very glad to forward to Mr. Webster a small amount of this variety.

"With regard to your idea of spelling the Yokoten variety of soybeans as 'Yoko-Tenn,' I am rather of the opinion with Professor Morgan that it is more desirable.

"Very truly yours, 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.

169. Morse, W.J. 1916. Soy beans for the South (Letter to the editor). *Southern Planter* 77(4):230-32. April.

• ***Summary:*** In this long letter, Morse discusses the many benefits of growing soy beans in Southern states and their many uses. "The South has many valuable legumes, but perhaps no one has greater value and is less appreciated than the soy bean... It has many points of superiority over the cowpea that should recommend it to the average farmer... At the present time the soy bean is grown principally for hay, which is comparable to alfalfa and red clover in feeding value. However, in a few sections, such as eastern North Carolina, a very profitable industry has developed from the growing of seed. As a pasture plant, the soy bean may be used to advantage for all kinds of stock, the most profitable method being to pasture with the hogs, supplementing the corn ration."

"The utilization of the soy bean as human food should be encouraged, as it can be used in many different ways. The green beans when three-fourths to full grown, compare favorably to the butter or lima bean. The dried beans may be used in baking or in soups, but require a longer soaking and cooking than the field or navy bean.

"The meal or flour prepared from the cake after the oil is expressed, or from the whole bean, may be used as a constituent of bread, biscuits, or muffins; in fact, much of the same way as corn meal." A photo shows the seeds and pods of seven of the best varieties of soy beans: Guelph (green, medium), Ito San (yellow, early), Buckshot [black], Austin, Hollybrook (yellow, late), Mammoth (yellow, late), and Haberlandt (yellow, medium late) (p. 231). Address: Scientific Asst., Forage Crop-Investigations, USDA, Washington, DC.

170. Morse, W.J. 1916. Re: Sending you to-day one-fourth pound of each of the following varieties. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, May 1. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: Referring to our previous correspondence concerning new varieties of soy beans, we are taking pleasure in sending you to-day one-fourth pound of each of the following varieties:

"S.P.I. No.
"3689-1 (F.C.I.)
"35622
"35625
"36116
"37036
"37080-A-A

"37080-C
"37080-E
"37042
"37232
"37233
"37239
"37244
"37247
"37254
"37259
"37261
"37262
"37273
"37277
"37289
"37295
"37301
"37338
"37344
"37346
"37571-F
"40113

"All of these varieties were obtained from Manchuria, China, and Korea during the winter of 1914, having now been tested out at Arlington Farm for two years, and I have endeavored to source only the best for the test at Knoxville. If you desire to obtain more notes regarding these varieties as to their maturity and source, I will be glad to furnish you with all the data we have.

"Very truly yours, 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.

171. Morse, W.J. 1916. Re: Publications on soybeans. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, May 4. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: Referring to your memorandum of May 3, requesting the approximate titles of any publications which I expect to issue during the fiscal beginning July 1, 1916, I will say that I have in mind the following publications:

"'Soybeans: Culture and Uses'–Farmers' Bulletin
"'Improved Varieties of Soybeans'–Dept. Bulletin
"'Soybeans as a Human Food'–Dept. Bulletin

"I might say that the intended publication 'Soybeans as a Human Food' is the result of a suggestion that I cooperate with the Bureau of Chemistry in getting together such information as we can on the use of the bean for human food.

"Very truly yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

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.

172. Piper, C.V. 1916. Re: Dr. Rodney H. True. Letter to W.J. Morse, [USDA], June 1. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Will you kindly send to Dr. Rodney H. True about one-half pound of Barchet, Mammoth, Haberlandt, and some other early varieties of soybeans, also about one-half pound each of Early Buff, Groit, and Iron cowpeas? 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

173. Piper, C.V. 1916. Re: Soybeans are to be planted at Marlborough, Maryland, and Oxford, North Carolina. Letter to W.J. Morse, [USDA], June 2. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: There are to be planted at Marlborough, Maryland, and Oxford, North Carolina, nine 1/40-acre plots each of cowpeas and soy beans. It is desired to plant these at each place late enough so that by the time the first frost the first pods will have barely matured. Will you kindly look into this matter and advise me what varieties should be used and what their dates of planting at each place should be."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

174. Morse, W.J. 1916. Re: Sending you *Farmers' Bulletins* on Cowpeas, Soybeans, and Bur Clover. Letter to Mr. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama,

June 17. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: In reply to your letter of recent date, I am taking pleasure in requesting that *Farmers' Bulletins* 318 "Cowpeas," 373 "Soybeans," and 693 "Bur Clover" be sent to you.

"I regret that the supply of our B.P.I. [Bureau of Plant Industry] Bulletins on these crops has been entirely exhausted. They may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., at the following prices:

"B.P.I. 197–'Soy Bean: History, Varieties, and Field Studies.'–15¢

"B.P.I. 229–'Agricultural Varieties of Cowpea and Immediately Related Species.'–25¢.

"B.P.I. 167–'Nonperennial Medicagoes, Agronomic Value and Botanical Relationship of Species.'–15¢.

"Very truly yours, 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–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.

175. *Washington Post.* 1916. In Uncle Sam's government departments. June 25. p. A5.
• ***Summary:*** In the section titled "Agriculture": "W.J. Morse, scientific assistant in forage crop investigations of the bureau of plant industry, has gone to Savannah, Georgia, and Raleigh, North Carolina, to inspect soy bean experiments and confer with experiment station officials."

176. Dyer Packing Co. 1916. Better beans at lower cost: Dyers Pork and Beans with Tomato Sauce (Ad). *Chicago Daily Tribune.* July 2. p. 10.
• ***Summary:*** See next page. This is a large and prominent display ad. An illustration at the upper left shows a hand holding a sheet of paper titled "The United States government's estimate of the value of the soja beans as a food for mankind." It states: "In 'Farmers Bulletin' No. 121, issued Nov. 19, 1906, prepared under the supervision of the Office of Experiment Stations, on pages 12 and 13, an account of Soja Beans is given, and the statement made that 'In the Orient this bean, and the various food products made from it, are so largely consumed that it is perhaps the most important food plant next to rice.'

"On page 19 of this Bulletin we find a comparison of the Food Values of various food materials,..." A comparison of the nutritional composition of navy beans, soja beans, potatoes, wheat flour, lean beef, milk, and eggs is given. Soja beans have the highest content of protein (34.0%, followed by navy beans at 22.5%), fat (16.8%, followed by eggs at 10.5%), ash [minerals] (4.7%, followed by navy beans at 3.5%), and food value per pound (1,970 calories, followed by wheat flour at 1,650 calories).

Two more quotations are then given [from: Morse, W.J. 1915. "Soy beans in the cotton belt." *Special* (USDA Office of the Secretary). 6 p. Jan. 12 [No. 21]. See p. 6]: "Although Soja Beans have attracted attention from time to time in the U.S., thus far they have been but little used."

"The numerous ways in which the Soja bean can be prepared as human food should encourage its use. The green bean when three-fourths to full grown has been found to compare favorably with the butter or Lima bean. The dried beans are used like the field or navy bean in baking or in soups... Soja bean meal or flour may be used as a constituent of biscuits, muffins, and bread." Note 1. The actual text in Morse's publication uses the word "soy" instead of "Soja."

At the lower right of the ad is an illustration of a can of these beans. An attractive, well-dressed lady is seated on the lower inside curve of the letter "D" (for Dyer) holding op a can of the beans in her left hand.

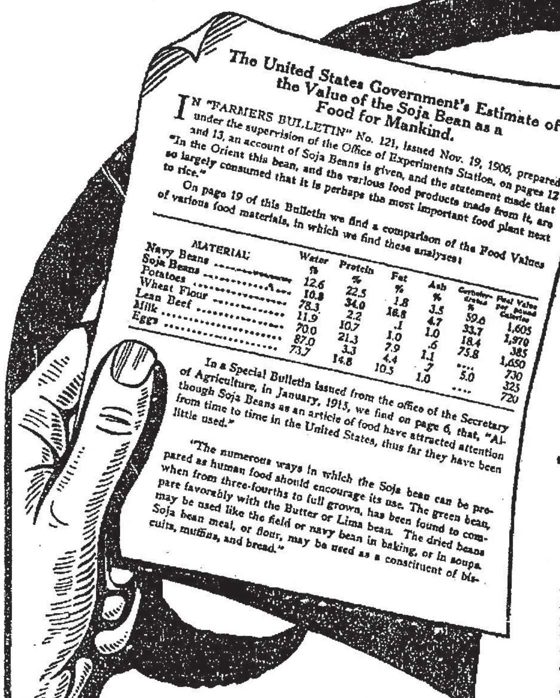
The main large, bold text at the top of the ad reads: "The amazing popularity of Dyer's Beans, as compared with the many old established brands, is due to the fact that they are Better Beans at Lower Cost. Dyer's beans are entirely different from any others ever put into tins. In that difference lies the secret of their goodness. Dyer's beans are a delicious and highly digestible combination of the finest hand-picked select Navy Beans and the nutritious Soja Beans from the Sunny Southland.

"Note from the government report quoted... that Soja Beans contain 50 per cent more protein than Navy Beans. It is protein that builds and repairs body tissue and furnishes energy.

"Note also that Soja beans contain nine times as much fat as Navy Beans. This is also a valuable food element. But Soja beans contain little more than one half as much carbohydrates as Navy Beans. It is the carbohydrates or starchy content which is the least easily digested element in Navy Beans."

"The three points of superiority of Dyer's: More food value, weight for weight. A larger can for the same price. Better flavor and digestibility." Note 2. There is a remarkable emphasis on providing nutritional information in this ad. This company would continue to advertise this product in large, prominent ads in this paper for about the next year; each ad would have a different slogan and design, but with much continuity of message and general design. Address: Vincennes, Indiana.

177. Morse, W.J. 1916. Re: Report of inspection tour to Monetta, South Carolina. Letter to Prof. C.V. Piper, Washington, DC, Aug. 17. 2 p. Handwritten, with signature on USDA letterhead.
• ***Summary:*** Morse is writing from Athens, Georgia. "Dear



The United States Government's Estimate of the Value of the Soja Bean as a Food for Mankind.

IN "FARMERS BULLETIN" No. 121, issued Nov. 19, 1906, prepared under the supervision of the Office of Experiments Station, on pages 12 and 13, an account of Soja Beans is given, and the statement made that "In the Orient this bean, and the various food products made from it, are so largely consumed that it is perhaps the most important food plant next to rice."

On page 19 of this Bulletin we find a comparison of the Food Values of various food materials, in which we find these analyses:

MATERIAL	Water %	Protein %	Fat %	Ash %	Carbohydrates %	Fuel Value per pound Calories
Navy Beans	12.6	22.5	1.8	3.5	59.6	1,605
Soja Beans	10.8	34.0	16.8	4.7	33.7	1,970
Potatoes	78.3	2.2	.1	1.0	18.4	385
Wheat Flour	11.9	10.7	1.0	.6	75.8	1,650
Lean Beef	70.0	21.3	7.9	1.1	....	730
Milk	87.0	3.3	4.4	.7	5.0	325
Eggs	73.7	14.8	10.5	1.0	....	720

In a Special Bulletin issued from the office of the Secretary of Agriculture, in January, 1915, we find on page 6, that, "Although Soja Beans as an article of food have attracted attention from time to time in the United States, thus far they have been little used."

"The numerous ways in which the Soja bean can be prepared as human food should encourage its use. The green bean, when from three-fourths to full grown, has been found to compare favorably with the Butter or Lima bean. The dried beans may be used like the field or navy bean in baking, or in soups. Soja bean meal, or flour, may be used as a constituent of biscuits, muffins, and bread."

Ask Your Grocer for Dyer's Pork and Beans

The amazing popularity of Dyer's Beans, as compared with the many old established and widely advertised brands, is due solely to the fact that they are

Better Beans at Lower Cost

Dyer's Beans are entirely different from any others ever put into tins. In that difference lies the *secret of their goodness.* Dyer's Beans are a delicious and highly digestible combination of the finest hand-picked select Navy Beans and the nutritious

SOJA BEANS
From the Sunny Southland

Note from the government report quoted in the upper left corner of this page that Soja Beans contain 50 per cent more protein than Navy Beans. It is protein which builds and repairs body tissue and furnishes energy.

Note also that Soja Beans contain nine times as much fat as Navy Beans. This also is a valuable food element. But Soja Beans contain but little more than one-half as much carbohydrates as Navy Beans. It is the carbohydrates or starchy content which is the least easily digested element in Navy Beans.

Above is given the estimate of the United States government as to the relative constituents of the ordinary "Navy" Bean and the "Soja" Bean. All other packers use the Navy Bean. After much careful experimenting we have succeeded in blending in a certain happy combination, a portion of the rich, flavory and nutritious "Soja" with the common "Navy" Bean. The result is a product more digestible, much higher in food value and so much finer in flavor that thousands of people who cannot be induced to eat ordinary tinned beans have become very fond of Dyer's. The sale of Dyer's throughout the country more than doubled within six months after the new Soja-Navy combination was placed upon the market.

Dyer's Pork and Beans
With Tomato Sauce

The Three Points of Superiority of Dyer's:

More food value, weight for weight — A larger can for the same price — Better flavor and superior digestibility

NOTICE TO DEALERS: If your stock of Dyer's Beans is running low notify your jobber immediately. He can supply you.

Your Grocer is glad to sell you Dyer's, because he knows you will be back for more

Ask Your Grocer for Dyer's Pork and Beans

Dyer Packing Co.
Vincennes, Indiana

Chicago Branch:
113 East Austin Avenue
Tel. Central 4347

Prof. Piper: Spent all day Wednesday at Mr. [Joseph M.] Johnson's Monetta and found things most promising. Many of the Groit-Brabham hybrid [cowpea] selections appear most excellent both for seed and for hay. They are as resistant to wilt and nematode as Iron and Brabham, and excel other varieties in seed and forage. I am hoping to obtain some pure strains of them so that we can put them out on a larger scale next season.

"The soybeans are doing fairly well. We have about thirty varieties out there but the three that we have been working with as resistant strains are far ahead of the others.

"The Biloxi, though planted late, is making a very nice showing.

"Mr. Johnson will need a number of sacks for seed and I am giving herewith a list of his needs so that Mr. Reed may send them.

"100 print / pint [?] [cotton] bags. 150 prisk [?] bags. Buel [?] twine. 500 tags–small with string attached.

Address above to: Joseph M. Johnson, Monetta, South Carolina.

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

178. Morse, W.J. 1916. Re: Need for supplies of subvouchers and film. Letter to Mr. H.L. Nestorr, Washington, DC, Aug. 21. 2 p. Handwritten, with signature on USDA letterhead.
• ***Summary:*** Morse is writing from Fayetteville, Arkansas. "Dear Sir, Will you send me a book of subvouchers c/o Lahr Hotel, Lafayette, Indiana. Would also like to have two films (6 exposures each) 2½ x 4¼, [Kodak] Brownie 2-A sent to Mr. Jos. [Joseph] M. Johnson, Monetta, South Carolina. Mr. Johnson promised to take some photos of the cowpeas at Monetta as he has a small camera. I desire very much to have such photos as the peas looked very promising indeed. I think Mr. Reed can get the films all right and send them.

"The soybeans and cowpeas, especially soybeans, have looked very promising at the places I have visited so far. They have some excellent tests of soy beans, cowpeas, velvet beans, and soybeans at this place. he soy beans and velvet beans appear mighty fine.

"As I result [?] expect to make a trip south sometime during Sept. or Oct. I was at the Georgia Station at Athens, Ga. and found them very much interested in alfalfa. They have a variety test there and are also growing a number of fields at the station. They have quite an alfalfa campaign on and say that the farmers are all talking alfalfa. If you can I think you will find it of value to visit Prof. Fair [?] there.

"At the Mississippi Station, Kirkville [?] they have only a small patch of Perurians [?] and the weeds are taking it although they have had a very promising first cutting. Dr. Edgerton is much interested in getting alfalfa there but is rather discouraged with the results thus far.

"From here for Columbia, Missouri, and then to Ames, Iowa. Will probably be in Ames when the strike begins so do not know what I shall do then. If the strike lasts I may have to cut out some of the places.

"Please do not forget the subvouchers or I will not have sufficient to last me through the trip. Very sincerely,...

"P.S. Have received the news letters which Miss Brown has so kindly sent me and they were very much appreciated."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

179. Meyer, Frank N. 1916. Re: Loneliness, depression, and hardships. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. See p. 2195, 2197. Letter of 1 Sept. 1916 from Hotel Seward, Portland, Oregon, to P.H. Dorsett.
• ***Summary:*** "Last night I landed here in Portland [Oregon], having come direct from Mandan [Experiment Farm, North Dakota] where I spent a night and a day and where [at Mandan] I found that a remarkable progress has taken place since you and I were here in Sept. 1912."

"And you are just a little bit surprised about I feeling lonely! My, Mr. Dorsett, there are times that my lonesomeness may destroy me. I wish I could tell you face to face some problems we go through, but I can assure you that the specter of a lonely old age looms up larger and larger and the spectacular office of an active explorer does not hold it down any longer!"

In a follow-up letter to David Fairchild dated 19 Sept. 1916 (written from Seattle, Washington) Meyer writes: "I am thankful to you for your interest in my recent illness, but I feel quite all right now, except of course that I have a touch of what the Germans and Swiss call "Heimweh" [homesickness]. It seems that it created almost somewhat of a sensation in the Office when I wrote that I felt lonesome. Well, that's not crime! Even wanderers like I, we find it hard to break ties of friendship! And the prospect of having to live again for several years among a race of people with whom one never becomes familiar, after having enjoyed the pleasure of our own white man's civilization for several months, well, that makes one feel lonesome. If I knew I could find a congenial white assistant in China I would feel better..."

"My illness was caused by being tired and then

becoming over-heated in striking an unexpected hot wave. I got feverish, lost appetite almost entirely, could not sleep any more and for a few days I was in that strange borderland where sanity has slipped away and where insanity is entering. It is a dangerous, delirious borderland, and I really was afraid I would become seriously ill. The visions I have had are too strange to describe them; just fancy yourself visiting this early a million of years ago when Pithecanthropus erectus lived in small families and Aeantropus and all the strange beasts were all around. Well, I went thru it and marvelled. When I began to get better the animals and fishes went away and landscapes and forests came in succession but not landscapes of today, all was way, way back. I cannot explain all these matters!"

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer.

180. Morse, W.J. 1916. Re: Change of plans on inspection tour. Letter to Mr. H.L. Nestorr, Washington, DC, Sept. 6. 2 p. Handwritten, with signature on USDA letterhead.
• ***Summary:*** Morse is writing from Spooner, Wisconsin. "Do not know who is in the office at the present time so will write you. Found some mail here from the office and will change my trip in Michigan. I had planned to go to Lansing. In view of the Roach Canning Co. I think I shall go to Hart, Michigan to talk over the canning of green soybeans. Their company is willing to undertake this work and a considerable number of beans (soy) are grown in the section about Hart."

"The soybeans at Ames, Iowa, and St. Paul [Minnesota] seem very promising. Although but few are grown in either state, the stations have experimented with them in different ways and not done much extension work. However they are now starting to do extension work for they feel this crop has a chance.

"Shall be in Lafayette, Indiana, Thurs. Hart, Michigan, Sat., Stryker, Ohio, Mon. Columbus, Ohio, Wed.

"If I am not held up by rains shall probably be back about the 20th or 22nd [of Sept.].

"I wonder if cotton bags, twine, and tags were sent to Jos. [Joseph M.] Johnson, Monetta, South Carolina. Wrote Prof. Piper when I was in S.C. to have Mr. Reed send them. Wish you would ask Mr. Reed if the things were sent. Sincerely,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

181. *Washington Post.* 1916. In Uncle Sam's government departments. Oct. 15. p. FD3.
• ***Summary:*** In the section titled "Agriculture": "W.J. Morse, scientific assistant in the forage crop investigations, will spend the remainder of October at points in North Carolina inspecting soy bean variety tests in cooperation with the North Carolina experiment station."

"Prof. C.V. Piper, agrostologist in charge of the bureau of plant industry, spent last week inspecting forage crop experiments in North Carolina, Georgia and Tennessee."

182. Morse, W.J. 1916. Re: Itinerary for present trip. Letter to Mr. R.A. Oakley, Washington, DC, Oct. 22. 1 p. Handwritten, with signature on USDA letterhead.
• ***Summary:*** Morse is writing from Belhaven, North Carolina. "Dear Mr. Oakley: Following is the itinerary of my present trip.

"Oct. 20. Raleigh, North Carolina.
"Oct. 21. Washington, North Carolina.
"Oct. 22. Belhaven, North Carolina.
"Oct. 23. Srenona [?], North Carolina.
"Oct. 24. Suququarter [?], North Carolina.
"Oct. 25. Belhaven, North Carolina.
"Oct. 26. Columbia, North Carolina.
"Oct. 27. Columbia, North Carolina.
"Oct. 28. Tarboro, North Carolina.

"The [soy] bean crop through the section is much shorter this year than last. Oil mills are taking up considerable quantities, and the price is much higher than previous years. Very truly tours,..."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

183. Meyer, Frank N. 1916. Re: Chinese soybean cheese. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. Typed.
• ***Summary:*** Meyer wrote all these letters from China to Fairchild or Dorsett at USDA in Washington, DC. Page 2246-47 (21 Nov. 1916 from Peking). "Parcel No. 125c, contains first quality Chinese soybean cheese; please taste a little on the point of a knife; it is extremely appetising. Mr. [William] Morse of Forage Crops [USDA] wants it and asked me for some samples of Chinese bean cheese in May 1916. I wonder whether the fermenting organism is a new one possibly, that can be made to work in other substances than beancurd." Note 1. This is the earliest document seen (April 2001) concerning USDA's work with fermented soyfoods.

Note 2. This is the earliest English-language document seen (Oct. 2011) that uses the term "bean cheese" or

"soybean cheese" or "Chinese soybean cheese" or "bean-cheese" to refer to Chinese-style fermented tofu.

Page 2282, 2284 (12 Feb. 1917 from Peking). "I am sending tomorrow, via Diplomatic Pouch, one small tin case, well soldered up and containing 33 small squares of old bean cheese... Mr. Morse again may be the right man to give it to. The quality is not as fine as that of sample 125b, but still, it is passable. There must be several kinds of this soft cheese here in this land and I'll be on the lookout for them when traveling about. My interpreter informs me that in summertime one has to keep this cheese perpetually under a layer of sesame-oil, otherwise maggots get in and eat it all up."

Page 2289, 2291-92 (23 March 1917 from Ichang). "Well, I am also busy in getting details about Chinese bean-cheese making; it is getting to be a very interesting process in which fungi and personal experience play their parts."

Page 2316, 2321 (6 June 1917 from Hankow, Hupeh). "No, the bean-cheese you tasted was not any more spoiled than Limburger or Camembert."

Page 2328 (14 June 1917 from Hankow to David Fairchild). "It certainly surprised me agreeably that you and your guests dared to eat that bean cheese after its long journey–and that it was found to be a good appetizer. I hope my fotos [photos] and letters relating to the making of same have reached you since and that Mr. Morse can do something with this new food product."

Page 2338 (20 June 1917 from Hankow to Fairchild). "In my descriptions about the making of bean cheese I have used the word 'foo' instead of 'fu' since the last can be pronounced fyu, as in future, etc. I also mentioned that ground-up capsules of *Illicium anisatum* are used; now I am not sure whether *I. anisatum* and *I. verum* are synonyms; I saw, however, that the last name has been given to the true star-aniseed, which is the one the Chinese are using and which is said to come both from Kwantung [probably Kwangtung province in southeast China] and from Szechuan."

Page 2343 (23 June 1917 from Hankow to Mr. Stuntz). "I'm glad the bean-cheese was so well received."

Page 2355, 2358 (27 July 1917 from Hankow). Meyer lists samples he is sending to Mr. Morse and the Bureau of Chemistry: "Fermented rice, used in coloring bean cheese red. Bean cheese, one white and one red, each in a little jar."

Page 2361, 2363-64 (1 Aug. 1917 from Hankow). "I am certainly very much interested to hear that Mrs. [Yamei] Kin has obtained a commission from the Bureau of Chemistry [within the USDA] to investigate the bean cheese industry... a subject like this is too fascinating to leave it alone. I do not think Mrs. Kin will find that bacteria play much of a role in this bean cheese affair; it seems a mould does the work... It pleases me that you and almost everybody to whom you served the bean cheese, liked it... Did Mrs. Kin put you in touch with a New York firm of Chinese products where this bean cheese can be obtained?"

Note 3. In 1927, the Bureau of Chemistry's regulatory powers were reorganized under a new USDA body, the Food, Drug, and Insecticide organization. In 1930, this name was shortened to the Food and Drug Administration (FDA).

Page 2369-70 (8 Sept. 1917 from Kingmen, Hupeh). "I am quite pleased to hear in your letter of July 5, 1917 that my soy bean-cheese samples have really created so much interest. Mr. Menderson wrote me a long letter on this problem; I cannot give him, however, much more information in my report to Mr. Morse and on the photos. [Note 4. This report has apparently been lost.] Beancurd and beanmilk always taste beany. The cheese, however, has lost this unpleasant characteristic. If soft beancurd is beaten up with sugar, it also improves much in flavor. I have not heard from Mrs. Kin yet; she surely will get along without my assistance, for she 'knows the ropes' here in her own land."

Page 2407, 2409 (25 Oct. 1917 from Kingmen, Hupeh). "Yes, I'll get various varieties of bean cheese as soon as I can lay my hands on novelties."

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer.

184. Morse, W.J. 1916. Re: Oleomargarine and soy sauce. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., Nov. 28. 1 p. Typed, without signature.
• ***Summary:*** "Dear Prof. Williams: I have your letter of November 24 advising me of name of the manufacturer of oleomargarine, a package of which was shown at the Raleigh State Fair. Will say that I will use the information contained in your letter as confidential.

"With regard to procuring some of the soy bean sauce and other products from the Chinese stores here in Washington will say that I shall be glad to obtain some of them for you. I obtained two different sorts of soy sauce and a can of bamboo shoots. Inquiry among the different Chinese merchants of Chinatown did not reveal any further products than the soy sauce made from soy beans. I so writing to know if you desire just the two kinds of soy sauce sent you.

"Very truly yours..."

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.].

185. Morse, W.J. 1916. Re: Photos of the soy bean industry in eastern North Carolina. Letter to Dr. R.Y. Winters, Experiment Station, Raleigh, N.C., Nov. 28. 1 p. Typed, without signature.

• ***Summary:*** "Dear Dr. Winters: During our trip to eastern North Carolina you no doubt will recall that a number of picture were taken of various phases of the soy bean industry. In the developing of the films I find that only a very few of the pictures turned out good. These were the first two or three taken at the beginning of our journey around the Mattamuskeet Lake. It seems evident to me that the camera was injured in some way during our rough ride and interfered with the taking of good, clear photos.

"I wonder if it will be possible to obtain from you some pictures of the thrashing operations, especially where the baling of the straw was being done at the stand after the thrashing. It you would care to let me have these pictures I think it would be advisable to send the films and I would have the plates made at our photo laboratory here and then return the films to you.

"Very truly yours..."

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.].

186. Morse, W.J. 1916. Re: I will send you samples of soy sauce. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., Dec. 5. 1 p. Typed, without signature.
• ***Summary:*** "Dear Prof. Williams: In reply to your letter of November 29 will say that within the next day or two I will ship you samples of soy sauce which can be secured from Chinese merchants in this city.

"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.].

187. Morse, W.J. 1916. Re: Acreage and production of soybeans in Indiana in 1916. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, Dec. 6. 1 p. Typed, without signature (carbon copy). [1 ref]
• ***Summary:*** "Dear Prof. Cromer: We are desirous of having the Bureau of Crop Estimates include the acreage and production of soy beans and cowpeas in their reports. As you may know, the soy bean during the past three or four years has increased to a very considerable extent, not only in importance but in acreage."

"In presenting this matter to the Bureau of Crop Estimates it would strengthen our argument if we could give a report on the importance of these crops in your state and a rough estimate of the acreage grown the past season."

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–#5.

Note: This is the earliest document seen (Jan. 2004) related to the collection of statistics on acreage or production of soy beans in the USA.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

188. Morse, W.J. 1916. Re: Data on soy beans yields in different states where grown extensively. Letter to Dr. F.A. Wolf, Experiment Station, West Raleigh, N.C., Dec. 6. 2 p. Typed, without signature.
• ***Summary:*** "Dear Sir: Replying to your letter of November 20 requesting certain data on the yield of soy beans in different states where this crop is grown extensively, I submit the following:

"Alabama, Mammoth Yellow variety, 20 to 25 bushels.
"Arkansas, Mammoth Yellow variety, 15 to 20 bushels.
"Delaware, Wilson variety, 20 bushels.
"Illinois, Medium Yellow variety, 20 bushels.
"Illinois, Ebony variety, 20 bushels.
"Illinois, Ito San variety, 17 to 23 bushels.
"Indiana, Early Brown variety, 20 bushels.
"Indiana, Mikado variety, 20 bushels.
"Indiana, Peking variety, 18 bushels.
"Indiana, Wilson variety, 20 bushels.
"Indiana, Ito San variety, 20 to 25 bushels.
"Kentucky, Mammoth Yellow variety, 18 to 20 bushels.
"Missouri, Mammoth Yellow variety, 15 to 20 bushels.
"Missouri, Peking variety, 20 bushels.
"Missouri, Medium Yellow variety, 20 bushels.
"North Carolina, Mammoth Yellow variety, 25 to 35 bushels.
"Ohio, Peking variety, 20 bushels.
"Ohio, Medium Green variety, 20 bushels.
"Ohio, Ito San variety, 20 bushels.
"Ohio, Medium Yellow variety, 25 bushels.
"Tennessee, Haberlandt variety, 25 bushels.
"Tennessee, Mammoth Yellow variety, 25 bushels.
"Tennessee, Tokio variety, 30 bushels.
"Virginia, Mammoth Yellow variety, 25 bushels.
"Virginia, Haberlandt variety, 20 bushels.
"Wisconsin, Wisconsin Black variety, 18 bushels.
"Wisconsin, Ito San variety, 18 bushels.

"The above yields are based on reports of fields in the different states and also on the reports of experiments conducted in cooperation with this office.

"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.].

189. Morse, W.J. 1916. Re: Hopes Bureau of Crop Estimates will include soybeans and cowpeas in their reports. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., Dec. 6. 1 p. Typed, without signature.
• ***Summary:*** "Dear Prof. Williams: I expect to take up in the near future with the Bureau of Crop Estimates the matter of including soy beans and cowpeas in their reports. You no doubt will recall during visits to your station that we have talked the soy bean proposition over and you advised that you would be glad to aid us in any way possible.

"I am writing to the agronomists of the various stations asking for information on the importance of the cowpea and soy bean in their states and to obtain their opinions and also a rough estimate of the acreage grown. I will be very glad to have you write me in the near future a rough estimate of the acreage of each of these crops in your state and also your opinion regarding the including of these crops in the Crop Estimate reports. "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.].

190. Morse, W.J. 1916. Re: Request for estimates of acreage and production of soy beans and cowpeas in Alabama. Letter to Prof. D.J. Burleson, Agricultural Experiment Station, Auburn, Alabama, Dec. 6. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: We are desirous of having the Bureau of Crop Estimates include the acreage and production of soy beans and cowpeas in their reports. As you may know, the soy bean during the past three or four years has increased to a very considerable extent not only in importance but in acreage. Regarding cowpeas, no definite data as to the acreage or production has been available and we think it of importance to include this crop.

"In presenting this matter to the Bureau of Crop Estimates it would strengthen our argument if we could give a report on the importance of these crops in your state and a rough estimate of the acreage grown the past season, Will you give us briefly your opinion regarding this matter and any data you may have?

"An early reply would be greatly appreciated.

"Very truly yours, 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–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.

191. Morse, W.J. 1916. Re: Acreage and production of soy beans and cowpeas for Bureau of Crop estimates. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Dec. 6. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: We are desirous of having the Bureau of Crop Estimates include the acreage and production of soy beans and cowpeas in their reports. As you may know, the soy bean during the past three or four years has increased to a very considerable extent, not only in importance but in acreage. Regarding cowpeas, no definite data as to acreage or production has been available and we think it is of importance to include this crop.

"It presenting this matter to the Bureau of Crop Estimates, it would strengthen our argument if we could give a report on the importance of these crops in your state and a rough estimate of the acreage grown the past season. Will you give us briefly your opinion on this matter and any data you may have?

"An early reply would be greatly appreciated.

"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.

192. Morse, W.J. 1916. Re: Sending you to-day a small package of soy bean flour. Letter to Mr. S.M. Spangler, Farm Foreman, Tennessee Experiment Station, Knoxville, TN, Dec. 7. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Spangler: In accordance with the

promise made you the past fall I am taking pleasure in sending you to-day a small package of soy bean flour. This flour can be used in any corn meal recipe, using three-fourths soy flour and one-fourth wheat flour. Inclosed are some recipes which have given some rather good products.

"We shall be very glad to hear from you as to your opinion of this flour when you have tried it in different ways.

"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.

193. Hopkins, Cyril G. 1916. Re: Cowpeas and soybeans in Illinois. Letter to W.J. Morse, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, Dec. 9. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Replying to your letter of December 6, I beg to state that we regard both the cowpea and the soybean as valuable crops for Illinois, primarily as substitution crops in years when the farmer has no clover in his rotation because of clover failure. The soybean is better adapted to central and northern Illinois, while the cowpea is largely limited to southern Illinois... I have no statistical basis upon which we estimate the production of these crops in Illinois. My guess would be that about one farmer in ten in southern Illinois grows some cowpeas, perhaps on one-tenth of his cultivated acreage. Possibly half as large a proportion of soybeans is grown in central and northern Illinois in seasons when there is little or no clover, but, in normal seasons when clover is abundant, the soybean is correspondingly more rarely grown."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#2.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Head, Agronomy and Chemistry Dep., Agric. Exp. Station, Urbana, Illinois.

194. Williams, C.B. 1916. Re: Oleomargarine and soy sauce. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Dec. 9. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Professor Morse: Replying to your inquiry of November 20 will say that the manufacturer of oleomargarine into which soybean oil entered that we had on exhibit at the Fair was Swift & Company. I would prefer that you would not make known the name of the manufacturer as they asked us not to do so. It will be well for you to write all the leading manufacturers like Swift, Armour, Morris, etc., and ask them if they are using soybean oil. Do not state to Swift of any one else that I gave you this information.

"I am wondering if it would be possible for me to secure through you some of the soybean sauce and other products which you showed me that you had recently secured on your trip through the Chinese settlement of Washington [DC]. If you could I would be glad if you would forward them with a statement to me made out to the N.C. Experiment Station.

"With kindest regards to yourself and Mrs. Morse, I am,

"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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

195. Williams, C.B. 1916. Re: Estimates of soybean and cowpea acreage in North Carolina. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Dec. 9. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Professor Morse: Replying to your letter of December 6 will say that I would estimate that the acreage in soybeans this year in North Carolina was at least one million. The acreage in cowpeas would probably be this much, or possibly a little more. I certainly hope that it will be possible for you to induce Mr. Estabrook to make estimates on these two crops.

"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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

196. Morse, W.J. 1916. Re: Names of soy bean varieties used by USDA workers in 1900. Letter to Prof. Frederick A. Wolf, Experiment Station, West Raleigh, N.C., Dec. 12. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Wolf: Replying to your letter of November 22 requesting names of certain varieties of soy beans which were used by workers in the United States Department [sic, of Agriculture] in 1900, I submit the following data:

"Best Green = S.P.I. No. 17264, Tokio.
"Early Black = S.P.I. No. 17251, Buckshot.
"Yoshoka = S.P.I. No. 17262, Yosho.
"Rokugatsu = S.P.I. No. 17268, Ito San.
"Black Round = S.P.I. No. 17251, Buckshot.
"Green Medium = S.P.I. No. 17261, Guelph.
"Bakaziro = S.P.I. No. 17275, Amherst.
"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.].

197. Mooers, C.A. 1916. Re: Bureau of Crop Estimates Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Dec. 20. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: I think it would be very desirable for the Bureau of Crop Estimates to estimate the acreage and production of soybeans and cowpeas, at least in the southern states where they are grown so extensively. I am unable to give you any figures, however, in regard to the acreage of these crops in Tennessee. Practically every farmer, however, grows one or both of them and they are considered among our staple farm crops [?]. At the present they are being grown chiefly for hay, but also to some extent for seed.

"Ten years ago comparatively few soybeans were being raised. They are, however, [?]lasting the cowpeas, and at the present time there may be one-third as much or even more soybeans than cowpeas.

"Yours very truly, Chemist & Agronomist."

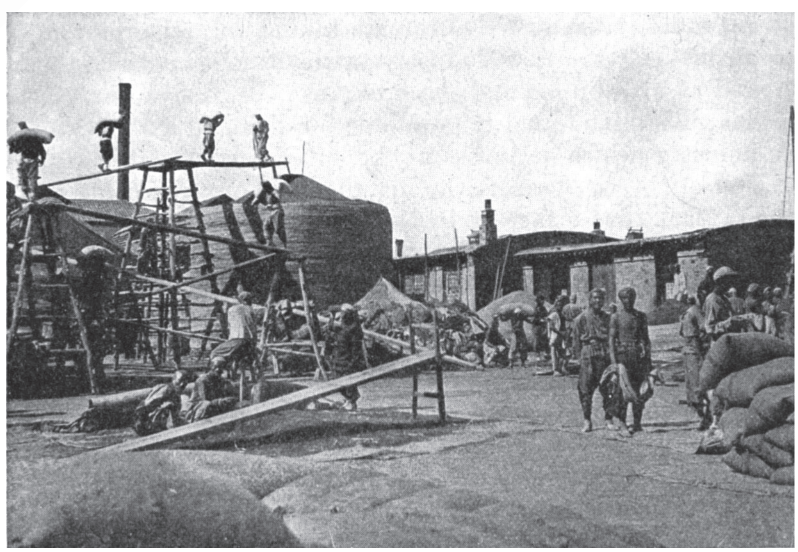
Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–Correspondence with State Agricultural Experiment Stations, 1899-1928. S.C.–Tenn. Box no. 33.

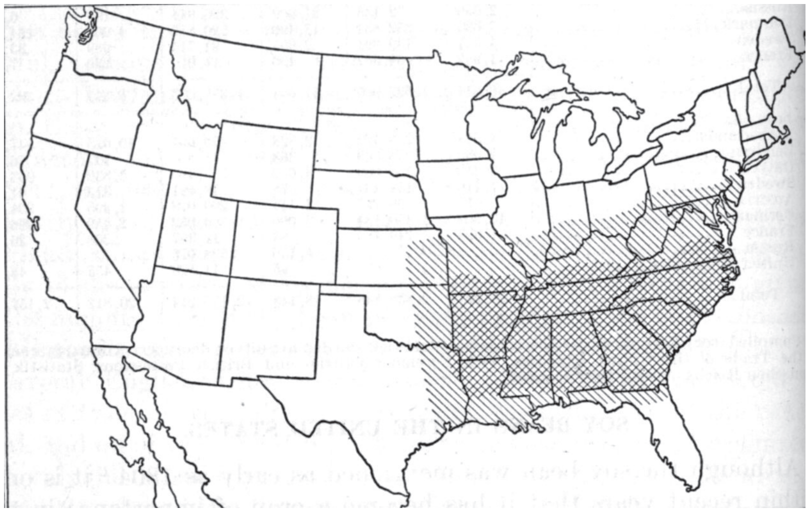
Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Chemist and Agronomist, Univ. of Tennessee Agric. Exp. Station, Knoxville, TN.

198. 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 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 (Aug. 2013) that mentions the soybean variety Lexington. Address: 1. Agrostologist in Charge; 2. Scientific Asst. Forage-Crop Investigations, USDA, Washington, DC.

199. 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.

200. Piper, C.V.; Morse, W.J. 1916. The soy bean, with special reference to its utilization for oil, cake, and other products: Uses of soy-bean oil (Document part). *U.S. Department of Agriculture Bulletin* No. 439. 20 p. Dec. 22. See p. 15-16. [2 ref]

• ***Summary:*** "One of the principal uses of the oil in Asiatic countries, chiefly China, is for food, it being consumed largely in the crude state by the poorer classes, but among the rich it is boiled and allowed to stand until clarified. The oil is

also utilized in the Orient in the manufacture of foodstuffs, paints, waterproof goods, soap, varnish, and printing ink, and for lubricating and lighting.

"Soy-bean oil was at first used in Europe and America in its crude state principally in the manufacture of soft soaps. It is now claimed that some soap manufacturers have a secret process by which the oil can be utilized in the manufacture of the best grades of hard soap. To some extent it is being refined and placed on the European markets as an edible table oil. The refined oil is also used in the manufacture of butter substitutes, and in the Mediterranean countries to blend for salad oil. In the search of manufacturers for new oils to replace linseed oil for paint purposes partly or wholly, soy-bean oil was found the most suitable. In Europe and the United States, paint grinders are using large quantities of soy-bean oil successfully in the manufacture of certain types of paint. Other trade uses of this oil are the manufacture of linoleum and of a rubber substitute, for which a factory has been established in Germany.

"As the process of refining soy-bean oil is improved and perfected there seems to be scarcely any use in which oil has a part in the manufacture of foodstuffs to which it will not be an important adjunct.

"Soy-bean oil has been studied with other oils in a series of experiments carried on by the Office of Home Economics and found to compare favorably with the more common culinary table oils with respect to the thoroughness with which it is assimilated." Address: 1. Agrostologist in Charge; 2. Scientific Asst. Forage-Crop Investigations, USDA, Washington, DC.

201. Piper, C.V.; Morse, W.J. 1916. The soy bean, with special reference to its utilization for oil, cake, and other products: Soy-bean meal as human food (Document part). *U.S. Department of Agriculture Bulletin* No. 439. 20 p. Dec. 22. See p. 11-13. [2 ref]

• ***Summary:*** "The meal remaining after the oil is extracted from Mammoth soy beans is bright yellow in color when fresh and has a sweet, nutty flavor. The use of the meal as flour for human food has become an important factor in several European countries during the last few years and to some extent in America as a food of low starch content."

"In England, manufacturers have placed on the market a so-called 'soya flour,' which is 25% soy-bean meal and 75% wheat flour. This soya flour is being used by bakers in making a soy bread which is very palatable and may be found on the market. A similar product has been manufactured in Amsterdam [Netherlands] for 25 years. 'Soya biscuits' are also manufactured from this flour and constitute an article of export from England. German millers have been experimenting to some extent with soy meal in making brown bread by mixing with rye flour... Soy-bean flour enters largely as a constituent in many of the so-called diabetic breads, biscuits, and crackers manufactured as food specialties.

"As a human food, soy-bean flour has been used principally in the U.S. as a special article of diet and is sold by a number of food companies manufacturing special foods. Extensive tests are being conducted by the USDA with soy-bean flour in the making of bread. The flour or meal can be successfully used as a constituent for muffins, bread, and biscuits in much the same way as corn meal. In these various food products about ¼ soy flour and 3/4 wheat flour have been found to be the proper proportions." Note: This is the earliest document seen (Sept. 2004) which clearly states that soy-bean flour has been used to make bread in the USA.

"Although soy-bean milk has been used in both the fresh and condensed form and in the manufacture of cheese [tofu] in Japan and China for centuries, it only recently has been considered of possible importance in the United States. Soy-bean milk, owing to its food value and for sanitary reasons, is said to be of the greatest importance for cooking purposes and can be used by bakers, confectioners, and chocolate manufacturers. In Asiatic countries the whole bean is utilized in the manufacture of the milk, but quite recently it has been discovered that soy-bean meal, after the oil is extracted, is fully as useful for milk purposes as the whole bean.

"If the milk from the soy bean is used in the manufacture of products as a substitute for milk, the labels of such products should indicate that the substitution has been made, otherwise it would constitute adulteration under the food and drugs act.

"In addition to its uses for flour and milk, the soy bean can be prepared as human food in numerous ways. The green bean, when from three-fourths to full grown, has been found to compare favorably with the butter or Lima bean... The soy bean has been utilized not only in the U.S. but in European countries as a substitute for the coffee bean. When roasted and prepared, it makes an excellent substitute for coffee." Address: 1. Agrostologist in Charge; 2. Scientific Asst. Forage-Crop Investigations, USDA, Washington, DC.

202. Williams, C.B. 1917. Re: Looking for seed of Wilson or Virginia or varieties of soy beans. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Jan. 2. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Morse: I should like to know if you know of any farmers or dealers that have seed of Wilson or Virginia varieties of soybeans. I have an inquiry this morning from a friend of mine in Missouri who wishes to secure a few bushels of the seed of these varieties. As I recall, you told me sometime ago that one or both of these varieties were being grown for your office by some gentleman in Georgia.

"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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

203. 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.].

204. 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 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.

205. 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

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 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.

206. Helman, J.P. 1917. Re: Question about acreage and seed stock. Letter to Mr. W.J. Morse [USDA], Jan. 6. 1 p. Typed, with signature on USDA letterhead.

• ***Summary:*** "Dear Mr. Morse:–Will you kindly advise me the acreage and seed stock required under ordinary conditions to produce 150 bu. of Black Eyebrow soybeans, 150 bu. Manchu soybeans, 100 bu. Tokio soybeans, 50 bu. Virginia soybeans, 50 bu. Wilson-5 soybeans, 50 bu. Biloxi soybeans, 100 bu. Monetta cowpeas? This information is desired for use in planting contract fields for the coming year.

"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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Office of Seed Distribution, Bureau of Plant Industry, USDA, Washington, DC.

207. 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.

208. Morse, W.J. 1917. Re: Are any cotton oil mills in North Carolina crushing soy beans? Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., Jan. 11. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: We are interested to know if any of the Cotton Oil Mills in North Carolina are crushing any soy beans for oil and meal at the present time. I have written the Elizabeth City and Winterville people, but have received no answer. We have received numerous inquiries regarding the meal. During my visit to North Carolina in October I received information that the Elizabeth City Mill had already purchased 20,000 bushels for crushing and intended to obtain at least 100,00 bushels. The high price of the Mammoth Yellow at the present time, I fear, will have rather a bad effect on the crushing of soy beans for oil.

"I understand that a very considerable quantity of seed is being forwarded to some of the Southern states for planting large areas in order to produce seed for the manufacture of oil and meal this coming season.

"I received your publications, 'Soy Bean Growing in North Carolina' and 'Soy Bean Products and Their Uses.' I am very glad, indeed, that you have issued these circulars, for I tend they will tend to increase interest in the soy bean

not only in North Carolina but in many of the other states.

"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.].

209. 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.

210. Morse, W.J. 1917. Re: Lantern slide, soy sauce, and bean cheese [fermented tofu]. Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., Jan. 13. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: We have beep preparing during the past two months a collection of lantern slides illustrating different phases of the culture and uses of the soy bean. I note in your circular No. 31, 'Soy Beans,' that figure three represents the hogging down of the soy bean. I have never been able to obtain a good photo of this method of harvesting the beans. I am wondering if you could supply me with the negative long enough to obtain a lantern slide. I endeavored to obtain photos of hogging down soy beans when visiting Tarboro [North Carolina] the past October, but failed to obtain any pictures at all.

"No doubt you may think that I have forgotten regarding the soy sauce which you wished me to obtain for you in our China Town here. I am sending you to-day a small jug of this sauce by express. I shall send a statement regarding the cost of this in another letter.

"It may interest you too know that recently we obtained from Mr. Frank Meyer who is in China at the present time a sample of 'Old Bean Cheese.' This bean cheese is made from the soy bean, being ripened with rice straw bacteria [sic, molds], and also treated with soy sauce. The sample sent was very small and Dr. Fairchild is sending for a larger quantity. The cheese we find to be comparable to some of the cured cheeses as Camembert and Roquefort.

"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.].

211. Williams, C.B. 1917. Re: Cotton oil mills in North Carolina have soy beans. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Jan. 13. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Morse: Replying to your inquiry of Jan. 11, will say that we find that many of the cotton oil mills in this State have soybeans. We do not find that they have crushed them up to this time. As you probably know there has been a tremendous demand for soybeans for seed purposes, especially from states to the south of us. In consequence of this unusual demand the price of soybeans during the early fall advanced rapidly from $1.00 per bushel to $2.00 per bushel. As long as soybeans sell for $2.00 per bushel, it is my opinion that it will be more profitable for the oil mills to sell them for seed purposes rather than to crush them. What the mills will so with the seed they have not already disposed of will depend largely upon the price of the soybeans and soybean products. "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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

212. Williams, C.B. 1917. Re: Lantern slide. Soy sauce jug. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Jan. 13. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Morse: In compliance with your request of January 13 I take pleasure in sending you herewith the photograph which you wish to use in making lantern slides. This photograph need not be returned.

"We will be very glad to receive the jug of soybean sauce which you obtained for use from China Town. If at any time you have samples of any other products made from soybeans or soybean oil or meal and you can spare us a small sample we would appreciate very much receiving them.

"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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

213. Mooers, C.A. 1917. Re: The new varieties of soy beans. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Jan. 15. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Morse: We will be glad to get the new varieties of soybeans, and also note books which you are proposing to send out. As far as I am able to judge, the outline is O.K. I may not, however, be able to make all the distinctions which you have included.

"I believe it would be well for you to omit sending me certain varieties which we tried last year and which did not appear promising. I will therefore enclose a slip giving a list of the varieties we tried and found promising. Also I will specify those which we desire to omit during the coming year.

"Yours very truly, Chemist & Agronomist. Encls."

Note: Below his title, Mooers writes by hand in black ink: "P.S. I will take the liberty of saying that in the testing of varieties of soy before it is very important that they be tried on soils which differ rather widely in fertility. I find that many varieties which show up well on fertile soils, fail to do well on poor land where such a variety as Mammoth Yellow forged far in the lead. Haberlandt for example seems to be a better grain producer on rich land than Mammoth Yellow but dwarfs down so on poor land as to be very inferior to the Mammoth Yellow

"C.A.M."

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.

214. Mooers, C.A. 1917. Re: Soy bean varieties tried in 1916 but to be omitted in 1917. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Jan. 15. 1 p. Handwritten, with signature on letterhead.
• ***Summary:*** "For W.J. Morse: Soy bean varieties tried in 1916 but to be omitted in 1917.

"35625
"3689-1
"37036
"36116
"37277
"40113
"37295
"37232
"37338
"37301
"37080-C
"37289
"37233
"37247
"37042
"37344
"37346
"37244

"Varieties to be retained for trial in 1917:
"37344
"35622
"37571
"37262
"37080-E
"37080-AA
"37273
"37239
"37259
"37254

"Note–If you have any special reason for our including one or two of those we propose to omit, we will be glad to do so.

" C.A.M."

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.

215. Morse, W.J. 1917. Re: Expecting samples of soy bean products from Japan. Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., Jan. 17. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: I have your letter of Jan. 15, also the photograph mentioned in my letter of January 13 to you. I appreciate very much your kindness in sending this view.

"Concerning samples or other products made from the soy beans will say that it is very likely that in the near future we shall have some products direct from Japan. Last fall I took up the matter with Dr. Fairchild of the Office of Foreign Seed and Plant Introduction and he wrote to Miss Scidmore, Tokio, Japan, advising that he wished to obtain all products made from the soy bean. I shall be glad, indeed, to spare you any of the products that we can.

"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.].

216. Morse, W.J. 1917. Re: List of varieties grown at Knoxville the past season. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Jan. 19. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Mooers: I have your letter of January 15, inclosing a list of varieties grown at Knoxville the past season, and indicating those which are to be omitted in 1917 and those to be retained for further trial. Relative to the varieties to be sent you this season I will say that none of the varieties to be omitted by you in 1917 are included.

"I quite agree with you as to the importance of the nature of the soil in the testing of varieties of soy beans.

"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.

217. Morse, W.J. 1917. Re: Part relating to soy beans and cowpeas in the accompanying letter from Hon. Martin A. Morrison. Letter (memorandum) to Mr. Connor [USDA], Jan. 25. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Connor: With regard to the request of Hon. M.A. Morrison relative to the planting of cowpeas and say beans in the middle of orchards will say that this is quite frequently done. I have found among orchardists that they use either of these crops in production of seed; that is, grow a crop in rows in the middles of young orchards. For the section referred to I would suggest that the Haberlandt variety of the soy bean and the Groit variety of the cowpea be used.

"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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Scientific Assistant, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

218. Williams, C.B. 1917. Re: Received jug of soy sauce. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Jan. 29. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Morse: We have received the jug of sauce which you sent us on January 19. Enclosed herewith we are sending you sixty cents in currency in payment for the same. We appreciate very much your securing this for us. Maybe later on we will call on you to send us a jug of something else as we are in a 'dry' State.

"Yours very truly,..."

Note: Below his signature, Williams has written by hand: "P.S. Kindly receipt the enclosed bill and return. CBW."

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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

219. Morse, W.J. 1917. Re: Enclosing photographs of two soy bean harvesters. Letter to Dr. R.Y. Winters, Experiment Station, Raleigh, N.C., Feb. 3. 1 p. Typed, without signature.

• ***Summary:*** "Dear Dr. Winters: I am enclosing three glossy prints, two of which are the Pritchard soy bean harvester

and one of the Keystone harvester. As I recall, you desired photographs of these machines at work in soy bean fields.

"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.].

220. Williams, C.B. 1917. Re: Tests of soybeans with high oil content. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Feb. 3. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Morse: In connection with your letter of January 4 we are wondering if the high oil strains mentioned are represented in the lot of fifty tested on our plats during the past season.

"If this be true we have data on these in regard to yield and it would probably only be necessary to test those which have given a good yield at this point. The strains which have yielded best with us are:

"37250–30.00 bushels per acre.
"37272–29.05 bushels per acre.
"37301–26.98 bushels per acre.
"37048–25.40 bushels per acre.
"38215–24.90 bushels per acre.
"37399–23.35 bushels per acre.
"37295–22.31 bushels per acre.
"37054–21.79 bushels per acre.
"37077–20.75 bushels per acre.
"37243–20.24 bushels per acre.
"38458–20.75 bushels per acre.

"Strains which yield lower than these could probably not come in competition with Mammoth Yellow even though their oil content were high. It is possible however that high oil content strains, which yield low, could be crossed with Mammoth or other high yielding strains with profit. We are interested in the matter of increased oil content and shall be glad to make such tests as may help in the discovery of high oil strains for this section.

"In connection the soybean and cowpea work conducted in cooperation with your office, we are wondering if it could be changed somewhat without materially injuring the test. In making these tests we have found it difficult to find a sufficient area of uniform soil on which to make the test. The results have not been as consistent as we would like. On this account we would suggest that two varieties of soybeans and two of cowpeas be used in the culture test instead of three. In the case of soybeans Manchu and Tokyo could be retained. This would give one late and one early variety in the test. Of the cowpeas Whippoorwill and New Era could be retained.

"In our tests it has been practically impossible to cultivate the eighteen inch rows and they are usually taken by grass and weeds. Tests in two foot rows would be more practical for our conditions. We understand that these tests are being correlated with your tests at Washington and hope the changes suggested will not interfere with the test under your conditions.

"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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

221. Winters, R.Y. 1917. Re: Thanks for prints of soybean harvester. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Feb. 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Please accept our thanks for the prints of the soybean harvester which reached us in good condition. We are very glad to have these prints for our files.

"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: Plant Breeding Agronomist, North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

222. Morse, W.J. 1917. Re: Your suggestions for soybean trials. Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., Feb. 13. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: I have your letter of February 3 with regard to the variety test mentioned in my letter of January 4. Of the varieties sent you during the past two years only a very few are included in this new lot to be sent you this season. In selecting out the 40 varieties we have used the oil and protein analyses as well as the seed yield and promise of the variety in our test at Arlington [Farm, Virginia] during the past three seasons.

"In connection with the soybean and cowpea work being conducted in cooperation with your office I do not think the

changes mentioned in your letter would materially injure the test. These changes are the use of two varieties of soy beans and two of cowpeas in the method of culture test instead of three varieties.

"I think that in the method of culture tests the 24-inch rows can be used instead of the 18-inch rows. In our work at Arlington we use the single-horse, adjustable cultivator and find no difficulty in cultivating the 18-inch rows. Perhaps it would be best if you are to use the 2-foot rows that we also use them in our test at Arlington.

"Very truly yours..."

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.].

223. Oakley, R.A. 1917. Re: Mr. Fritz Knoor. Letter to W.J. Morse, [USDA], Feb. 13. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Referring to the attached letter from Mr. Fritz Knoor, I would be greatly obliged if you will assist him as far as is possible in testing soy beans and cowpeas. Any seed that you can send I am sure will be well cared for. Very truly yours, Agronomist. O-BB."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

224. Morse, W.J. 1917. Re: Soybean varieties from Manchuria are available for testing. Letter to W.L. Burlison, Experiment Station, Urbana, Illinois, Feb. 16. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Burlison: During the past two or three years we have tested a number of selected Manchurian varieties of soy beans in the Central and Northern States. I note in going over our list that as yet we have not tested these varieties out at your station.

"These varieties were selected from out of over 300 introductions which we received about four years ago from central and northern Manchuria. We would be glad to know if you are interested in testing out at your station about thirty of these varieties. If so, will you kindly let me know in the near future.

"I might add that our supply of seed of these varieties is rather limited and we perhaps could not spare seed for more than for rods of each variety."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#2.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

225. Williams, C.B. 1917. Re: Soybeans grown for market. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Feb. 21. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Morse:... I am sure that many of the oil mills that purchased soybeans in the fall are disposing of them to millers further south to distribute among their patrons... I would estimate that not more than one-third of the soybeans grown for market purposes are now in the hands of growers and cotton oil mills."

"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: Chief, Agronomy Div., North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

226. Williams, C.B. 1917. Re: How many acres of soybeans grown in North Carolina. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, Feb. 26. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Morse: Replying to your inquiry of recent date, will say that I would estimate the increase in the number of acres devoted to the soybean in this State during the past year was at least 100,000. The average yield was probably eighteen bushels. All of these beans were not used for the production of seed. In fact, we would not estimate that more than 20% were, the other 80% being used for grazing and hay producing purposes. This is about as definite information as I can give you at this time.

"Yours very truly,...

"P.S. Mr. L.M. Estabrook, Chief, Bureau of Crop Estimates promises to have estimates made on soybeans as for other crops, during the coming year."

Note: This is the earliest letter seen indicating that C.B. Williams is now using a typist. In the lower left is written:

"CBW:A" meaning that he dictated the letter.

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: Chief, Div. of Agronomy, North Carolina Experiment Station, conducted jointly by the North Carolina Dep. of Agriculture and Agricultural and Mechanical College, West Raleigh [North Carolina].

227. Burlison, W.L. 1917. Re: Soybean varieties at Illinois station. Letter to W.J. Morse, Scientific Assistant, Bureau of Plant Industry, USDA, Washington, DC, Feb. 27. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: I do not believe it would be possible for us to use as many varieties of soy beans as you suggested in your letter. We are making up our new schedule of variety trials of soy beans and will report to you in the near future how many we can possibly use."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#1.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crop Production, Agric. Exp. Station, Urbana, Illinois.

228. Morse, W.J. 1917. Re: We are unable to put you in touch with firms handling soy bean meal. Letter to Mr. Earl Hostetler, North Carolina Experiment Station, West Raleigh, N.C., March 3. 1 p. Typed, without signature.
• ***Summary:*** "Dear Sir: Your letter of February 28. requesting information as to parties that can furnish you with soy bean meal, has been referred to this office for attention. I regret to say we are unable to put you in touch with firms handling soy bean meal in the Eastern United States. The Pacific Oil Mills, Seattle, Washington, crush yearly quite large quantities of Manchurian soy beans for oil and meal. This meal is sold principally in the extreme Western States, and to my knowledge none has been shipped East on account of the high freight rates.

"As the price of domestic soybean seed has prohibited the cotton oil mills of your state from crushing soy beans this season, I am unable to give you any eastern sources. It seems quite likely that one of the mills, perhaps the Winterville Cotton Oil Mill, Winterville, North Carolina, would crush a small quantity of beans if you put the proposition up to them.

"Very truly yours,... 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. 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, USDA, Washington, D.C.].

229. 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.

"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.

230. Burleson, D.J. 1917. Re: I am not connected with the Experiment Station but with the Extension Service. Letter to W.J. Morse, Bureau of Plant Industry, U.S. Dep. of Agriculture, Washington, DC, March 19. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir:–In reply to your letter of several days ago, I will say that I am not connected with the Experiment Station but with the Extension Service, and have referred your letter relative to testing varieties of soybeans to Professor E.F. Cauthen of this Station. He will give you a reply as to whether he will be able to test the soybeans.

"My reply has been delayed on account of an operation for appendicitis.

"Yours very truly, Agronomist for Extension."

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: Agronomist for Extension, Cooperative Extension Work in Agriculture and Home Economics, Alabama Polytechnic Inst., Auburn, Alabama.

231. Cauthen, E.F. 1917. Re: Testing different varieties of soybeans. Letter to Mr. W.J. Morse, Scientific Assistant, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, March 19. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir:–In reply to your letters to Mr. D.J. Burleson, which have been handed to me, I beg to state that the Experiment Station can handle the different varieties of soybeans for you.

"I note that you wish to have the record of these crops kept in duplicate form and that the crops will require the space of an acre or more. The Experiment Station is willing to grow these crops and keep notes as suggested, and also furnish you as much as a half gallon of seed of each variety for chemical purposes. In return, the Experiment Station should have from you a duplicate chemical analysis of beans sent you and the privilege of using this information in whatever way the Experiment Station should see fit.

"It may be more convenient for this station to use smaller plots than suggested in your letters. Will this inconvenience the work in any way, in case the size of the plots is changed?

"I should also have a germination test made of the seed that I am to plant.

"The Station has plenty of the Mammoth Yellow variety for the check plots.

"Yours truly, Associate Agriculturist."

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

232. Piper, C.V. 1917. Re: Address meeting at Wilmington, North Carolina. Letter (memorandum) to W.J. Morse, [USDA], March 19. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: I expect you to attend the meeting at Wilmington, North Carolina, March 28 and 29, and address the conference there on the subject of soy beans. It will probably be necessary for you to be there but one day but which day cannot be ascertained until I get a copy of the program. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

233. Morse, W.J. 1917. Re: Details of test of 40 soybean varieties and a check. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, March 21. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of March 19, advising that your station can handle the soy bean variety experiment referred to in previous correspondence. I note that you advise it would be more convenient to you to use smaller plots than suggested in our letter. In all there will be 40 varieties which will be run in duplicate. There will be a 4-rod row of each variety and a check. This will take perhaps one-half acre of land. Of course, if the size of the plot is changed it will not inconvenience the work in any way.

"With regard to the chemical analyses of the seed I will say we will be glad to furnish you a duplicate report; in fact, it is our intention to supply fully the notes kept by your station. In using this information in whatever way your station should see fit of course it is just and proper that the Department be given credit for the analyses. In like manner, if the data should be used by the department, credit for the growing and note taking would be given the Alabama station.

"The seed will be sent you shortly, as well as the books for taking the notes.

"Very truly yours, 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–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 [USDA].

234. Morse, W.J. 1917. Re: Sending you 15 pounds each of the Ito San, Haberlandt, and Tokio varieties of soy beans. Letter to Mr. C.M. Hume, Field Agent, Murfreesboro, Agric. Exp. Station, Univ. of Tennessee, Knoxville, TN, March 22. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: Your letter of March 17, requesting seed of varieties of soy beans, has been referred to this office for attention concerning your request for varieties of soy beans. I am taking pleasure in sending you 15 pounds each of the Ito San, Haberlandt, and Tokio varieties.

"Very truly yours, 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.

235. Piper, C.V. 1917. Re: Publication on the soy bean by H.D. Wilson. Letter (memorandum) to W.J. Morse, [USDA], March 27. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Is there a publication of any kind on the soy bean by H.D. Wilson, Secretary of Agriculture, Louisiana? 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

236. Morse, W.J. 1917. Soy beans in the cotton belt. *USDA Cooperative Extension Work in Agriculture and Home Economics, States Relations Service* No. A 85. 7 p. S.R.S. Doct. 43. Ext. S. Originally published in Jan. 1915 under the same title as a USDA Office of the Secretary Special.
• ***Summary:*** Contents: Introduction. Adaptations. Soil preparation. Fertilizers. Inoculation. Seeding and cultivation. Rotations. Mixtures. Varieties. Soy beans for hay. Soy beans for pasture. Soy beans for soiling. Soy beans for ensilage. Soy beans for seeds. Storing soy beans. Value for human food. Soy-bean oil and cake.

"This circular is intended especially for farmers in the cotton belt who desire to diversify their farming by partly replacing cotton as the sole money crop with other profitable crops."

"The soy bean, called also soya bean, soja bean, and, in North Carolina, stock pea, is an erect, rather hairy, summer legume, resembling somewhat the common field bean, but usually much taller and not twining...

"Although the soy bean as an article of food has attracted attention from time to time in the U.S., thus far it has been used but little. The beans contain only a trace of starch and are highly recommended as a food for persons requiring a food of low starch content. The numerous ways in which the bean can be prepared as human food should encourage its greater use. The dried beans may be used like the ordinary field or navy bean in baking or in soups. When prepared in either of these ways the beans require a somewhat longer soaking and cooking. The immature bean when from three-fourths to full grown compares favorably with the butter or lima bean. Roasted and prepared soy beans make a substitute for coffee which has been found pleasing to those fond of cereal beverages. In Asiatic countries the dried beans are soaked in salt water and then roasted, this product being eaten after the manner of roasted peanuts. Soybean meal or flour may be used as a constituent of biscuits, muffins, and bread, or in any recipe in which corn meal is used. In the various preparations one-fourth or one-third soy bean flour or meal and the remainder wheat flour are recommended."

Note: This is the earliest English-language document seen (June 2009) that uses the term "immature" in connection with green vegetable soybeans. Address: Scientific Asst., Forage-Crop Investigations, USDA Bureau of Plant Industry, Washington, DC.

237. Williams, C.B. 1917. Re: Name of the manufacturer at Baltimore who is using Mammoth Yellow soybeans to make pork and beans. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, April 2. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Morse: We have just received your letter of March 31 giving us the name of the manufacturer at Baltimore who is using Mammoth Yellow soybeans to make pork and beans. We would be glad if you would supply us with the names of others who are using soybeans in any way to make human foods. We wish to keep as closely in touch with the situation as possible as it will help us to help our people who are interested in the growing of soybeans.

"Yours very truly,... Chief, Division of Agronomy.

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: Chief, Div. of Agronomy, North Carolina Experiment Station.

238. Morse, W.J. 1917. Re: Variety test with soy beans. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, April 3. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Mooers: Referring to our previous correspondence relative to a variety test with soy beans, I am inclosing a plan of this experiment. The varieties are not arranged numerically, as you will note, but are arranged according to maturity, leading from the earliest up to the latest. A four-rod row is given each number and the entire series is to be run in duplicate.

"To obtain full information it is perhaps advisable to cut

one-half of each row, that is, two rods, for forage, and leave the remaining two rods for seed yield. This method, although on a small scale, will give us a relative comparison of each number with regard to its forage and seed value.

"Of those varieties showing most promise for seed yield, analyses for oil and protein content will be made.

"I am sending to-day four ounces of seed of each of the varieties and four pounds of seed of the Mammoth Yellow for the check row. Notebooks having printed forms for note taking are being prepared and will be sent you in the near future.

"This test, I feel confident, will afford both the station and this office much valuable information and possibly give us new high oil and seed yielding strains of this crop.

"If time will permit, I plan to visit the tests some time during the growing season.

"Very truly yours, 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.

239. Winters, R.Y. 1917. Re: Strains of soy-beans to be tested for oil contents. Letter to Mr. W.J. Morse, Office of Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, April 5. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Your letter of the 3rd came in due time and I note what you say regarding the strains of soy-beans to be tested for oil contents. It is possible that our tests will have to be made in 50 foot rows instead of 4 rod rows. All of the space in our plant breeding garden is laid off in 100 foot spaces. It is possible that we could plant strains in triplicate rows.

"Yours 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: Plant Breeding Agronomist, North Carolina Experiment Station.

240. Williams, C.B. 1917. Re: Have you any formulas for making milk and cheese from soybean meal? Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, April 17. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Morse: Have you any information at all with reference to the formulas that have been used in the making of milk and cheese from soybean meal. Any information you could give use would be very much appreciated.

"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: Chief, Div. of Agronomy, North Carolina Experiment Station.

241. Morse, W.J. 1917. Re: Formulas we use in the manufacture of milk and cheese [tofu] from soy bean meal. Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., April 20. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: I have your letter of April 17 relative to formulas used in the manufacture of milk and cheese from soy bean meal. I regret to say that we have not worked out any special formulas for making these products. In the production of milk from meal I have simply used the meal, soaking it for about 12 or 14 hours, then boiling it for about 30 minutes. After the meal is soaked, about three times the amount of water as of bean material is added and then boiled.

In case the beans are used, they are soaked for about the same period, then crushed finely and treated the same as the manufacture of milk from meal. After the milk is obtained, the casein may be precipitated by the addition of magnesium chloride, or the milk may be set aside and allowed to coagulate, similar to the souring of cow's milk. After the casein has coagulated in either case, the water may be drawn off, leaving a cheese-like substance.

"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. 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.].

242. Piper, C.V. 1917. Re: Kudzu and soy beans for Texas. Letter (memorandum) to Mr. W.J. Morse, USDA, April 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Professor J.D. Tinsley, who was formerly professor in agronomy in the New Mexico Experiment Station, is endeavoring to find crops suited to the

poor lands of extreme Eastern Texas. I suggested to him that Kudzu ought to be a very good thing and he is also anxious to try out soy beans in a small way as he thinks he can take care of the rabbits. Will you kindly send him both Kudzu roots and soy beans."

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. Folder–Morse, W.J.–#1 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

243. Peters, A.J. 1917. Re: Mr. Louis P. Haight, Muskegon, Michigan. Letter (memorandum) to W.J. Morse, [USDA], April 24. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. Louis P. Haight, Muskegon, Michigan, who is doing some experimental work on the improvement of sandy soils near Muskegon, Michigan, would like to get soy beans for trial. I am sending him some lupines and other things and shall be glad if you can send him enough seed or such varieties of soy beans as you think have a show up there. He wants to grow them as a money crop to be followed by hairy vetch and rye as a soil improver so it might be worth while also to send him a little seed of a variety of soy beans which should be turned under for soil improvement.

"Very truly yours,..."

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: Agronomist in Charge of Clover Investigations [Bureau of Plant Industry, USDA, Washington, DC].

244. Wolf, F.A. 1917. Re: Request for black eye brow [Black Eyebrow] soy beans. Letter to Mr. W.J. Morse, Forage Crop Investigations, Bureau of Plant Industry, Washington, DC, April 17. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: I should appreciate it very much if you could send us for some experimental work three of four pounds of black eye brow soy beans. Address them and the bill for the same to this department. If it can be arranged so that they reach us within a few days, it will facilitate matters very much since it is now time to plant this crop in this section.

"Yours very truly,...

[Handwritten] "P.S. If you have plenty, five lbs. could be used by us."

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: Dep. of Botany and Plant Pathology, North Carolina Experiment Station.

245. Morse, W.J. 1917. Re: Sending seed of the Black Eyebrow soy bean. Letter to Mr. F.A. Wolf, Experiment Station, Raleigh, N.C., April 26. 1 p. Typed, without signature.
• ***Summary:*** "Dear Sir: Replying to your letter of April 24, requesting seed of the Black Eyebrow soy bean, I am taking pleasure in requesting that 5 pounds of this variety be sent you. No cost is attached to the seed or the sending of it.

"Very truly yours,... 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. 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.].

246. Kilgore, B.W. 1917. Re: Wish to contact a reliable packer of soy beans in Baltimore. Letter to Mr. W.J. Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, May 1. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Could you give me the name and address of a reliable packer of soy beans in Baltimore [Maryland] with whom I might communicate in regard to canned beans.

"Very truly yours,... Director"

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: Office of the director, Cooperative Extension Work in Agriculture and Home Economics, State of North Carolina [Experiment Station], Raleigh.

247. Cauthen, E.F. 1917. Re: Soybeans for testing have arrived; two books for taking notes have not. Letter to Mr. W.J. Morse, Scientific Assistant, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, May 2. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I beg to inform you that the soybeans for the test of the best oil producing strains have been received.

"You kindly promised that two books for taking notes would be furnished. These books have not yet been received.

"In case the weather conditions are favorable for planting, I shall plant these beans this week.

"Yours truly, Associate Agriculturist and Recorder."

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

248. Cauthen, E.F. 1917. Re: Request for soybean varieties for testing. Letter to Mr. W.J. Morse, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, May 3. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I am asking you to let me have, if you can spare them, about a quart of each of the following varieties of soybeans. I find that my seed of them seem to be somewhat mixed, and I desire to get seed that is true to name. If you have not seed of all these varieties, I shall appreciate such varieties as you may have. The varieties that I need are Arlington, Edward, Ebony, Black Beauty, Morse, Barchet and Wilson.

"I should be glad to include in my variety test again Ito San, Early Black or Buckshot, Shanghai and Medium Green. You may also include Riceland, if you think this variety suited to our Southern conditions.

"I am anxious to make a comparison of those varieties that are semi-vine [semi-viny] in habit of growth, for the purpose of making hay. Some years ago we had a variety that came from Eastern China which was very late, but which, as I remember it, was so much inclined to the vine habit that the plants fell down almost as much as peavines [cowpea vines]. My records have it under the name of Peking. If you have any seed of this variety, or something similar to it, I shall be glad for you to include about a quart of seed of it.

"It may be that you have some varieties that offer promise to the extreme South. If so, I have space for about three or four plots, and will be glad to include them in the variety test for seed.

"Thanking you in advance for a prompt shipment of same, I am

"Yours truly, Associate Agriculturist and Recorder. EFC/PJ"

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

249. *Hoard's Dairyman.* 1917. Soy beans. 53(15):641. May 4.

• ***Summary:*** This is a long excerpt from USDA Bulletin No. 439 [by Piper & Morse, 1916, titled "The soy bean, with special reference to its utilization for oil, cake, and other products"]. Photos show: (1) A field of soy beans (rows 42 inches apart) at a soy bean nursery at Redfield, South Dakota. (2) Seeds and pods of seven common varieties of soy beans: Guelph, Ito San, Buckshot, Austin, Hollybrook, Mammoth, Haberlandt. (3) A *Glycine hispida* plant, with leaves intact. (4) A Mammoth variety of soy bean plant. (5) "Keystone harvester in operation in a field of Haberlandt soy beans. There are also other makes of soy bean harvesters." A man is driving two horses pulling the harvester. Address: Secretary of Agriculture.

250. Morse, W.J. 1917. Re: A reliable packer of soy beans in Baltimore. Letter to B.W. Kilgore, North Carolina Experiment Station, Raleigh, N.C., May 4. 1 p. Typed, without signature.

• ***Summary:*** "Dear Sir: Referring to your letter of May 1, requesting the name and address of a reliable packer of soy beans in Baltimore [Maryland], I refer you to the Assau Canning Company.

"Very truly yours,... 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. 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.].

251. Morse, W.J. 1917. Re: Soy bean recipes. Roasting soy beans. Soy coffee. Letter to Prof. C.B. Williams, Experiment Station, Raleigh, N.C., May 4. 2 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: With reference to our conversation at Raleigh, I am taking pleasure in inclosing the soy bean recipes. These, as you will recall, I obtained from the Iowa station, and they were adapted from the field bean recipes from the New York Cornell Domestic Science School.

"I am also sending you a small sample of soy

bean cheese which I told you was obtained through the agricultural explorer, Mr. Meyer, in China. Vol. 3, No. 3, pp. 227-249, 1914.

"You also asked that I write you, concerning the method used in roasting soy beans. The beans are soaked overnight in a 10 per cent salt solution. This salt water is then drained from the beans and the beans boiled slowly in another water for about one hour. The water is then drained off from the beans and the beans may be roasted in an oven or in a peanut roaster.

"In roasting, one should be careful that the beans are not burned. They should be watched from time to time and when the cotyledons begin to turn brown the beans may then be removed.

"Where the beans are to be used for coffee, simply take a small amount of beans and roast until the seed are coffee brown. Here also the beans should not be allowed to become burned as it gives a bitter taste to the dish.

"As yet I have had no opportunity of selecting out the six best Oliver cowpea hybrids, but will do so in the near future. I will be sure to include the white seeded variety concerning which I said Prof. Piper might want a few acres grown. In talking the matter over with him, however, he advised that the hybrid should be grown on a field basis so that we might get some idea of it under field conditions before growing it for distribution.

"With regard to the effect of soil, climate, fertilizers, etc., on the yield of oil with the soy bean, I refer you to the Agricultural Research Bulletin.

"Very truly yours,... 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. 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.].

252. Morse, W.J. 1917. Re: Delay in getting record books. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, May 5. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of May 2, advising that you had received the seed of the soy bean varieties sent you for the test to be conducted in cooperation with this office. I regret to say that there has been some delay in getting the books for taking notes on the varieties. I was recently informed by the property clerk that the books would be received shortly and we will endeavor to send them as soon as they are filled out.

"Very truly yours, 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–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 [USDA].

253. Morse, W.J. 1917. Re: Sending soy bean varieties for testing. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, May 8. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: In reply to your letter of May 3, requesting certain varieties of soy bean seed, I am taking pleasure in sending you to-day 2 pounds each of the Arlington, Barchet, Wilson Five, Ito San, Medium Green, Peking, Virginia, and Biloxi varieties. I regret to say that we have no seed of the Edward, Ebony, Black Beauty, Morse, Early Black, or Shanghai varieties. It is quite likely that you might obtain quantities of these from the Missouri Experiment Station, Columbia, Mo. During my visit to that station last fall I noted that they had plots of nearly all the varieties of which you request and I have not the seed.

"You will note from the varieties being sent you that the Biloxi, Virginia, and Wilson-Five were not mentioned in your letter. The Wilson-Five is a pure selection made from the old Wilson three or four years ago, and is a considerable improvement over the original Wilson. The Virginia is a vining variety and has found considerable favor in North Carolina, Virginia, and Georgia.

"We are hoping to obtain some new varieties from the recent small lots of varieties sent from this office, especially with regard to the high oil and protein in these strains.

"Very truly yours, 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–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 [USDA].

254. Dacy, George H. 1917. Cheap foods from soy beans. *Country Gentleman* 82(19):863. May 12.

• ***Summary:*** A soybean substitute is available for nearly every ordinary dish on the average menu. "Soys" can be substituted for navy beans in the baked pork-and-beans dish. "A mixture of one part navy beans to three parts of soy beans, supplemented by a juicy piece of pork, makes an article for the menu that surpasses Boston baked beans.

"A Michigan cannery profitably canned green soy beans during the past season... the soy may in time supplant the lima bean in the canning business."

"A New York factory is now engaged in making vegetable milk from the whole bean, converting the by-product meal [sic, okara] into livestock feeds."

"When bread, biscuits, muffins or griddle cakes are to be made it is customary to use one part of soy-bean flour to three parts of wheat flour. The Germans use bean flour in combination with rye flour in making brown bread."

The soy bean "is a crop possessed of the camel's ability to do without drink for long periods. On the other hand it is not afraid of wet feet." "W.J. Morse, soy bean expert in the Division of Forage Crop Investigations of the Department of Agriculture at Washington [DC], knows almost all there is knowable about the thousand-odd varieties that have been acclimated to American conditions, and he will gladly help you solve your problems." A photo shows a typical soybean plant with pods.

255. Morse, W.J. 1917. Re: Sending you to-day two books for taking notes on the varieties of soy beans. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, May 12. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Mooers: Relative to previous arrangements, I sending you to-day two books for taking notes on the varieties of soy beans. One of these books is to be kept by your station and the other is for this office.

"You will note that the varieties are arranged in the books according to the plan of planting sent you recently. You will also note that the locality, date, and seed color have been stamped for each variety.

"Thinking perhaps you might wish to include in the book to be kept by your station the original source of each variety, I am inclosing herewith a separate sheet giving the source of each variety.

"Any question regarding this test or note books I will be glad to take up with you.

"I am hoping to visit your station some time during the season.

"Very truly yours, 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.

256. Morse, W.J. 1917. Re: Sending you books for taking notes on the varieties of soy beans. Letter to Dr. R.Y. Winters, Plant Breeder, North Carolina Experiment Station, Raleigh, N.C., May 12. 1 p. Typed, without signature.
• ***Summary:*** "Dear Dr. Winters: Relative to previous arrangements, I am sending you to-day two books for taking notes on the varieties of soy beans. One of these books is to be kept by your station and the other is for this office.

"You will note that the varieties are arranged in the books according to the plan of planting sent you recently. You will also note that the locality, date, and seed color have been stamped for each variety.

"Thinking perhaps you might wish to include in the book to be kept by your station the original source of each variety, I am inclosing herewith a separate sheet giving the source of each variety.

"Any question regarding this test or note book I will be glad to take up with you.

"I am hoping to be able to visit your station some time during the season.

"Very truly yours,... 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. 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.].

257. Mooers, C.A. 1917. Re: Received the list of varieties of soy beans, and two note books. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., May 16. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I was glad to get the list of varieties of soybeans showing their origin. The two note books came O.K. We will try to take care of the most important items, at least from our point of view.

"We expect to have a number of simple experiments which I think will be of interest to you, and I hope that you will be able to visit us, as you suggest, some time during the summer.

"With regards,

"Yours very truly, Chemist & Agronomist. CAM/k."

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.

258. Williams, C.B. 1917. Re: Soybean cheese [fermented tofu]. Letter to Prof. W.J. Morse, Bureau of Plant Industry, Washington, DC, May 24. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Morse: We have received the small

sample of soybean cheese which you sent us some time ago. We have tried it and rather liked it used in small amounts with bread.

"The receipts [recipes] which you sent us were received sometime ago but we have been holding your letter expecting the cheese to come in any day. This explains our delay in replying to your letter. We wish to thank you very much for supplying these to us.

"Yours very truly,... Chief, Division of Agronomy."

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: Chief, Div. of Agronomy, North Carolina Experiment Station.

259. Morse, W.J. 1917. Re: Mr. Herman's salary. Letter to Prof. C.B. Williams, Experiment Station, West Raleigh, N.C., May 4. 2 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: In reply to your letter of May 24 to Prof. Piper with regard to carrying Mr. Herman's salary during the fiscal year ending June 30, 1918, will say that under our original plan the season of 1917 will be the third and last year of cooperative cowpea and soy bean investigations. If the work for this season will run into the next fiscal year, we no doubt will be able to pay Mr. Herman's salary for the months of July, August, September, and October.

"Very truly yours,... 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. 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.].

260. Williams, C.B. 1917. Re: Cooperative cowpea and soybean investigations. Letter to Mr. W.J. Morse, Bureau of Plant Industry, Washington, DC, June 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Morse: We have received your letter of May 28 stating that under our original plan the season of 1917 would be the third and last year of the cooperative cowpea and soybean investigations. In order to finish up with this work it will be necessary to go through July, August, September and October. I am very anxious that our cooperative relations continue. I believe that there is much to be accomplished in such cooperation.

"Enclosed herewith I am submitting a brief outline of work which it seems to me would be very proper for your office to take up with our Station. As we see it there are great possibilities along the lines indicated the Project. We expect Dr. Winters and Mr. Herman to devote considerable time to work in connection with this Project should it or any modification of it be agreed upon.

"As you doubtless know we have out 150 high oil strains this year from our own selections or rather presumably they are high oil strains. Seed of about fifty varieties were secured from you earlier in the year for these studies.

"Yours very truly,... Chief, Division of Agronomy."

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: Chief, Div. of Agronomy, North Carolina Experiment Station.

261. Morse, W.J. 1917. Re: More on cooperative research. Letter to Prof. C.B. Williams, North Carolina Experiment Station, West Raleigh, N.C., June 12. 1 p. Typed, without signature.

• ***Summary:*** "Dear Prof. Williams: I have your letter of January [sic, June] 8, advising that in order to finish up the cooperative work with cowpeas and soy beans it will be necessary to go through July, August, September, and October.

"With regard to further cooperative relations, I have gone over the plans and am very much interested in the matter. I feel that we might undertake some such project, perhaps more extensively than you have outlined. I shall take up the matter with Prof. Piper shortly, and let you know just what arrangements can be made.

"Very truly yours,... 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. 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.].

262. Morse, W.J. 1917. Re: Farmers' Bulletin No. 372 on Soy Beans. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Aug. 7. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: Relative to the attached letter from Mr. S.B. Reid inquiring whether or not it would

be advisable to republish Farmers' Bulletin No. 372 on Soy Beans, will say that I have in preparation now a Farmers' Bulletin on Soy Beans. I have had this in mind for some time, to take the place of Farmers' Bulletin No. 372. Many things need revising in the old Bulletin and I think many things can be added to make it a much stronger one. At the present time I have about one-fourth of this new publication completed, and no doubt can get it in shape to hand to the editor's office in November or December.

"Very truly yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

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.

263. Morse, W.J. 1917. Re: Report on visit to North Carolina. Letter to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Aug. 13. 3 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** "Dear Prof. Piper: Am about one day behind in my itinerary due to the fact that I spent part of a day at the Farmers' Cotton Oil Mill, Wilson, North Carolina. I learned that this mill was receiving rather a large quantity of Manchurian soy beans. During my time there they unloading twenty (20) carloads of beans and were expecting eighty (80) more carloads within a short time. The mill purchased in all 3,000 long tons. I learned that the Newbern [New Bern], North Carolina Mill had received 2,500 tons, the Hartford [Hertford], North Carolina Mill, 2,000 tons and the Edenton, North Carolina Mill, 2,000 tons, making in all for eastern North Carolina oil mills about 10,000 long tons or about 375,000 bushels.

"As far as I could learn the mills paid about $60 per ton at the port. The shipment was received at Wilmington, North Carolina. 2000 tons however were put off at Charleston, South Carolina for some South Carolina oil mill.

"The Wilson people were rather eager to put the meal up as flour and have the proper machinery for doing so. If any inquiries come to the office relative to soy meal for stock feed or for flour as human food it would be well to refer them to the following:

"Farmers' Cotton Oil Mill, Wilson, North Carolina.

"Newbern Cotton Oil Mill, Newbern [New Bern], North Carolina.

"Edenton Cotton Oil Mill, Edenton, North Carolina."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Hotel Myon, Irvine W. Myers, Owner and Proprietor, Tifton, Georgia.

264. Morse, W.J. 1917. Re: Manufacturers of soy bean harvesting machines. Letter to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Aug. 19. 4 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** On Aug. 15 C.V. Piper had written Morse in Texas: "Your bulletin on soy beans (probably *USDA Farmers' Bulletin* No. 886. Sept. 1917; "Harvesting soy-bean seed") has already gone to the printer and galley proof is expected by August 20. I fear that when this bulletin is issued we are going to receive a large number of letters asking where the different types of harvesting machines can be obtained. Kindly write me at once information on this point."

Morse responded with a list of manufacturers: Bean harvesters or beaters–(1) Pritchard Harvester Co., Elizabeth City, N.C. [North Carolina]. (2) Gordon Harvester Co., Elizabeth City, N.C. (3) Tarheel Bean Harvester Co., Farmville, N.C.

"There is another machine manufactured by another man but I do not recall the name. The machine is an improvement on the other types in that it can be adjusted to level cultivation and cleans the seed. I understood this machine would be available for the 1917 harvest. I am writing Prof. [C.B.] Williams requesting that he send you the name and address of the manufacturer.

"The following firms have has [have] special beans and pea separators:

"Koger Thresher Co., Morristown, Tennessee

"Owens Thresher Co., Minneapolis, Minnesota."

Note 1. None of the information in Morse's letter appeared in Bulletin No. 886.

Note 2. This is the earliest document seen (June 2017) that mentions the "Gordon Harvester;" the registered trademark for this machine was filed on 26 March 1920.

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crosby House, Beaumont, Texas.

265. Meyer, Frank N. 1917. Re: Soybeans, soybean products, and other beans in China. In: Letters of Frank N. Meyer. 4 vols. 1902-1918. Compiled by Bureau of Plant Introduction, USDA. 2444 p. See p. 2393-95. Letter of about 18 Sept. 1917 from Kingmen, Hupeh, China, to Mr. Menderson.

• ***Summary:*** Mr. Menderson seems to be working with William Morse at the USDA. Meyer begins: "I was delighted to get your enthusiastic letter of July 24, 1917, on the bean

situation, and I am really sorry I cannot get a taste of some of these products you and Mr. Morse are creating.

"You ask me whether there is a simple flavoring to take away the beany taste of beancurd [tofu]. No there is not! The Chinese are of course used to this peculiar paint- or putty-like flavor, but even then they often season their bean curd dishes highly with salt and chili peppers. I have noticed tho [sic] that the curd in some towns tastes much better than in others, and I found that greenish yellow soy beans have a coarser taste and flavor than light yellow ones. I have some idea that the quality of oil has something to do with this characteristic. If I were you I would try to cook with superheated steam for a considerable time and see if that does not remedy the matter considerably. Remember that Boston baked beans need a whole night and morning of slow heat before they are 'tasty.'

"You also might try to de-fatten the beans, before making them into curd. Before doing so, first see whether bean cake can be used for making curd; if so, we are on the road to kill 2 birds with 1 stone."

Meyer has come into contact with numerous vegetable seeds that can be sprouted, including: "*Phaseolus angularis.* Adzuki bean; the speckled grayish black variety supplies the finest quality of beansprouts, of very sweet and juicy flavor. The red varieties are boiled, pounded with sugar and used as a filling in cakes and as sweetmeats.

"*Phaseolus aureus,* Mung bean, the ordinary sea-green variety supplies good beansprouts, vermicelli and gelatine; also much eaten boiled with rice as a broth or gruel.

"*Soya max,* the small green and yellowish green varieties are sprouted, but the sprouts have a rank flavor; the large green varieties are allowed to germinate only, or often not even that, and are fried in oil and some salt sprinkled over them; they are very appetizing. Often they are served with bits of raw, chopped-up carrots in between, creating a dish pleasing to the eye. From the small yellow and yellowish green soybeans, beancurd is made in all its forms. The large yellow varieties are used for oil production."

Broadbeans (*Vicia faba*) and peas (*pisum sativum*) can also be sprouted. "Mustard seed (*Sinapis juncea*), in wintertime is sown out in warm, moist and dark places and the tiny plants eaten with sugar sprinkled over them. *Amaranthus blitum* and *A. tricolor* are eaten in the same way.

"Chives, *Allium schoenoprasum,* are forced in dark, warm places and eaten in soups, with meats, and baked in extremely thin pancakes, made from yellow soybean flour. They are considered, together with the garlic, to prevent ptomaine poisoning.

"Of all these forced winter vegetables the Mung bean is the most commonly used, on account of cheapness and availability, but in my opinion the Adzuki beansprout is the best."

"Did you have a look at my fotos [photos] of soybean products? I hope they gave you, Mr. Morse and others some ideas how big an affair the soy bean is in the daily life of 1/4 of the world's population, and if the white races do not soon stop committing suicide, these people will, by the year 2000, constitute 1/3 of the earth's inhabitants."

Location: University of California at Davis, Special Collections SB108 A7M49. Address: USDA Plant Explorer, China.

266. Morse, W.J. 1917. Harvesting soy-bean seed. *Farmers' Bulletin* (*USDA*) No. 886. 8 p. Sept. Superseded by Farmer's Bulletin 1605.

• ***Summary:*** Contents: The soy bean as a seed crop. Time of harvesting. Methods of harvesting. Methods of curing and handling. Thrashing [Threshing]. Special bean harvesters. Soy-bean straw. Storage of seed.

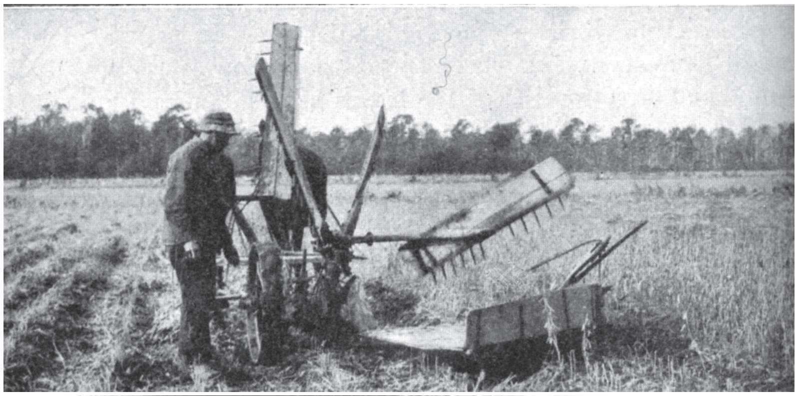
"The character of growth, the uniform maturing habit, and the heavy seed yields of the soy bean contribute to the ease of harvesting and recommend the plant for seed production. The many disadvantages which attend the harvesting of cowpeas for seed are not common to the soy bean. When grown for grain alone, the shattering of the pods of the soy bean is a serious fault, and inexperienced growers are likely to sustain a heavy loss of seed through lack of knowledge and improper handling of soy-bean plant.

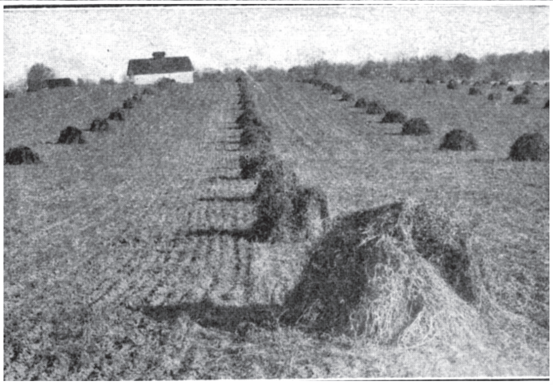
"All soy beans are strictly determinate as to growth; that is, the plants reach a definite size, according to variety and environment, and then mature and die. Nearly all varieties shatter their seed somewhat, especially during changeable weather, if not harvested at the proper stage of maturity. Some varieties, like the Guelph or Medium Green, shatter inordinately, while others, such as the Peking, scarcely at all. Special attention, therefore, is required when the plants approach maturity to prevent serious losses from the scattering of the pods." (p. 3).

Photos show: (1) A man using a mowing machine with side-delivery attachment.

(2) A man standing by a self-rake reaper [also called a "sweep rake"] used in cutting soy beans for seed.

(3) Soy beans cut for seed with a binder and the shocks





set in rows so that wheat can be sown without waiting to remove the beans from the field. Note: An Indiana farmer says (March 1999): "After cutting with a sweep rake, we would "doodle" it with pitch forks to dry."

(4) Two men working on a single-drum web loader, commonly used for haying. This will load the soy beans rapidly (on to a pile on a wagon) and with less loss of seed than would result in hand gathering.

(5) Men thrashing soy beans from the field in eastern North Carolina with an ordinary gasoline thrashing outfit.

(6) Men using a special bean harvester used in gathering the soy-bean seed from the standing mature plants. (7) Two men working to bale soy-bean straw direct from the thrasher. Address: Scientific Asst., Office of Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

267. Morse, W.J. 1917. Re: This office desires to obtain two ounces each of the varieties of

soy beans grown in the test. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Oct. 30. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: You will, no doubt, recall from our previous correspondence that this office desires to obtain two ounces each of the varieties of soy beans grown in the test conducted in cooperation with this office the present season. The seed of these varieties is to be analyzed for oil and protein contents and the iodine value of the oil is also to be obtained.

I am enclosing herewith forty-five small tags for the different varieties, giving the number and source of each, and

two franked tags for sending the seed to this office. Under separate cover, I am sending forty-five small bags and two large bags. I think that it will be necessary to divide up the small bags into two lots, as only four pounds can be sent in one bag.

"Very truly yours, 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.

268. Winters, R.Y. 1917. Re: Strains of soybeans planted at Wenona. Letter to Mr. W.J. Morse, Office, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, Nov. 1. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Your letter of the 27th is at hand and I note what you say regarding the strains of soybeans planted at Wenona. The B.P.I. strains have been discontinued at Wenona on account of the difficulty of getting stand and growth from the irregular plats there. The main test for oil content is being conducted here on the Station farm. Enclosed on a separate sheet you will find the numbers that are planted here. The last of these are being harvested now and will be in shape for taking the samples in the course of a few days. If you will furnish us with containers and frank tags, we should be glad to send you the samples required for your test.

"From what we can hear from the Hyde County and Gum Neck sections [Gum Neck is a township in Tyrrell County, in northeastern N.C.] the soybean crop is very short this season. The crop seems to have been drowned out in both of these sections. Around Elizabeth City the crop is somewhat better.

"With best wishes, Very truly yours,... Plant Breeding Agronomist. RYW-R."

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: Plant Breeding Agronomist, North Carolina Experiment Station.

269. Cromer, C.O. 1917. Re: Soybean varieties and recipes. Letter to W.J. Morse, Scientific Assistant, Forage Crops Investigation, Bureau of Plant Industry, Washington, DC, Nov. 3. 23. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I have your letter of the 31st relative to the sending of samples of soybeans of several of the numbered varieties, seed of which you sent me for planting. You remember that when you visited this Station that several of these varieties were quite late and gave evidence of not maturing before frost. We had a frost on the 10th of Sept. and another one the latter part of September which stopped maturity of these varieties. I had, however, harvested the rod rows which we saw growing, but the same have not yet been threshed. I have men at work at present on the flailing and cleaning of these varieties. As soon as the seed has been sorted out, I shall send you the quantity specified of all the varieties which matured. I shall be very much pleased to receive the results of the analyses you obtain if it is not contrary to your orders to let out this information.

"A few years ago you send me a quantity of soybean meal and some recipes for the use of the same in the form of soybean gems, cakes and such like. I propose to use some soybeans this year if I can obtain these recipes from you again. I turned them over to my mother who has lost them. If you are in a position to send me a copy of all recipes for using soybean flour or meal, I shall very much appreciate the receipt of the same.

"Very truly yours, Associate in Crops."

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–#5.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Associate in Crops, Purdue Univ., Lafayette, Indiana.

270. 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.

271. *Washington Post.* 1917. Will tell of soy bean uses: W.J. Morse in demonstration lecture tomorrow afternoon. Nov. 11. p. 10.
• ***Summary:*** "W.J. Morse, scientific assistant forage crop investigator, will give a lecture and demonstration on the utilization of soy beans as food tomorrow at 2:30 p.m. at Woodward & Lothrop's Auditorium, eighth floor, showing how they can be used as wheat, meat and fat substitutes.

"This will be the first in a series of six lectures and demonstrations on methods of saving sugar, fats, wheat and meat, given under auspices of the assistant home demonstration agent for the District of Columbia, Miss Grace E. Schaeffer, in cooperation with the liberty war kitchen."

272. Morse, W.J. 1917. Re: Address of the firm manufacturing the meal grinder. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Nov. 26. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: I have your letter of November 20, requesting the address of the firm manufacturing the meal grinder, concerning which we had a talk while you were at this office. The firm referred to is the Wilson Bros., Easton, Pennsylvania. If you care to take up correspondence with other firms handling meal grinders, I refer you to the following:

"Enterprise Milling Co., Philadelphia, Pa.

"Grey Iron Castings Co., Springfield, Ohio.

"Hibbard, Spencer, Bartlett & Co., Chicago, Illinois.

"Concerning the recipes for making different food products from the soybean, will say as soon as we have leaflets or other publications ready for sending out, I will be very glad to send you copies.

"Very truly yours, 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.

273. Morse, W.J. 1917. Re: Exhibit of soy-bean products sent by Frank N. Meyer from China. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, Dec. 7. 1 p. Typed, without signature (carbon copy). [1 ref]
• ***Summary:*** On Nov. 27 Cromer wrote Morse that he was sending two-ounce samples of different numbered varieties of soy beans, which Morse had requested in a latter of Oct. 31. Morse has not yet received these samples.

"I am very sorry indeed that you were unable to make the trip to Washington for the annual meeting of the American Society for the Advancement of Science the forepart of November.

"I have rather an interesting exhibit of soy-bean products which were received about the first of November from our agricultural explorer, Mr. Myer [sic, Frank N. Meyer], who is in Southern China.

"With regard to new soy bean varieties, it is quite possible that I will have a few new ones for your station this coming season."

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.

274. Mooers, C.A. 1917. Re: Sent samples of soy beans but used the wrong frank. Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., Dec. 31. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I sent the 2 ounce samples of the varieties of soybeans a few days ago, but I am afraid I used the wrong frank. If you do not get them promptly please let me know.

"With regards of the season.

"Yours very truly, Chemist & Agronomist. CAM/k."

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.

275. Hill, C.E. 1917. Report of the forage crop investigations on the eastern Oregon dry-farming substation, Moro, Oregon. Moro, Oregon. See p. 42-44.
• ***Summary:*** The section titled "Soy beans: Varietal test"

states: "Soy beans were tested at the Moro Station for the first time in 1917. Seed of four varieties–Black Eyebrow, Ito San, Early Green and Manchu was received from Mr. [William] Morse of the [USDA] Office of Forage Crop Investigations and planted in summer fallow in rows three feet part. Two rows 8 rods long were seeded to each variety on May 19th.

"All varieties but Early Green emerged with very firm stands. The plants averaged about 4 inches apart in the rows... Soil was secured from land on the experiment station farm at Corvallis which had grown soy beans and was drilled along the rows after seeding. The plants were examined during the season but none having nodules were found. The failure in securing nodules may be due to the fact that after the inoculated soil was drilled into dry ground, no rains occurred during the summer months. The varieties were given three cultivations and some hoeing.

"All varieties but Early Green were harvested when the leaves were dry and falling... As all varieties but Manchu were damaged more or less by rabbits, it was not deemed advisable to take the total yield of the two rows seeded to each variety in determining the varietal yields."

The yields of the different varieties were as follows: Early green 11.4 bu/acre, Ito San 10.5, Manchu 10.5, Black Eyebrow 7.8. Address: Scientific Asst.

276. Morse, W.J. 1918. Re: Samples of soy bean varieties grown by you have been received. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Jan. 2. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: The samples of seed of the various soy bean varieties grown by you the past season have been received. In checking them over with my list. I note that a sample of the Mammoth Yellow variety was omitted. Will you kindly send me a two or three ounce sample of this variety? I am enclosing a frank tag which may be used for mailing this sample.

"I appreciate very much your kindness in sending this seed, and as soon as the results are obtained from the Bureau of Chemistry, I will be very glad to send you a copy.

"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 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.

277. Morse, W.J. 1918. Re: Samples received. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Jan. 7. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: Replying to your letter of December 31, will say that the samples of varieties of soy beans sent me recently have been received.

"I think that I wrote you a short time ago regarding this and at the same time requesting a sample of the Mammoth Yellow which was used as a check in the variety test.

"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 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.

278. Morse, W.J. 1918. Re: Space at Arlington Farm. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Jan. 8. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: Relative to the attached letter concerning field crops, greenhouse space, and laboratory space desired at Arlington Farm, will say that I have taken the matter up with the different men of the office who have more or less work at the Farm.

"Mr. Coe and Mr. Kephart desire about 150 to 200 square feet in all. They also desire laboratory space and the field area that they had the past season. Mr. Kephart thought perhaps he might need a little more ground for his weed garden. I think we can arrange this matter all right by assigning him part of the field that we had for our field crops the past season.

"For the soy bean and cowpea work I think it would be desirable to have at least 200 square feet of greenhouse space, some laboratory space, and it is quite likely that we will hold the same amount of land as we had the past season for the field work.

"Very truly yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

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.

279. Morse, W.J. 1918. Re: Manuscript of "Soy Beans in Systems of Farming in the Cotton Belt" by Mr. A.G. Smith. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Jan. 19. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: Attached herewith is a copy of a manuscript entitled 'Soy Beans in Systems of Farming in the Cotton Belt' by Mr. A.G. Smith of the Office of Farm Management.

"As I understand, this is to be published as a Farmers' Bulletin and was sent to this office for criticism and suggestions. After reading the manuscript, I do not deem it worth while to offer any criticisms on the subject matter. The whole bulletin, in my opinion, is one belonging wholly to the Office of Forage Crop Investigations, and the various subjects, as shown in the Table of Contents, are better able to be treated after years of investigation by the Office of Forage Crops than by the Office of Farm Management with a few weeks' study of this crop. Nothing new is presented in the text of the manuscript and the various points on the culture, varieties, and uses of the soy bean have been covered entirely by our office in the following publications:

"Farmers' Bulletin No. 372–Soy Beans.

"Farmers' Bulletin No. 886–Harvesting Soy-Bean Seed

"Special Leaflet–Soy Beans in the Cotton Belt.

"Department Bulletin No. 439–The Soy Bean, with Special Reference to Its Utilization for Oil, Cake, and Other Products.

"I have now, at your request, completed a revision of Farmers' Bulletin No. 372, 'Soy Beans,' and it should be ready for handing in about February 1.

"In view of what is stated above, and the fact that no Farm Management data are presented, I can hardly understand why a similar publication should be issued by the Office of Farm Management.

"Very truly yours, Scientific Assistant."

Note: This bulletin was subsequently published under the title given here as Farmers' Bulletin 931 in May 1918 (23 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

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.

280. Morse, W.J. 1918. Re: Sample of Mammoth Yellow soy bean received. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, Jan. 19. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: I have your letter of January 15, relative to the sample of Mammoth [Yellow] soy bean recently sent me and the notebook reporting on the variety trial of soy beans at your Station the past season. I appreciate very much your kindness in sending the seed, and also the notebook. The notes you have sent will give me the information I desire. I was especially interested in the comparative yields and also the comparison of the different varieties with the Mammoth Yellow and also the dates of maturity of the numerous varieties. The detailed notes as to pubescence, pods, flowers, etc., have been taken on our variety test at Arlington Farm so that I have them on file in our office.

"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 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.

281. Morse, W.J. 1918. Re: Growers and seedsmen handling soy beans suitable for northern conditions. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, Jan. 26. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "Dear Professor Cromer: We are endeavoring to get in touch with the growers and seedsmen handling seed of varieties of soy beans suitable for northern conditions. We will appreciate it very much if you will kindly send us as soon as convenient a list of such growers and seedsmen handling these varieties." Note: Cromer sent such a list to Morse on 29 Jan. 1918.

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.

282. Cauthen, E.F. 1918. Re: Sending you a duplicate report of results of soy bean tests. Letter to Mr. W.J. Morse, Scientific Assistant, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, March 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: Under separate cover I am sending to you a duplicate report of the growing, culture and yield of the soy bean that you sent me in 1917 to grow for oil purposes. In the fall I sent you two ounce samples of each variety for analysis. If you have completed this work I shall be glad to have your report in order that it may be filed along with our record of the crop.

"Yours very truly, Associate Agriculturist."

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

283. Morse, W.J. 1918. Re: Notebook received. Analytical work not yet completed. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, March 14. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of March 9, advising that you are sending under cover a duplicate report of the variety test of soy beans grown at your Station the past season. The notebook has been received and I appreciate very much your kindness in sending this report.

"Relative to the analytical work on the samples of beans grown at Auburn, will say that as yet it has not been completed. As soon as I receive the results from the Bureau of Chemistry, I will send you a copy.

"Very truly yours, 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–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 [USDA].

284. Cauthen, E.F. 1918. Re: Is the Department still furnishing inoculating material for soy beans? Letter to Mr. W.J. Morse, Scientific Assistant, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, March 22. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. [sic] Morse: I would like to know if the Department is still furnishing inoculating material for soy beans. We are preparing a bulletin on this crop, and I wish to make a statement that free culture can be secured from the Department, provided the Department is still giving the farmers this culture. If there are any conditions on which it is given, I shall be glad to know them also.

"Yours very truly, Associate Agriculturist."

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

285. *Lowville Journal and Republican* (*Lewis County, New York*). 1918. This week in local history: March 30, 1893. April 4, col. 7.

• ***Summary:*** "John B. Morse and James Coffey have purchased the Union market from James H. Ralsten."

286. Mooers, C.A. 1918. Re: Can you supply me with one pint each of Wilson and Virginia soy beans? Letter to W.J. Morse, Scientific Assistant, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, D.C., April 5. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Can you supply me say with one pint each of Wilson and Virginia soy beans? Do you have them under some numbers? If so, we may have had them in our trials from time to time. I will appreciate your letting me know so I can look up our previous results that we may have gotten with them.

"We are preparing to continue our best selections of soy beans from last year.

"Hoping you will be able to visit with us later, with regards, I am

"Yours very truly, Chemist & Agronomist. CAM/k."

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.

287. Morse, W.J. 1918. Re: We can supply you with Virginia and Wilson varieties of soy beans. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, April 9. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Mooers: I have your letter of April 5, making inquiry as to whether or not we can supply you with one pint each of the Virginia and Wilson varieties of soy beans. I am taking pleasure in sending you today two pounds each of seed of these varieties. The Wilson has been grown under the number 19185, while the Virginia has been grown under the numbers 19186-D and 32906.

"The seed of Wilson being sent you is now called Wilson-Five. About 5 years ago we made eleven selections out of the old Wilson No. 19183. The Wilson-Five seemed to be about the best of those selections and we are now distributing this seed instead of the old Wilson. It is quite likely that I will be able to visit your Station some time in the latter part of August.

"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 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.

288. Cromer, C.O. 1918. Re: Mr. Thomas Myers of London, Ontario, Canada. Soybean production in Indiana. Letter to W.J. Morse, Scientific Assistant, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, April 13. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "I have been in communication with Mr. Thomas Myers of London, Ontario, Canada, who wrote you relative to the soybean products which he is attempting to manufacture. I might say that he and his assistant are here at the present time relative to a site for a factory for the manufacture of these products.

"Our production for seed in this state [Indiana], of course, at present is quite low. Mr. Bryant, the Field Crop Estimates Agent places the seed acreage at 545 acres and the hay acreage at 4630 acres. I feel, myself, that he is too low on the seed acreage. I also believe that with an outlet for the seed, soybeans will be more generally grown. In fact I think the acreage will increase by leaps and bounds. Up until this year seed has been selling for something like $2.50 per bushel. These gentlemen promise 5¢ a pound and can use all the seed than [sic, that] can be produced. I feel quite optimistic over the proposition and will be quite glad when the soybean in Indiana becomes one of the leading crops. Any information you can give me will be gratefully received."

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–#7.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Associate in Crops, Purdue Univ., Lafayette, Indiana.

289. Morse, W.J. 1918. Re: Soy bean varieties and statistics. Mr. Thomas Myers. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, April 19. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** In a letter of April 13, Cromer asked about the Arlington soy bean. Morse replies: "This variety has been grown under the number 22899. I do not recall whether or not you have included it in your test; if not, I will be very glad to supply you with a quantity of seed."

The Bureau of Crop Estimates will soon issue a publication giving statistics on soy bean production for seed in the various states.

"I am very glad, indeed, to hear that Mr. Thomas Myers is looking up the proposition of putting a factory in your State for the manufacture of soy bean products. I have had quite a little correspondence with Mr. Myers relative to the work on soy beans. It seems to me that if he will contract with the farmers for five cents a pound, he can secure all the seed he desires for his 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–Correspondence with State Agric. Exp. Stations, 1899-1923. Box 12–Illinois-Indiana. Folder–Indiana Experiment Station–#7.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

290. Cauthen, E.F. 1918. Re: I have lost the Edward soy variety. Letter to Mr. W.J. Morse, Scientific Assistant, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, April 30. 1 p. Handwritten, with signature on letterhead.

• ***Summary:*** "Dear Sir: I have lost the Edward soy variety. I wish to continue it in our variety test and would like to get a qt. [quart] of seed from you, if you can spare this amount of seed from your [?]. Allow me to thank you for this, and I shall be glad to pay any charges incurred in getting them.

"Should any of the varieties included in the oil test of 1917 be repeated for oil purposes in 1918?

"Yours truly, Associate Agriculturist."

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

291. Morse, W.J. 1918. Re: Seed of the Edward soy variety. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, May 4. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: Replying to your letter of April 30 advising that you wish to obtain seed of the Edward variety of soy bean, will say that we have only a very small amount of this seed on hand. I am taking pleasure in sending you what we can spare. It is quite possible that if you desire a larger amount of seed of this variety you can secure it from the Georgia Experiment Station, Athens, Ga.

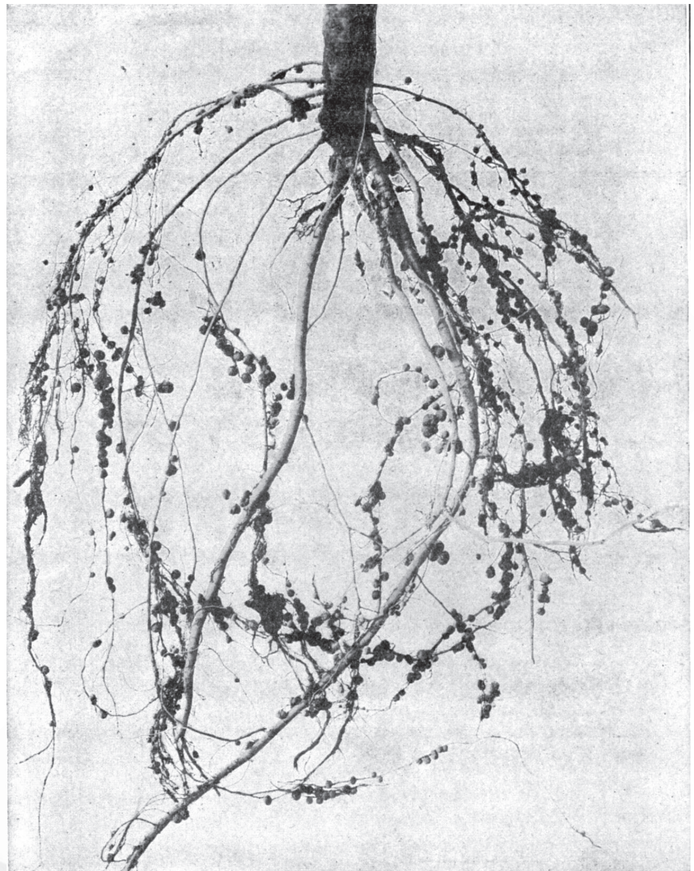
"Relative to the testing out of some of the varieties

which were included in last year's variety test for oil, will say that it might be well to test out the highest forage and seed yielding varieties in comparison with the standard sorts you are growing at your station. Some of the varieties tested out for oil showed very good seed yielding qualities and I think it would be of value to test them in plots with sorts you have tested at the Station for a number of years.

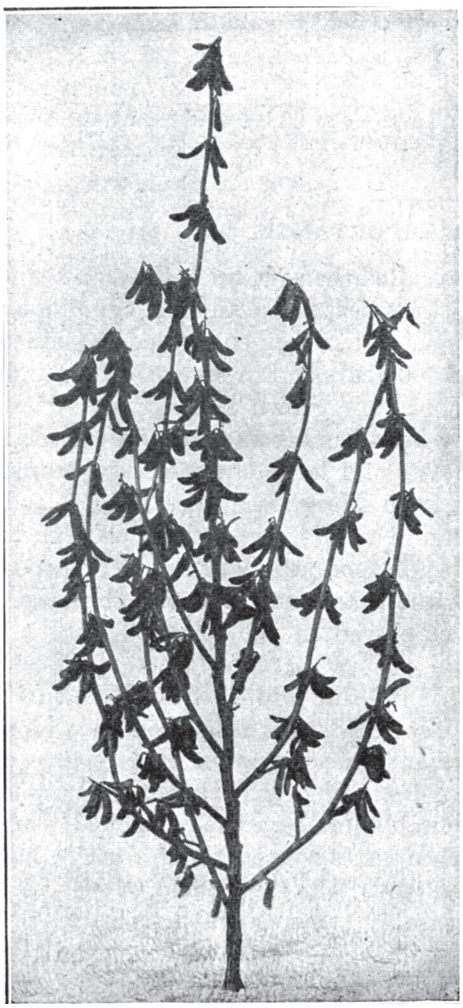
"Very truly yours, Scientific Assistant."

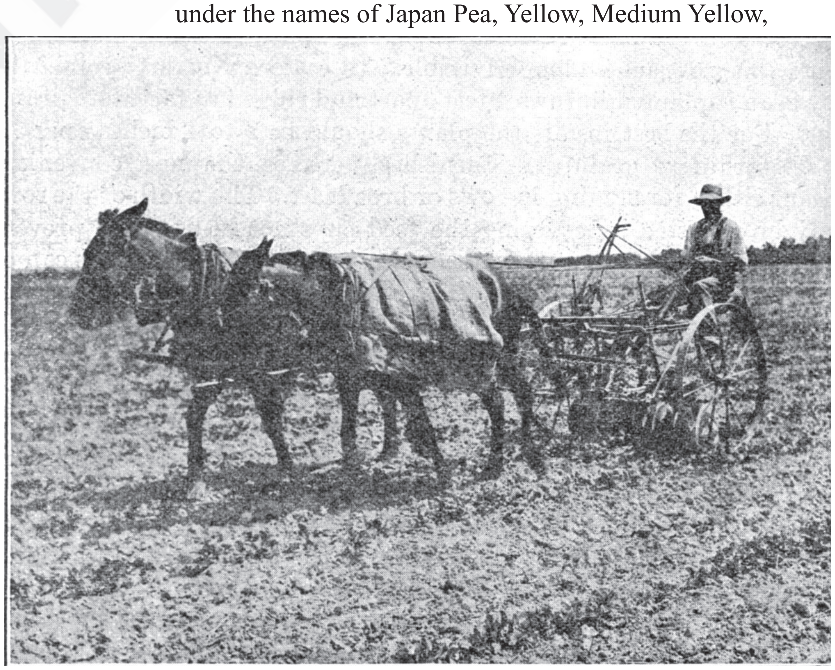
Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases. Series–General Correspondence with State Agricultural Experiment Stations, 1899-1928. Alabama. Box no. 1.

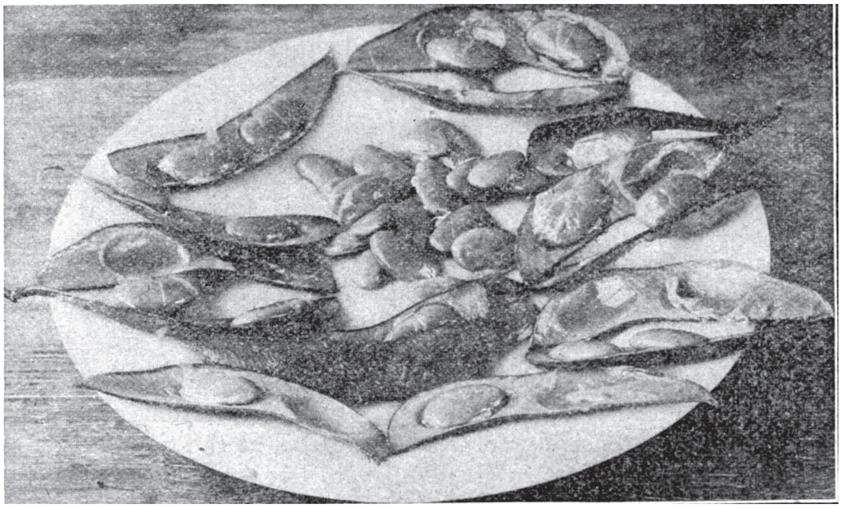
Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Scientific Assistant [USDA].



292. Morse, W.J. 1918. The soy bean: Its culture and uses. *Farmers' Bulletin* (*USDA*) No. 973. 32 p. July. Superseded by Farmers' Bulletin 1520. [27 ref]
• ***Summary:*** Contents: Summary. Commercial importance. Climatic adaptations. Soil requirements. Preparation of the seed bed. Fertilizers. Inoculation. Time of planting. Depth of planting. Rate of seeding. Method of seeding. Cultivation. Varieties (22): Barchet, Biloxi, Black Eyebrow, Chiquita, Early Brown, Elton, Guelph ("also known as Medium Green, Early Green, Medium Early Green, and Large Medium"), Haberlandt, Hahto, Hollybrook, Ito San ("has been known under the names of Japan Pea, Yellow, Medium Yellow,



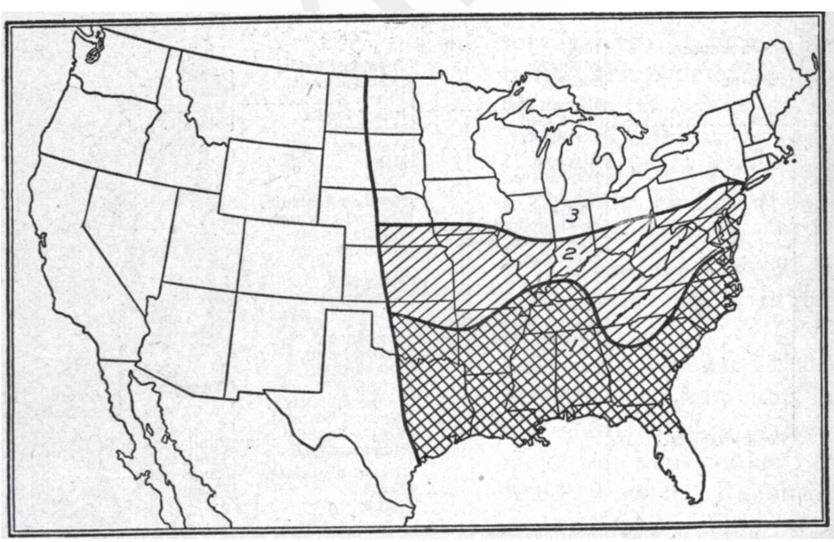




Dwarf Yellow, Early Yellow, Early White, and Coffee Berry"), Lexington, Mammoth, Manchu, Medium Yellow ("has been grown under the names Early Yellow, Mongol, Banner, and Roosevelt"), Mikado, Peking ("In variety tests the Peking, Sable, and Royal varieties appear to be identical, and it is quite evident that the latter two are selections from the Peking."), Shanghai ("has been grown in North Carolina under the name of Tarheel Black"), Tokyo, Virginia, Wilson-Five [black seeded], Yokotenn [Yokoten].

Soy beans in rotations. Soy beans in mixtures: With cowpeas, corn, sorghums, or Sudan grass. Soy beans for seed: Yields of seed, feeding value, for human food, for oil and meal, viability of soy-bean seed, cost of production, soy-bean straw. Soy beans for hay: Time of cutting, curing soy-bean hay, feeding value of soy-bean hay, yields of soy-bean hay. Soy beans for soiling. Soy beans for pasture. Soy beans for ensilage. Soy beans for soil improvement. Enemies of the soy bean: Rabbits, root-knot caused by a nematode, cowpea wilt due to a Fusarium, caterpillars, and black blister beetles.

"Commercial importance: The soy bean, also called the soya bean, the soja bean, and in North Carolina the stock pea, is an annual leguminous plant, a native of southeastern Asia. It has been cultivated in China, India, and Japan for more than 5,000 years and in extent of use and value is the most important legume now grown in these countries."



"The soy bean was introduced into the United States as early as 1804, but it is only during the last decade that it has become a crop of much importance. At the present time it is most largely grown for forage. In many sections, especially southward and in some parts of the corn belt, a very profitable industry has developed from that growing of seed. During the past few years the acreage has increased to a very considerable extent. The large yield of seed, the excellent quality of forage, the ease of growing and harvesting the crop, its freedom from insect enemies and plant diseases, and the possibilities of the seed for the production of oil and meal and as a food all tend to give this crop a high potential importance and assure its greater agricultural development in America" (p. 3).

Concerning the variety Hahto (p. 14): "This variety recently introduced from Japan is a large producer of seed and forage, and the seeds when from three-fourths to full grown make an excellent green vegetable, similar to the Lima or butter bean. Plants stout, erect, maturing in about 135 days; pubescence tawny; flowers purple; seeds olive yellow, with a black seed scar, much flattened, very large, about 75,000 to the bushel; oil, 14.8%; protein, 40.6%." Note 1. This is the earliest English-language document seen (May 2003) that uses the term "butter bean" to refer to the lima bean.

Uses for human food (p. 22-23): "Until 1916 the soy bean had been used but little in the United States for food and only as a special diet for persons [diabetics] requiring foods of a low starch content. Much interest has been shown during the last two years in the possibilities of the soy bean for food. The United States Department of Agriculture and many schools of cookery and domestic science have conducted successful experiments in utilizing the dried beans in the manner of the navy bean and the green beans when three-fourths grown to full grown as a green-vegetable bean. The variety and palatability of the forms in which the bean can be served make it a very desirable article of food, and undoubtedly it will grow in favor as it becomes better known. Soy-bean meal or flour may be used as a constituent of bread and muffins and in pastry."

Photos show: (1) A man standing in a field

of soy beans (front cover). (2) A typical mature soy-bean plant (p. 4).

(3) Roots of a soy-bean plant with abundant development of nodules (p. 7).

(4) Cultivating soy beans. Cultivation should begin as soon as the seedling plants appear. Two horses pull a man on a harrow or weeder. (5) A field of the Biloxi variety of soy beans in Mississippi (p. 13). (6) A field of the Black Eyebrow variety of soy beans in South Dakota. (7) Plats of the Mammoth and Virginia varieties of soy beans at Arlington Farm, Virginia (p. 15). (8) A man standing in a field of the Peking variety of soy beans grown in 24-inch rows. (9) A field of soy beans and corn grown for ensilage (p. 17). (10) A field of soy bean and Sudan grass grown in mixture for hay (p. 22).

(11) Opened pods of Hahto variety soy beans on a plate, showing the large seeds (p. 23). (12) Soy-bean hay on frames (p. 25).

A diagram (p. 5) shows 67 different ways in which soy bean plants and seeds are utilized. The plants are used for green manure, forage (hay, ensilage, soiling), and pasture. The seeds are used to make oil, meal, and food products. The oil is used to make various non-food industrial products (glycerin, explosives, enamels, varnish, waterproof goods, linoleum, paints, soap stock {for hard or soft soaps}, celluloid, rubber substitute, printing inks, lighting oil {illuminants}, and lubricating oil), and four food products (butter substitute, lard substitutes, edible oils, and salad oils). Food products include dried beans and green beans. From dried beans are made soy sauce, boiled beans, baked beans, soups, coffee substitute, roasted beans, breakfast foods, and vegetable milk (from which is made soy cheese {fresh, dried, smoked, or fermented}, condensed milk, fresh milk, confections, and casein). The green beans are used as green vegetables, canned, or in salads.

An outline map of the United States (p. 6) shows the areas to which the soy bean is especially adapted, as to varieties and purpose. The eastern half of the country is divided horizontally into 3 zones: Southern, for later and larger varieties for seed production; Central, for medium and medium-late varieties for seed and the same varieties and later varieties for forage; Northern (the line runs through central Ohio, Indiana, and Illinois, and southern Iowa) for very early varieties for grain production and the medium and medium-late varieties for forage and ensilage.

Note 2. This is the earliest document seen (July 2013) that mentions the soybean varieties Hahto, Yokoten, or Wilson-Five.

Note 3. This is the earliest document seen (June 2009) that describes a vegetable-type soybean variety (Hahto), or says that a specific variety makes an excellent "green vegetable."

Note 4. This is the earliest English-language document seen (June 2009) that contains the term "green-vegetable bean." Address: Scientific Asst., Forage-Crop Investigations, USDA Bureau of Plant Industry, Washington, DC.

293. Morse, W.J. 1918. Re: Report on travels in North Carolina. Letter to R.A. Oakley, USDA, Washington, DC, Aug. 3. 3 p. Handwritten, with signature.

• ***Summary:*** "Dear Oakley: Spent part of the day at La Grange, North Carolina, looking into the bean harvester proposition. Hardy and Newsome [Hardy and Newsom] have a real factory and expect to manufacture about 500 machines for this year's work. They now have about 375 orders.

"It seems to me that it is the best of any of the bean harvesters now being manufactured. The other machines won't do for Yarrow farms [a USDA Plant Introduction Field Station, near Rockville, Maryland] as they are adapted only to ridged cultivation. The Hardy and Newsome machine can be adjusted to level cultivation and is much lighter. It doesn't look so heavy and cumbersome. They are selling the machine for $150 and when introducing into a new territory, allow 10% off. Under favorable conditions the machine will harvest from 75 to 100 bushels a day. With the Yarrow acreage it might be well to obtain three of these machines. The N.C. station purchased one of these machines for their soy bean work here... Mr. Pate of the station investigated all of the bean harvesters and recommended this one. Am enclosing one of the company's booklets and ads so that you can judge..."

"Will you please send to Hardy and Newsome, La Grange, N.C.: Farmers' Bulletins 886 and 973, Departmental Bulletin 439 [Dec. 1916], Yearbook article 740. States Relations Leaflet [sic, USDA Office of the Secretary, Circular] "Use soy bean flour to save wheat, meat, and fat" [May 1918]...

"The soy bean acreage, according to Prof. [C.B.] Williams, has increased about 20% in N.C. this year. Quite a large quantity of soy bean seed that farmers were holding in N.C. for high prices went to the oil mills for $2.25 per bushel. In the fall and winter the oil mills offered $2.75 so some one was fooled.

"I have also written Mr. Dorsett relative to the harvesters as I think this will suffice."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Raleigh, North Carolina.

294. Oakley, R.A. 1918. Re: Little Giant Bean Harvester. Letter to Mr. W.J. Morse, General Delivery, Yazoo City, Mississippi, Aug. 6. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: I have your letter of August

3 and thank you very much for your report on the Little Giant Bean Harvester. I am taking this matter up with Mr. Dorsett at once, and have no doubt that he will act on your recommendation. I agree with you that it will probably be desirable to purchase three of these harvesters, in view of the relatively large acreage which we have to harvest."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

295. Morse, W.J. 1918. Soy-bean varieties. *Scientific American Supplement* 86:144. Aug. 31.
• ***Summary:*** In this speech to the Botanical Society of Washington Mr. Morse states: "The number of varieties cultivated in the Orient is very extensive and during the past ten years the Department of Agriculture has brought in through the Office of Foreign Seed and Plant Introduction nearly 1,000 introductions, nearly all of which were distinct sorts."

In the USA, although soy-bean acreage during "the past season is about five times that of five years ago, it should, and no doubt will, assume an important place among the farm crops of the United States." Address: USDA, Washington, DC.

296. Morse, W.J. 1918. Harvesting soy-bean seed. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(3):18-19. Aug.
• ***Summary:*** This is a reprint of an article with the same author and title published in Sept. 1917 in *USDA Farmers' Bulletin* No. 886. 8 p. Address: Scientific Asst., Office of Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

297. Morse, W.J. 1918. Re: Manuscript entitled "An Economic Study of the Soy Bean in Eastern North Carolina" by Messrs A.G. Smith and C.E. Holt. Mr. A.G. Smith. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Sept. 5. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Piper: With reference to the manuscript entitled 'An Economic Study of the Soy Bean in Eastern North Carolina' by Messrs A.G. Smith and C.E. Holt of the Office of Farm Management, will say that I have gone over this carefully, comparing it with recent publications on this crop.

"The first impression that I gained as I read through the manuscript, was the similarity of contents with a previous publication by Mr. Smith, Farmers' Bulletin 931, 'The Soybean in Systems of Farming in the Cotton Belt'. In criticising the manuscript as a whole, I would say that firstly; the subject matter is rather loose, and there is a great deal of repetition. Secondly; the various phases have been taken up in Farmers' Bulletin 931 with perhaps a little more detail and the addition of tables, and thirdly; certain parts of the manuscript treat on subjects that are strictly forage crop work.

"To support the criticisms mentioned above, it might be well to point out specific cases throughout the manuscript.

"Under the heading "Outlet for Soy Beans and Recent Economic Development', most of the matter in this is contained in Department Bulletin 439, 'The Soy Bean, with Special Reference to Its Utilization for Oil, Cake, and Other Products,' also our Farmers' Bulletin 973, 'The Soy Bean Its Culture and Uses.' and Yearbook Article Separate 740, 'The Soy Bean Industry in the United States.' In Farmers' Bulletin 931, about the same things are discussed under the heading 'Uses of Soy Beans.'

"Under the heading 'Soils', about the same thing is discussed in Department Bulletin 931, under 'Area and Soils Adapted to Soy Beans'. With the subject 'Varieties and Seed', this is a forage crop matter and is discussed to a greater extent in our recent Farmers' Bulletin 973. It is quite evident from the author's discussion here on Varieties and Seed, and also his discussion under ''Factors Influencing Yields', that his information concerning varieties in Eastern North Carolina is somewhat limited. The Office of Forage Crops has been doing a very considerable amount of work in cooperation with the North Carolina Experiment Station, with improving the varieties in the Eastern part of North Carolina and introducing new improved sorts. During the past two years the Virginia, Tokyo, and Back Eyebrow varieties have become quite well known. It is also to be noted that this same information under 'Varieties and Seed' is contained in Bulletin 931.

"Under the heading 'Growing Soy Beans', the information contained therein is practically the same as in Farmers' Bulletin 931 under 'Farm Practice in Growing Soy Beans'. Under 'Harvesting Soy Beans for Seed', the Office of Forage Crops published in September 1917, Farmers' Bulletin 886 entitled 'Harvesting Soy-Bean Seed'. The information and data contained in the manuscript under this title is discussed also very full in Farmers' Bulletin 931 under 'Harvesting.'

"Under 'Combination of Crops', this matter is again discussed in Farmers' Bulletin 931 under the heading 'Combining Soy Beans with Other Crops'. As I see it, this subject again is a matter relating to the work of the office of forage crops.

"On 'Factors Influencing Yields', it seems to me that this is entirely a forage crop proposition, as the authors discuss inoculation, improvement of seed, methods of planting, and fertilizing. The use of soy beans as a pasture for hogs is also discussed, and this subject has been taken up recently

in our Farmers' Bulletin 973, and discussed quite generally, showing the results of definite experiments.

"In summing up the situation, it seems to me that at this time when there is a call for economy in printing, that a manuscript or publication of this type is uncalled for. In fact, under normal conditions, I can hardly see where in view of the recent soy bean publications, another department bulletin merely giving in detail the substance of other publications, would be necessary. In fact, it is stated in the Beginning of Farmers' Bulletin 931 that the directions given in the bulletin are based on an economic study of soy beans in Northwestern North Carolina. You no doubt will recall that there was a considerable discussion at the time Farmers' Bulletin 931 was in galley-proof. It was found that a very considerable amount of the matter pertained to forage crop work and when taken up with the office of Farm Management, was admitted as such by that office.

"I am sending herewith copies of the publications referred to above.

"Very truly yours, Ass't. Agrostologist."

Note: We can find no evidence that this manuscript was ever published. However in April 1920 an article titled "Farm practices with soybeans: Based on a survey of fifty farms in northeastern North Carolina," by A.G. Smith and C.E. Hope [not Holt] was published in the *North Carolina Department of Agriculture, Bulletin.*

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

298. *Bean-Bag* (*The*) (*St. Louis, Missouri*). 1918. Bean oil: Soy beans for oil. 1(4):34-35. Sept.
• ***Summary:*** This entire article was reprinted (without credit) from: Morse, W.J. 1918. "The soy-bean industry in the United States." *Yearbook of the U.S. Department of Agriculture* p. 101-11. For the year 1917. See p. 104-05.

The next two articles ("English process of refining oil" and "Secret process of English company") are both excerpted (without credit) from Brodé, Julien. 1910. "Oil-seed products and feed stuffs." *Special Agents Series* (U.S. Bureau of Manufactures, Department of Commerce and Labor) No. 39. 32 p. See p. 12-13.

299. Morse, W.J. 1918. The soy-bean industry in the United States. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(4):13-14. Sept.
• ***Summary:*** This is a reprint of an article with the same author and title published in 1918 in the *Yearbook of the U.S. Department of Agriculture.* p. 101-11. For the year 1917. See p. 101-06. Contains many photographs by Frank N. Meyer. Address: Scientific Asst., Bureau of Plant Industry [USDA, Washington, DC].

300. Morse, W.J. 1918. Re: Request for names of firms in California handling imported soy bean seed. Letter to Prof. G.W. Hendry, Univ. of California, College of Agriculture, Experiment Station, Berkeley, CA, Oct. 7. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Hendry: We are somewhat anxious to obtain names of firms in California handling imported soy bean seed. Notices have come to our attention recently that different firms in different parts of California are importing soy bean seed from Manchuria. I thought it quite possible, in as much as you are working on the bean question, that you have some data on the soy bean. If you are able, we will appreciate it very much to receive all names of firms having seed of this crop.

"Very truly yours, Ass't Agrostologist (WJM/ML)."

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. Ala.–Calif. Box no. 2.

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.

301. Hendry, G.W. 1918. Re: Names of firms in California engaged in the importation of Soy Bean seed. Letter to Mr. W.J. Morse, Bureau of Plant Industry, U.S.D.A., Washington, DC, Oct. 17. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: The writer wishes to acknowledge the receipt of your letter of Oct. 7th, containing inquiries relative to firms in California engaged in the importation of Soy Bean seed, from the Orient.

"I regret very much that I do not have this information at hand, but am making inquiries on this subject and will write you fully concerning it, at a later date.

"Very truly yours, G.W. Hendry"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Prof. of Agronomy, Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

302. Hendry, G.W. 1918. Re: Names of firms in California engaged in the importation of Soy Bean seed. Letter to Mr.

W.J. Morse, Bureau of Plant Industry, U.S.D.A., Washington, DC, Oct. 29. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: Further reference to your letter of Oct. 7th; I take pleasure in giving you herewith a list of the largest Soy bean importers of this state as they have been given to me by various members of our importing trade.

"Probably the largest importers are the Mitsui & Co., of San Francisco and Seattle [Washington], and S.L. Jones & Co., of San Francisco. Other importers are:

"Western Import Co.,

"Nozaki Bros.,

"Suzuki & Co.,

"North American Merc. Co.

"all of San Francisco.

"I would also suggest your making inquiry of the Importers & Exporters Association, Henry P. Dimond, Secretary, California and Battery Streets, San Francisco.

"Very truly yours, G.W. Hendry (GWH:MK)"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Prof. of Agronomy, Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

303. Cauthen, E.F. 1918. Re: Preparing to publish data relative to soy beans. Letter to Mr. W.J. Morse, Scientific Assistant, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, Oct. 30. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir:–The Experiment Station is preparing to publish most of its data relative to soy beans. I would like to include in this publication of the chemical analysis and test that your department was to furnish in the cooperation test f 1917. If you have your data ready I shall be glad to receive a copy very soon.

"Thanking you for your cooperation, I am

"Yours very truly, Associate Agriculturist."

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: Associate Agriculturist & Recorder, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

304. Morse, W.J. 1918. Re: Analytical work not yet finished. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, Nov. 9. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: I have your letter of October 30th stating that the Alabama Station is preparing to publish most of its data relative to soy bean work, and that you would like to include in this publication chemical analyses of the varieties of soy beans furnished for the cooperative test of 1917.

"I would like to say that this analytical work has been done by the Bureau of Chemistry under the direction of Dr. J.A. LeClerc. The same varieties were sent to all of the Southern Stations and some of the Southwestern Stations. In all, we had about 1200 samples of beans for analysis. Therefore, you see it has taken some little time to do this work. I have not been in touch with Dr. LeClerc lately on account of our work at Arlington Farm. I am writing him stating that you wish to obtain the analyses of the beans grown at Auburn, and as soon as he sends me the results, I will forward them to you at once.

"Very truly yours, Ass't. Agrostologist."

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: Assistant Agrostologist [USDA].

305. Morse, W.J. 1918. Re: Thank you for names of firms in California handling imported soy bean seed. Letter to Prof. G.W. Hendry, University Farm, Univ. of California Experiment Station, Davis, CA, Nov. 9. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Hendry: I have your letter of October 29th, furnishing me with a list of the largest soy bean importers in the State of California. I appreciate very much your kindness in sending me this list, and also your suggestion for making inquiries of the Importers and Exporters Exchange, San Francisco. I will write Mr. Dimond and see if I can obtain further names concerning the importations of soybeans and products.

"Very truly yours, Ass't Agrostologist (WJM/ML)."

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Agrostologist, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

306. Hendry, George W. 1918. Re: Names of firms in

California engaged in the importation of Soy Bean seed. Letter to Mr. W.J. Morse, Bureau of Plant Industry, U.S.D.A., Washington, DC, Nov. 14. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I take pleasure in giving you herewith an additional list of importers of Soy bean seed, or perhaps, more exactly, dealers in Soy Beans which have been imported. This list was given to me by Mr. C.B. Williams of the North Carolina Experiment Station:

"Farmers Cotton Oil Company, Wilson, N.C.

"New Bern Oil & Fert. Co., New Bern, N.C.

"Eastern Cotton Oil Co., Elizabeth City, N.C.

"Farmville Oil & Fert Co., Farmville, N.C.

"Consumers Cotton Oil Co., Tarboro, N.C.

"Very truly yours, G.W. Hendry (GWH:MK)"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Prof. of Agronomy, Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

307. Morse, W.J. 1918. Re: Letter from Tennessee Board of Control. Letter to Mr. R.A. Oakley, USDA, Washington, DC, Nov. 18. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Oakley: Relative to the attached letter from Tennessee Board of control requesting information on the growing of crops in Tennessee for both farm and vegetable products, will say that the soy bean has given most excellent results, both for forage and for food. It might be well to call the Board's attention to the work being done by the Nashville Agricultural and Normal Institute [NANI] located at Madison, Tennessee. This Institute has a very large farm and produces practically all of its food for the members of the Institute as well as the Sanitarium.

"The Horticulturist in charge of the Institute is Prof. Floyd Brailliar, who has done a considerable amount of work with different food products from the soy bean. At the present time they have a factory for canning several different soy products from the soy beans which are grown on their farm.

"Of course, the Cowpea is another crop which may be used both for forage and for food. The Blackeye have given very good results in Tennessee and no doubt would furnish them with a great amount of food. I am attaching here with our available publications on the Soy Bean and Cowpea.

"Very truly yours,..."

Note: This is the earliest document seen (May 2017) that mentions soy in connection with the Nashville Agricultural Normal Institute (NANI, in Madison, Tennessee; named Madison College after 1937).

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

308. Morse, W.J. 1918. Re: Thank you for names of firms in California handling imported soy bean seed. Letter to Prof. George W. Hendry, University Farm, Univ. of California Experiment Station, Davis, CA, Nov. 21. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Hendry: I have your letter of November 14th giving a list of importers of soy beans, or rather dealers in soy beans which have been imported. The names you submit I am acquainted with, in fact, was present at some of the mills when they were unloading quantities of the imported beans. I am especially interested in the companies on the Pacific Coast that are importing beans. It is quite likely that the concerns in North Carolina purchased the seed through firms, either in San Francisco or Seattle.

"Very truly yours, Ass't Agrostologist (WJM/ML)."

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Agrostologist, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

309. Morse, W.J. 1918. Re: Sending analyses of soy beans. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, Dec. 17. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: In accordance with your request for analyses of the seed of the varieties of soy beans grown at Auburn, Ala. in 1917, I am taking pleasure in enclosing the report as submitted by the Bureau of Chemistry. You will note that the analysis has merely to do with the moisture, fat, and protein contents, and the weight per thousand beans. I regret that we have been unable to send you a report of these analyses before, but as I wrote you some time ago, we had so many that it has taken a considerable time to get them analyzed.

"Yours truly, Ass't. Agrostologist."

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: Assistant Agrostologist [USDA].

310. Morse, W.J. 1918. Re: Please send Biloxi soy beans. Letter to Prof. S.M. Tracy, Agronomist, Bureau of Plant Industry, USDA, Biloxi, Mississippi, Dec. 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Tracy: Quite recently the Office of Tobacco Investigations advised me they desire to obtain seed of a very late variety of soy beans for experimental purposes in the greenhouse. They desire to start the seed as soon as possible and I suggested that they try Biloxi. In looking up the seed here, I find that we have no seed of this variety available. I will be very glad if you will send me in the near future two pounds of Biloxi seed.

"Very truly yours,..."

Note: On 30 Dec. 1918 S.M. Tracy returned this letter to Morse with the following note typed on the bottom: "Biloxi soys sent today. Also a few of 43529 which is much later. Mine were planted 3/23, and were killed by frost on 12/25.

Yours... 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 Special Agent at Biloxi, Mississippi, 1907-20. S.M. Tracy, 16-23. Box 5.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012. Address: Ass't. Agrostologist, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC.

311. Tracy, S.M. 1918. Re: Please send "Bulletin 439" on soy beans. Letter to W.J. Morse, Office of Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC, Dec. 27. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Please send me half a dozen copies of 'Bulletin 439' on Soy Beans [by Piper & Morse]. The 'Biloxi' [soybean variety] is making a great stir here on the Cast, and I want to show analyses. Best Xmas wishes.

"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 Special Agent at Biloxi, Mississippi, 1907-20. S.M. Tracy, 16-23. Box 5.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Biloxi, Mississippi.

312. *J. of the Royal Horticultural Society* (*London*). 1918. Notes and abstracts: Soy bean, The [by C.V. Piper and W.J. Morse, Dec. 1916]. 43:576. [1 ref]

• ***Summary:*** A brief summary of this article.

313. Morse, W.J. 1918. The soy-bean industry in the United States. *Yearbook of the United States Department of Agriculture* p. 101-11. For the year 1917. See p. 101-06. Contains many photographs by Frank N. Meyer.

• ***Summary:*** Contents: Early history of the soy-bean industry. Soy beans in the United States. Cultural requirements. Varieties. Soy beans as forage. Soy beans for oil. Soy-bean meal. Soy beans for human food: Dried beans, green beans, soy-bean milk, soy-bean cheese, soy sauce, soy-bean sprouts. Possibilities of the soy-bean industry in the United States.

"The annals of Old China set forth the fact that the soy bean was an important food fully 5,000 years ago. When the ports of China were first opened to foreign commerce, the trade in [soy] beans and bean products was found to have been a long-established and flourishing institution. In value and in extent and in variety of uses the soy bean is the most important legume grown in Asiatic countries." Note: This is the earliest document seen (May 2003) which gives the age of the soybean as "5,000 years."

"Near the close of the eighteenth century the soy bean found its way its way to Europe, its cultivation being recorded in England in 1790. It is mentioned in the United States as early as 1804. For several decades, however, it was regarded more as a botanical curiosity than as a plant of much economic importance. In 1875, Prof. Haberlandt began an extensive series of experiments in Austria with the soy bean and strongly urged its use as a food for both man and beast. Although considerable interest was aroused during the experiments, the soy bean failed to attend the success hoped for by the experimenter.

"Previous to the Russian-Japanese war [1904-05] China and Japan were not only the greatest producers but also the greatest consumers of the soy bean and its products. During the war the production of the crop was greatly increased throughout Manchuria. After the war, however, it became necessary to find new markets for the surplus beans, and trial shipments were made to Europe. The first attempts to introduce the soy bean and its products into European markets were generally unsuccessful because of the unsatisfactory condition in which the beans and cake were received, owing to poor shipping facilities. About 1908 a large trial shipment made to the English oil mills was received in much better condition than previous shipments, and the results obtained were so satisfactory that larger imports were made."

"Soy beans in the United States. As previously stated, the soy bean was introduced as early as 1804, but it is only within recent years that it has become a crop of much importance in the United States. Until the present season it has been grown primarily as a forage crop, though a constantly increasing demand for seed for food and planting

has led to the development of a very profitable soy-bean seed industry in many sections of the South and the corn belt. The large yield of seed, the ease of growing and handling the crop, the value of the beans for both human and animal food, and the value of the oil and meal all tend to make this crop one of great potential importance and to assure its greater agricultural development in America."

"Varieties:... At the present time about 20 varieties are handled commercially by growers and seedsmen, although more than 500 distinct varieties are known and have been grown by the Department of Agriculture on its testing grounds. The yellow-seeded sorts are preferred for food and the production of oil and metal and include the following: Mammoth (late), Tokyo (late), Hollybrook (medium late), Haberlandt (medium late), Medium Yellow (medium), Mikado (medium), Ito San (early), Manchu (early), and Elton (early). For forage, the black and brown seeded varieties are most suitable and include Barchet (late), Biloxi (late), Peking (medium), Wilson-Five (medium [black seeded]), Virginia (medium late), Early Brown (early), and Black Eyebrow (early).

"Soy beans for oil: The soy bean was 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, and the success of the industry is indicated by the continued production of the oil and meal and the increasing imports of soy-bean seed from Manchuria.

"American-grown seed was first crushed for oil the latter part of 1915 by a few cottonseed-oil mills in North Carolina. A shortage of cottonseed and a surplus of soy-bean seed led to a rather extensive use of domestic-grown seed for this purpose. However, during the season of 1916-17 no domestic-grown beans were utilized for oil, owing to the extremely high price of seed. The cottonseed-oil mills of the South saw the possibilities of the soy bean as an oil seed, and many mills throughout the cotton belt contracted with planters for seed of the 1917 crop. This led to a considerable increase of acreage. Large quantities of Manchurian beans have been imported during the past few months and utilized by southern mills in the production of oil and meal.

"The utilization of the soy bean as an oil seed has not required any extensive changes in the equipment of the modern oil mills. The methods are similar to those employed with other oil seeds, such as cottonseed and linseed. According to data obtained from different mills, 1 ton of soy-bean seed yields from 28 to 31 gallons of oil and about 1,600 pounds of meal.

"The oil extracted from the soy bean in many respects resembles cottonseed oil, though it dries more rapidly. This oil has a good color, has but a faint odor, and is rather palatable. New trade uses are being constantly found for soy-bean oil, and it has become an important competitor of other vegetable oils. It was first used in the United States in its crude state, principally in the manufacture of soft soaps. In the search for new oils to replace linseed oil for paint purposes, partly or wholly, soy-bean oil was found most suitable. Paint grinders are using successfully large quantities of this oil in the manufacture of certain types of paint. Manufacturers of butter and lard substitutes are using considerable amounts of soy-bean oil in their products. Other uses for which this oil is employed are in the manufacture of explosives, linoleum, varnish, and foodstuffs.

"Soy-bean oil has been studied with other oils by the Office of Home Economics and found to compare favorably with the more common table oils with respect to digestibility. In view of the rapid improvement in the process of refining this oil, there seems to be scarcely any use to which oil is put in the manufacture of foodstuffs in which soy-bean oil may not eventually be found to have an important place" (p. 104).

"Soy-bean meal:... The meal or flour produced from American-grown yellow varieties is bright yellow in color when fresh and has a sweet, nutty flavor. Samples of meal from different sources range from 46 to 52 per cent protein and from 5 to 8 per cent oil. As a human food, soy-bean flour has been used in the United States principally as a special article of diet and sold by companies manufacturing special foods of low starch content. The flour or meal can be successfully used as a constituent of bread, muffins, biscuits, or pastry. Extensive tests have been conducted by the United States Department of Agriculture with soy-bean flour in the making of bread and pastry. In these various food products about one-fourth soy flour and three-fourths wheat flour has been found to be the proper proportion. In some of the pastry products, however, as much as one-half soy flour can be used. During the past year the use of soy-bean meal has gained in popularity on account of the many palatable products that may be made from it" (p. 105). Photos are described in Part II. Continued. Address: Scientific Asst. in Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

314. Morse, W.J. 1918. The soy-bean industry in the United States (Continued–Document part II). *Yearbook of the United States Department of Agriculture* p. 101-11. For the year 1917. See p. 106-10. Contains many photographs by Frank N. Meyer.

• ***Summary:*** Continued from p. 106. "Soy beans for human food: In Asiatic countries, especially China and Japan, the soy bean and the various food products made from it are so largely consumed that it is second only to rice in importance as a food crop. The soy bean is eaten only to a very small extent like other beans, but in China and Japan it is elaborated into a great variety of products, all having a high percentage of protein and making a well-balanced diet when eaten in connection with the staple food, rice. Some of these products are said to be eaten at every meal and by rich and poor alike. Of these numerous preparations, only one, 'shoyu,' or 'soy sauce,' has been introduced to any extent

in other countries. It is quite possible that some of these products would appeal to the American taste and with proper exploitation become established on the American market.

"Although the soy beans as an article of food has attracted attention from time to time in the United States, thus far it has been used but little except as a special food for invalids. The beans contain only a trace of starch and are highly recommended as a food for persons requiring a diet of low starch content. During the past year, however, much interest has been manifested in the possibilities of the soy bean as a staple food.

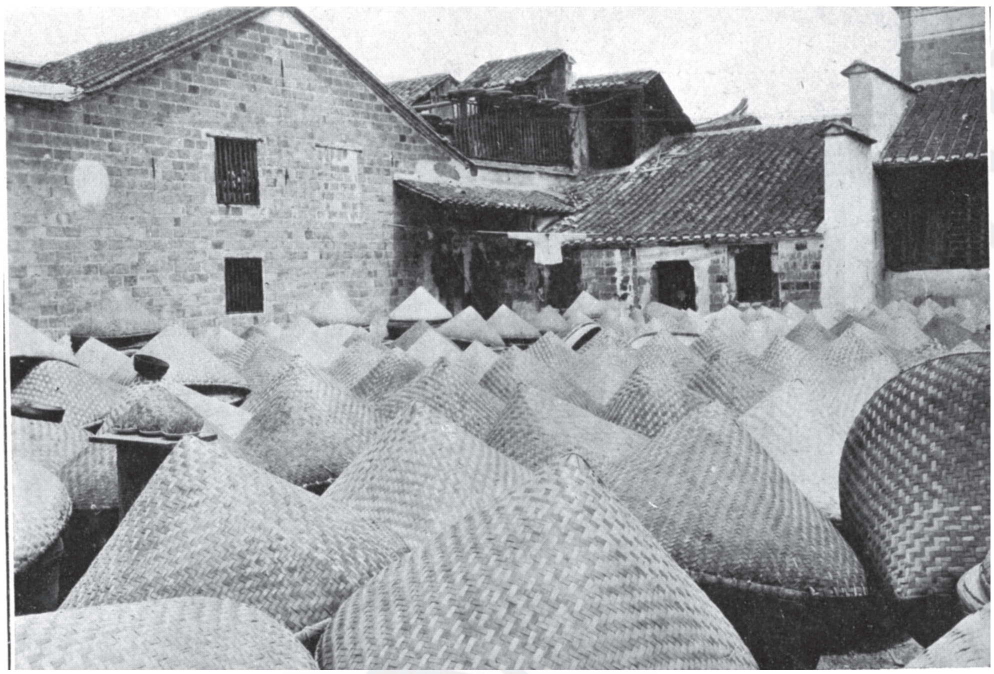
"Many schools of cookery and domestic science throughout the country have conducted experiments rather successfully, utilizing the dried beans in the manner of the navy bean. As a result, the dried beans can now be purchased in the markets in nearly all of the large cities. The variety and palatability of the forms in which the bean can be served make it a very desirable article of food, and it may be expected to grow in favor as it becomes better known (p. 107)."

"Dried beans:... During the season of 1916 about 100,000 bushels of American-grown soy beans were packed as baked beans by several canning companies in the Central and Eastern States." Properly roasted, the dried beans "make a good coffee substitute. Those fond of cereal beverages pronounce it equal to many of the preparations on the market. In China, the beans are soaked in water and roasted, the product being eaten after the manner of roasted peanuts. This method of preparing the beans is improved by soaking the beans for about twelve hours in a 10 per cent salt solution, boiling slowly for about 30 minutes, and then roasting to a light-brown color. The yellow-seeded and green-seeded varieties are preferable, as they make a product of better appearance.

"Green beans: When soy beans are three-fourths or more grown, the seed makes a most palatable and nutritious green vegetable. As such it may be used much as is the green pea or the Lima bean. The pods are somewhat tough and not desirable to eat. The green beans are rather difficult to shell, but after cooking in the pods for about five minutes, they shell out very easily."

"Soy-bean milk:" If dried soy beans are soaked, crushed, and boiled "a milky emulsion is obtained which is very similar in appearance and properties to cow's milk. This liquid, separated out by means of a very fine sieve or through a cloth filter, is the soy-bean or 'vegetable' milk used so extensively in China." "Soy-bean milk has a rather strong characteristic taste and odor which may be masked by the addition of a small quantity of coumarin or vanillin. This 'vegetable milk' can be used in numerous preparations, such as breads and cakes, in creaming vegetables, in milk chocolate, and in custards. If allowed to remain in a warm place the milk becomes sour, like animal milk, and in that form may be employed just like sour milk or buttermilk...

"After separating the milk from the solid material, the residue [okara] is still very rich in nutritive substances. It can be dried and used for cattle feed or possibly made into a meal



or flour for human consumption."

"Soy-bean cheese: "The addition of magnesium or calcium salts (about a 1 per cent solution) to soy-bean milk when hot precipitates some of the proteid substances, forming a grayish white curd which settles out, leaving a yellowish watery liquid. This curd, after being drained and pressed, represents the tofu, or bean curd, which is so extensively eaten and forms the basis of numerous fermented, smoked, and dried cheeses in China and Japan (Plates III and IV). Tofu is made fresh daily and is a staple article of diet of oriental peoples. In many cities of the United States having a large Asiatic population, fresh bean curd generally may be found in the Chinese markets. Although the fresh curd, or tofu, is tasteless, it is a highly nutritious food and no doubt could be elaborated by the American housewife into a variety of palatable dishes.

"Soy sauce: Soy or shoyu sauce is a dark brown liquid prepared from a mixture of cooked and ground soy beans, roasted and pulverized wheat (barley is sometimes used), salt and water. This mass is inoculated with a culture known as rice ferment (*Aspergillus oryzae*) and left in casks to ferment from six months to a year and sometimes longer (Plate V)... This product may well serve as the basis of sauces of the Worcestershire type... The manufacture of soy sauce is conducted on a large scale in China and Japan, and to some extent in India. The yearly production of Japan is said to amount to nearly 2,000,000 barrels. The brewing of this sauce has also become a well established industry in Hawaii. Although there are no factories in the United States, considerable quantities of the sauce are imported annually, and it can be obtained at Chinese stores in most of our cities."

"Soy-Bean sprouts: Several species of beans are sprouted and used as a green vegetable by the Chinese (Plate VI). Soy beans are used to a very considerable extent for this purpose, as these sprouts are larger and firmer than those of most other legumes. 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."

Note 1. This is the earliest English-language document seen (Jan. 2013) that uses the term "sprouted soy beans" (or "sprouted soy bean") to refer to soy sprouts.

A table (p. 111) shows the "Quantity and value of soy beans, soy-bean cake, and soy-bean oil imported into the United States, 1910-1917, inclusive.

Photos on unnumbered pages show: (1) A typical soy bean plant. (2) A field of the Biloxi soy bean grown at Biloxi, Mississippi. (3) Pods and seeds of 7 common varieties of soy beans.

(4) "Large blocks of freshly made bean curd, 'tofu' [on a round wooden table], ready to be cut up into squares and sold to the housewife."*

(5) "Large bamboo tray of various kinds of soy-bean cheese of the drier type" [pressed tofu sheets].*

(6) "A dark room of even temperature where wooden trays, full of bean curd [tofu] are piled. This is another method of preparing soy-bean cheese" [fermented tofu].* "

(7) "Large earthen jars full of squares of bean curd, which are covered with spiced brine and soy sauce. After several months' curing a bean cheese [fermented tofu] is

formed, which can be kept for many years."*

(8) A "courtyard full of covered pots of fermented soy beans and brine from which soy sauce is made."*

(9) The basket on the left contains "sprouted soy beans, which are sold and used as a green vegetable" [in China]* * = Photographed by Frank N. Meyer, Agricultural Explorer, USDA.

Note 2. This is the earliest published document seen (Jan. 2001) that contains photos of soyfoods by Frank. N. Meyer. Most of the photos appear to have been taken in China.

Note 3. This is the earliest document seen (Jan. 2013) in which William Morse describes "soy-bean sprouts" or "soy-bean cheese" (tofu).

Note 4. This is the earliest English-language document seen (Oct. 2011) that uses the term "soy-bean cheese" to refer to fermented tofu.

Note 5. This is the earliest English-language document seen (May 2005) that uses the term "masked" (or any other form of that verb) in connection with the undesirable taste or odor of soyfoods (soy-bean milk) or soy beans.

Note 6. This is the earliest document seen (June 2013) that gives statistics for the amount of whole soybeans used as food in the United States, or that gives a figure (about 100,000 bushels) for the amount of soybeans canned in the USA in 1916–the first time they are known to have been canned. Address: Scientific Asst. in Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

315. Morse, W.J. 1919. Re: Department Bulletin 439, "The Soy Bean..." Letter to Prof. S.M. Tracy, Agronomist, Bureau of Plant Industry, USDA, Biloxi, Mississippi, Jan. 2. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Tracy: Replying to your letter of December 27, requesting copy of Department Bulletin 439, 'The Soy Bean, with Special Reference to its Utilization for Oil, Cake and Other Purposes,' I am taking pleasure in sending you six copies. I am very glad indeed to hear that the Biloxi is finding so much favor throughout the South.

"Very truly yours,..."

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 Special Agent at Biloxi, Mississippi, 1907-20. S.M. Tracy, 16-23. Box 5.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., June 2012. Address: Ass't. Agrostologist, Seed and Plant Introduction and Distribution, Bureau of Plant Industry, USDA, Washington, DC.

316. Eddington, Jane. 1919. The Tribune Cook Book: Soy beans as human food. *Chicago Daily Tribune.* Jan. 12. p. B4.

• ***Summary:*** Miss Eddington first got interested in the use of "soy bean flour" in the human diet about 5 years ago when she "first received samples of this flour for a medical manufactory." During these five years "soy bean flour has come into wide use in hospitals and homes. From being used in the United states to renew worn out soil and then for hog feed, the soy bean has come to be used largely as a food for those who have worn out kidneys, the diabetics."

"Soy bean cookery, especially the whole bean cookery, must be good, or the variety [of] vegetable meat contained in it is ruined, becoming as indigestible as white of egg cooked to a crisp." The key is to cook the whole bean at a low temperature for a long time. "Baked soy beans must be

cooked at least eight hours."

"In Washington [DC], the government experts used 30 per cent soy bean flour with 70 per cent of wheat flour and called their product 'a high powered bread.'" She then gives four wartime recipes for "Soy bean muffins." Some call for "soy bean meal." Note: This "meal" is probably soy bean flour.

"Used as a meat substitute:... The tofu, a sort of cheese which is fried in deep fat and used as a meat substitute, was exploited by the United States department of agriculture last year, along with other of the soy bean products..." She then cites (incorrectly): Morse, W.J. 1918. "The soy-bean industry in the United States." *Yearbook of the U.S. Department of Agriculture* p. 101-11. For the year 1917. Then, from the section titled "Soy beans for human food," she includes the recipes for "Soy-bean milk" and "Soy-bean cheese," and the description of soy sauce. "Soy or shoyu sauce is a dark brown liquid prepared from a mixture of cooked and ground soy beans, roasted and pulverized wheat or barley, salt, and water..."

317. Piper, C.V. 1919. Re: Request for help in publishing book on The Soy Bean. Letter Mr. Hudson Maxim, 698 St. Marks Ave., Brooklyn, New York, Jan. 16. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Maxim: You may recall that on the occasion of your visit here I spoke to you concerning a book on 'The Soy Bean,' in preparation by Mr. Morse and myself, and which we have now completed. The manuscript will make a book of about 80,000 words with 50 to 60 illustrations. On discussing the book with my publishers, they fear, as I had anticipated, that the probable sales make it a somewhat dubious venture under present conditions.

"You may recall that you expressed a desire to assist us, if necessary, in securing the publication of the book. I believe the publishers would go ahead with it on the same plan Macmillans required when they published my 'Turf for Golf Courses,' namely, an order to take 500 copies at cost, which in this case was done by the United States Golf Association, and the books were distributed to their members. If you are willing to perform a similar function in the case of 'The Soy Bean,' I am sure it will effect the prompt publication of the book; otherwise I anticipate delay until publishing is cheaper. I fear that I am asking a great deal of you, but trust that your broad interest in what is destined to become one of our major crops will induce you to further its progress."

Note 1. On Jan. 18 Mr. Maxim wrote Piper saying that, while he appreciated the importance and value to the public of Professor Piper's work on the soya bean, he would not be able to help at this time.

Note 2. This classic book had to wait four years; it was not published until Feb. 1923 by McGraw-Hill.

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–Office file of C.V. Piper, 1903-24. Box 1–Folder–Miscellaneous correspondents–Not botanical.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist in Charge, Bureau of Plant Industry, USDA, Washington, DC.

318. Morse, W.J.; Hendrick, H.B. 1919. Illustrated lecture on soy beans. *USDA Syllabus* No. 35. 16 p. Jan. 23. Accompanied by 50 lantern slides. [16 ref]

• ***Summary:*** Discusses the increasing importance of soy beans in the United States. Contents: Introduction. Feeding value of soy beans: For sheep, for hogs, its use as pasture, silage, and hay. Value of soy beans other than for stock feed: Value of planting the beans for seed and for oil, use of soy-bean meal as a fertilizer, soy beans and soy-bean meal as human food. Requirements for successful production: Soil and climate, soil preparation, fertilizers, inoculation, seeding and cultivation. Varieties: Mammoth, Guelph, Haberlandt, Tokio, Ito San, Medium Yellow, Manchu, Wilson, Peking, Black Eyebrow, Biloxi, and Barchet. Place in the cropping system: Mixtures, special rotation. Harvesting and storing: Cutting soy beans for seed, storing. Soy beans and cowpeas compared. The talk is accompanied by 50 lantern slides; a description of each is given in the Appendix.

"Extensive tests are being conducted by the United States Department of Agriculture with soy-bean flour in the making of bread. The flour or meal can be successfully used as constituent for muffins, bread, and biscuits in much the same way as corn meal. In these various food products about one fourth soy-bean flour and three-fourths wheat flour have been found to be the proper proportions. When a special food of low starch content is desired, as for diabetic persons, a larger proportion of soy flour is used and some form of gluten is substituted for the wheat flour...

"The green bean when from three-fourths to full grown can be prepared like green peas, or green Lima beans and compares favorably with these in palatability... Soy beans are now being sold on the market in the form of baked pork and beans. Several large canners are now putting up this product and the industry seems to be established on a permanent basis. In addition to other uses given, the soy bean has been utilized not only in the United States but in European countries as a substitute for the coffee bean. When roasted and prepared it makes an excellent substitute for coffee. In Asia the dried beans, especially the green-seeded varieties, are soaked in salt water and then roasted. This product is eaten after the manner of roasted peanuts" (p. 6-7).

"Mixtures: Soy beans can be grown satisfactorily in combination with other crops, thus affording a greater variety and a larger yield of forage. A mixture of soy beans and cowpeas makes a very satisfactory hay. Soy beans may also be grown either for hay or ensilage in a mixture with sorghum. Sudan grass is also excellent for growing with

soy beans, both the yield and the quality of the forage being improved by the mixture. Soy beans are more generally grown with corn, however, than with any other crop. This mixture is planted in different sections in various ways; namely, in alternate hills with the corn in the same row, in alternate rows of each, in alternate series of two rows of each, or broadcast in mixture... Mixed fields may also be profitably utilized by pasturing to hogs. Early and medium varieties of soy beans are sometimes planted in between the corn rows at the time of the last cultivation. Silage made from a crop of corn and soy beans in combination is an excellent succulent feed. The larger late-growing varieties are most desirable for this purpose" (p. 11). Address: 1. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry; 2. Specialist in Agricultural Education, States Relation Service, USDA, Washington, DC.

319. Morse, W.J. 1919. Re: Naming a soy bean variety grown by Mr. Fred Scholl of Memphis, Indiana. Letter to Prof. C.O. Cromer, Associate in Crops, Purdue University, Lafayette, Indiana, Jan. 23. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "I have your letter of January 18 advising of the success of the soy bean variety No. 30746 with Mr. Fred Scholl, Memphis, Indiana. I note that he desires to have this variety named, and I agree with you that the name 'Clark County Favorite' is entirely too long for general use. In naming varieties during the last few years, we have tried avoiding giving rival names after the grower. We thought it would be much more desirable to give a name suggesting the origin of the bean, such as the 'Manchu' which originated in Manchuria, or to give it a name of a state or locality where it has been found best adapted. I am wondering if the name 'Hoosier' would not be suitable to both you and Mr. Scholl, in as much as this variety has been found so suitable to Indiana conditions.

"This is merely a suggestion and whatever name you decide upon I will be very glad to have you advise me so that we may add it to our files."

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–#7.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Scientific Asst., Bureau of Plant Industry, Washington, DC.

320. Morse, W.J. 1919. Re: Assignment of land at the Arlington Farm. Letter to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Jan. 23. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: With reference to the attached memorandum dated January 15, by Mr. E.C. Butterfield concerning the assignment of land at the Arlington Farm...

"Mr. [P.L.] Ricker will retain the two sections he has at the present time...

"Mr. Oakley will retain the alfalfa garden as it is at present...

"Mr. McKee states that he will probably desire this August, about one acre of land for plots of vetch."

"... Dr. Peters [probably A.J. Pieters] will require the same land as he has now in use." The land used by Mr. Coe for sweet clover and lespedeza can be given up. "As I recall, Mr. Coe had an entire section at the Southern end of the farm and a small piece of land in the North end of the farm. As we intend to increase the seed supply of some of our best varieties of cowpeas and soy beans, perhaps it would be desirable to keep this land for at least this season. Moreover, it is likely that other men will desire land this coming season, and I am afraid that there will be such a call for land by other offices that it will be hard to obtain anything suitable.

"As to the land we have been using for soy beans, cowpeas, and miscellaneous legumes, will say that I desire to have the same land as last season for this experimental work. In addition to growing seeds of the Hahto, Easy Cook and a very early strain of which we desire to obtain as large a supply of seed as possible for distribution, we will need other land. I have talked to Mr. Butterfield asking him about orchard land and he advised me that we could obtain all the orchard land that we probably would want for increasing our supplies of seed of new varieties. In going over the matter rather hurriedly, I think that we will desire at least twenty acres of the orchard land for the varieties mentioned above."

Note 1. This is the earliest document seen (July 2013) that mentions the soybean variety Easy Cook. It soon came to be considered to be one of the quickest cooking and best-tasting soybean varieties in America until the mid-1930s. The variety had large seeds.

"Mr. Kephart states that Weed Investigations will use the same land as they had last year..."

"Mr. Vinall will have some sorghum and millet work, but I can take care of all such work in the sections that are being retained for soy beans, cowpeas, and miscellaneous crops. Very truly yours,..."

Note 2. W.J. Morse has been promoted to Assistant Agrostologist, meaning assistant to the new Acting Agrostologist in Charge. What has happened to Dr. C.V. Piper?

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: Ass't. Agrostologist, Forage-

Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

321. Cromer, C.O. 1919. Re: New soybean varieties named Hoosier and Mandarin. Letter to W.J. Morse, Scientific Assistant, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, Jan. 27. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "The bean No. 30746 I have named the Hoosier, acting upon your suggestion and have written Mr. Fred Scholl of Memphis, Indiana, to the effect that from this time on he is authorized to speak of this variety as the Hoosier in buying or selling the same. I thank you for the suggestion."

"P.S.–I have just received your letter suggesting that soybean No. 36653 be given the name of Mandarin. I have already made the change and thank you kindly for the information."

Note 1. In June 1919 Prof. A.T. Wiancko was still at the Indiana Agric. Exp. Station, doing research on clover.

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–#7.

Note 2. This is the earliest document seen (Aug. 2013) that mentions the soybean varieties Hoosier or Mandarin.

Note 3. W.J. Morse of the USDA suggested the name "Hoosier" in a letter to Cromer dated 23 Jan. 1919.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Associate in Crops, Purdue Univ., Lafayette, Indiana.

322. Palen, L.S. 1919. The romance of the soya bean. *Asia: The American Magazine on the Orient* (*Asia and the Americas*) 19(1):68-74. Jan. Illust.
• ***Summary:*** The author, who begins by acknowledging his indebtedness to Dr. Yamei Kin, Dr. John Harvey Kellogg, and Mr. W.J. Morse for much of the material in this article, gives an overview of the soya bean worldwide. The article contains excellent photos (many by Adachi): (1) Stacks of soya bean cake in open storage on Dairen wharves, South Manchuria. (2) Horses plowing soybean fields in North Manchuria. (3) Modern machinery [a huge steam-powered tractor] used in bean cultivation in remote parts of Manchuria where foreign interests are involved. A Western man and woman ride horses nearby. Caption: "To the Manchurian farmer, with his laborious methods of hand cutting and hand winnowing, the introduction of modern Western farming methods would spell many-fold prosperity."

Note: This is the 2nd earliest document seen (Dec. 2014) that shows a photo of a tractor in connection with soybeans. (4) Stacks of soybeans piled high in sacks in Manchuria as far as the eye can see. (5) Soybeans stored in huge cylindrical, 20-foot-high osier bins, each covered with a conical top.

Soy oil is purified and flavored with an admixture of olive oil for use as a salad oil. It also forms the basis of some of our butter and lard substitutes. "What Mr. Li Yu-ying accomplished in Paris in the establishment of a Laboratory of Research and of a factory for the production of all the products derived from the soya has been the forerunner of activity on the part of certain independent Chinese companies in America and of government and private investigations."

"In general the use of whole soya beans has not been

attended with much success because of the ever present flavor of the oil content and because, with the ordinary method of cooking, they remain hard and unpalatable; but it has been found that cooking at a temperature somewhat above the boiling point, say from 220 to 230 degrees, breaks up the cellulose structure and develops a richness of flavor that is not obtainable with the lower temperature."

"By far the most extensive use of the soya is in the products manufactured from it. And it is here that Dr. Yamei Kin, the talented Chinese physician, is making her chief studies under the direction of the Pure Foods Division of the Department of Agriculture, with the purpose of spreading a knowledge of the soya among Americans. For convenience of consideration the products studied may be divided into sauces, curds, cheeses and milk.

"Of the sauces the liquid form is already familiar, although unrecognized, perhaps, by a large percentage of Occidentals through the work of early English traders in bringing back the base of the now famous Lea and Perrins Worcestershire Sauce. This original Chinese *shi-yu* was highly spiced and became a well recognized adjunct to many an English meal. Following the example of Lea and Perrins, others have put out sauces with the same base without, however, attaining the same success, because the makers did not understand that there are many kinds of soya sauce. While they are all made by the same ferments and in the same general way, they differ very greatly in quality according to the locality and to the manufacturer, just as wine, though made from the identical kind of grape and by the same process of fermentation, may be a very different article from different hands. It takes several months to make this liquid form of sauce, while the best kind requires a year or more to attain the finest flavor and mellowness. The hot condiment added by Lea and Perrins is not favored by the Chinese, since according to their taste it detracts from a wide use of the soya sauce."

To-fu (tofu) is discussed in detail. "There are records to show that it has been used since at least nine hundred years B.C. *To-fu* making is a staple industry in every little community. Usually it is done at night so that the fresh curd will be ready for the morning demand in the market, or for peddling around the streets. It provides, for the fraction of a cent, the indispensable equivalent of meat and affords very often the explanation of how the Chinese laborer does so much work on what is purely vegetable diet, popularly supposed not to contain much protein. *To-fu* is made in many different forms and the bean stalls occupy quite as large and prominent places in the city market as the fish and meat stalls...

"Cheeses are also made from the growth of cheese-making moulds on *tofu.* The Chinese resident in America regularly import a certain highly flavored red bean cheese for their own use...

"Perhaps the greatest contribution of the soya to the life of the Occident will be in its form of milk. Back in the golden era of peace there had been established in London a soya bean milk factory which was prepared to place its product regularly on the market, and there were said to be plans consummated for the erection of two others at Manchester and Liverpool; but of what the development has been we have no definite information. In Shanghai, Peking and Dalny Chinese companies are supplying hospitals and individuals with an 8 or 10 ounce bottle of concentrated milk per day at a cost of $1.00 Mex per month.

"In its competition with the cow the legume has in its favor the following facts: Soya milk can be produced with less contamination; it is tuberculosis-free; its caseins break down much more readily than the caseins of cows' milk and do not form curds in the stomach in the same degree...

"By those who advocate and urge a vegetarian diet, a very strong bill can be drawn in favor of this oriental substitute. In these days when war has thrown new light on many of our life problems, it will be easier to secure acceptance for their contention that the world must for both economic and physiological reasons adopt the biological diet. It has been calculated that, roughly speaking, it takes 100 pounds of foodstuffs to produce 3 pounds of beef and that a given acreage of land can support five times the population if the necessary protein can be derived directly from vegetable sources rather than going through the roundabout way of an animal form, imposing upon the body the burdens incident to taking in the toxines [toxins] resultant from the catabolism of the cells of the animal, and from possible putrefaction. In China the Buddhist priests and people who enter the various temperance societies all depend on varieties of *to-fu."*

323. Morse, W.J. 1919. Re: Mr. J.W. Nicholson and demonstration work with soy beans. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Feb. 15. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: Relative to the attached letter from Mr. J.W. Nicholson concerning demonstration work with soy beans, I will say that I am of the opinion variety tests will be the most important. It might be well to arrange with some of the County Agents to carry on a test consisting of four of our best Northern varieties. One of these tests, consisting of tenth acre plots of each variety, can be put in counties representing different soil conditions. Of course, other work such as time of planting could be arranged, but I think the most important thing at the present time is the finding of suitable varieties for different conditions and for different purposes in that State.

"Very truly yours, Ass't. 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

324. Morse, W.J. 1919. Re: Soy bean seed for Miss H.A. Stockwell. Letter (memorandum) to Mr. R.A. Oakley [USDA], March 1. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Oakley: Referring to the request of Miss H.A. Stockwell for soy bean seed according to the attached letter, will say that undoubtedly she is contemplating growing it as a garden crop. I would advise that she be sent one or two packets of Hahto seed, of which we have a large number of packets in the warehouse. Very truly yours,..."

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: Ass't. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

325. *Madison Survey* (*Madison, Tennessee*). 1919. Beans. 1(2):5. March 5.
• ***Summary:*** "During the past two years the school [Nashville Agricultural Normal Institute, renamed Madison College in 1937] has tested many varieties of soy bean, arriving at the following conclusions: *Ito San* and *Manchu* are perhaps the earliest edible seeded varieties, but the plants are too small to be profitable for a general hay crop.

"*Haberlandt* is a heavy yielder of the edible seeded varieties.

"*Mammoth Yellow* proves the best general bean for this locality.

"*Peking,* the black seeded variety, produces the most good hay.

"*Virginia* grows full six feet tall, is a semi-climber, and so goes well with ensilage corn. It is a very heavy seeder, but by most people is considered too strong in flavor for human food.

"The soy bean lima, or *Hito* [sic, probably *Hahto,* see Pelton 1920], is an exceptionally good garden vegetable, making a very heavy yield of seed. The green beans are as large as a small lima, and many people think they have a better flavor."

Note 1. The school got these soybean varieties from W.J. Morse of the USDA. (See *Madison Survey,* 14 May 1919, p. 4, and 22 Oct. 1919, p. 4).

Note 2. This is the earliest issue of the *Madison Survey* and the earliest document (Aug. 2011) seen that mentions the "soy bean lima" (see also 14 May 1919 issue).

326. Acting in Charge. 1919. Re: The Biloxi soybean. Letter (memorandum) to Prof. C.V. Piper, Biloxi, Mississippi, March 13. 2 p. (including enclosure). Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Piper: I am enclosing 'copy' on the Biloxi soybean, prepared by Mr. Morse for inserting in the soybean circular for enclosure in the package of Biloxi soybeans to be distributed, which kindly review if necessary and return to me for mimeographing. The 69 [?] bushels of Biloxi soybeans are now in the warehouse available for distribution. Please advise as [?] what quantity Professor Tracy wants sent to Biloxi.

"Yours very truly, Acting in Charge. Encls. [Enclosures]."

The one-page typewritten enclosure states: "Biloxi Soy Bean."

"The Biloxi variety is characterized by its dense bushiness, leafiness, and coarse, erect stems, growing from 4 to 6 feet high. It requires a very long season in which to make its full development and is therefore adapted only to the southern part of the cotton belt for seed production. The variety is especially suited to the rice lands as a green manure and is also available for forage and ensilage. For forage purposes the Biloxi can be grown much further north than as a seed crop. From the standpoint of seed production this variety is a most valuable sort on account of its non-shattering character. The varietal characteristics of the Biloxi are: tawny pubescence, purple flowers; deep brown seeds, much flattened, medium large, 111,000 to the bushel. Analysis of the seed of this variety grown at Biloxi, Miss., shows it to contain 17.6 per cent oil and 44.9 per cent protein.

Note: Prof. Piper is apparently traveling in Biloxi, Mississippi. This letter is quite difficult to read. We do not know who wrote the letter. At the top of the letter is unclear handwriting which appears to read: "Copy also sent to White House, Gainesville, Fla." [Florida]

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Acting in Charge [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

327. Oakley, R.A. 1919. Re: Dr. Hugh Smith, Chief of the Bureau of Fisheries. Letter (memorandum) to W.J. Morse, [USDA], March 25. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Will you please arrange to send to Dr. Hugh Smith, Chief of the Bureau of Fisheries, a few lots of soybeans suitable for testing on his farm in Virginia, in the upper Piedmont.

"As you will recall, we sent Dr. Smith some soybeans last year and he obtained some very satisfactory results with them but was unable to save any seed. I would like to have him try out some lots this year; also some cowpeas, especially the white seeded variety of Olivers [Oliver's White] and Black Eye, if you have seed of these. Very truly yours,..."

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: Acting Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

328. Morse, W.J. 1919. Re: Improved soy bean seed from Dr. W.A. Taylor. Letter (memorandum) to R.A. Oakley, [USDA], March 29. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Oakley: With reference to the improved seed beans referred to in the attached memorandum from Dr. W.A. Taylor, will say that the beans are soy beans.

"My attention has been called a number of times to the breeding work being conducted by this Agricultural Experiment Station at Szupingki [Ssupingkai / Siping {pinyin}, in the west of Jilin province, 100 miles north of Mukden, Manchuria]. In so far as I am able to learn, this Station is conducting breeding work with the varieties of soy beans grown in Manchuria. The new variety mentioned is quite likely one of the selections from the numerous sorts now grown. In all of the introductions we have received from Manchurian, China, each generally consists of a number of different sorts.

"At Arlington Farm [in Virginia] we have done considerable breeding work with these beans and ofttimes in one sample would obtain five or six and sometimes even more strains. It might be well to take this matter up with Dr. Fairchild's Office and obtain some seed of this new variety that we might compare it with the many introductions we have received from Manchuria.

"Very truly yours,..."

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: Ass't. Acting Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

329. Oakley, R.A. 1919. Re: Consular Report regarding improved soybeans. Letter (memorandum) to W.J. Morse, [USDA], March 31. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Referring to your memorandum of March 29, relative to the Consular Report regarding improved soybeans, I would suggest that you write a letter for my signature to Mr. [David] Fairchild, asking that he obtain some seed for us if possible. Very truly yours,..."

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: Acting Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

330. Morse, W.J. 1919. Re: Soy beans and cowpeas for Dr. Hugh Smith. Letter (memorandum) to R.A. Oakley, [USDA], April 2. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Oakley: Replying to your memorandum of March 25 requesting a few lots of soy beans and cowpeas to be sent to Dr. Hugh Smith for testing on his farm in Virginia, will say that the following varieties have been sent to him:

"4 lbs. Virginia.

"4 lbs. Wilson-Five.

"4 lbs. Haberlandt.

"4 lbs. Tokyo."

"...[Cowpeas]...

"4 lbs. Oliver's White.

"4 lbs. California Blackeye.

"4 lbs. Groit.

"4 lbs. Early Buff.

"Very truly yours,..."

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: Ass't. Acting Agrostologist [Bureau of Plant Industry, USDA, Washington, DC].

331. Morse, W.J. 1919. Re: Sending seed of Hahto soy bean variety. Letter to Prof. E.F. Cauthen, Experiment Station of Alabama Polytechnic Institute, Auburn, Alabama, April 7. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: In reply to your letter of April 3 stating that you will be very glad to try a sample of the Hahto variety of soy beans, I am taking pleasure in sending you today three pounds of seed of this variety.

"Very truly yours, Ass't. Agrostologist."

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: Assistant Agrostologist [USDA].

332. Gilmore, John W. 1919. Re: Please send three pound sample of Hahto Soy Bean seed. Letter to Mr. W.J. Morse, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, April 8. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "My dear Mr. Morse: I have your kind letter of recent date regarding the Hahto Soy Bean.

"We shall be pleased if you will send us a three pound sample of this bean and we will plant it at the Kearney Station and if possible small amounts at Davis and Imperial Valley.

"There is a growing interest in Soy beans in this State and I think some of the varieties that we are already growing at Kearney will prove of considerable use to us.

"Very truly yours, John W. Gilmore (JWG:AD)"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agronomy, Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

333. Morse, W.J. 1919. Re: Enclosed variety of soy beans. Letter to Prof. George W. Hendry, University Farm, Univ. of California Experiment Station, Davis, CA, April 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of April 4 enclosing a variety of soy beans which you obtained from the Germain Seed & Plant Co. of Los Angeles. It is quite evident from glancing at the seed that the beans were imported from the Orient. I regret to say that I cannot give you the varietal name, in fact, I will have to give you several varietal names if such is possible, as I can pick out at least one dozen varieties of the little sample you sent.

"The Department [USDA] last season strongly urged against the selling of imported seed in this country for planting purposes. We thought it would do more harm to the future of the soy bean than anything else. As you may know, the merchants who buy the seed from the Chinese or Manchurian farmers, mix all of the yellow varieties together; in fact, they simply go by color of seed. The same is the case with the big importers at the ports who simply separate the seed from all sources according to color. It may happen that in a very small sample you will obtain two seeds identical to each other, but they may represent two widely different varieties, that is, one may mature in about 100 days, while the other will mature in about 130 to 135 days.

"You can clearly see what an effect this would have on the farmers in this country who would plant seed of this sort. It might happen that if he was saving the field for seed, that one portion would be shattering its seed, another portion with seed about half mature and another portion still less so.

"With regard to the price of $8.00 per hundred weight, f.o.b. Los Angeles, I think it is rather high. Our North Carolina growers at the present time are offering seed anywhere from $2.25 to $2.50 per bushel of 60 pounds. The variety grown by these growers is the Mammoth Yellow and seed of this variety is of much higher quality than that of any imported seed I have ever seen. I think it would be best to discourage the firms in your State from selling imported seed for planting purposes in this country.

"Very truly yours, Ass't Agrostologist (WJM/ML)."

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Agrostologist, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

334. Morse, W.J. 1919. Re: Sending three-pound sample of Hahto variety of soy beans. Letter to Prof. John W. Gilmore, Univ. of California Experiment Station, Berkeley, CA, April 15. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Gilmore: In reply to your letter of April 8 advising that you will be glad to receive a three-pound sample of the Hahto variety of soy beans, will say that I am taking pleasure in complying with your request. I am very glad to know that you will try this variety at some of your stations in California.

I might say that two years ago we had a small row of it at the Normal Station at San Louis Obispo [sic, San Luis Obispo, located on the coast midway between San Francisco and Los Angeles]. With no irrigation whatever the plants made a very good growth and seeded very well, considering the adverse conditions under which they were grown. We will be glad to receive a report from you at the close of the season concerning your success with this variety.

"Very truly yours, Ass't Agrostologist (WJM/ML)."

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Agrostologist, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

335. Hendry, George W. 1919. Re: Sample of imported of Soy bean seed. Letter to Mr. W.J. Morse, Bureau of Plant Industry, U.S.D.A., Washington, DC, April 28. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Accept my thanks for your favor of April 10, containing information relative to the sample of beans which I sent you some time back.

"I have just received a shipment of Soy beans from the C.C. Morse Company of San Francisco, under the name Ito San, and am sending you a sample of these beans, herewith, in order to obtain your identification.

"Thanking you in advance for this courtesy, and assuring you of our willingness to carry out the suggestions contained in your letter, I am

"Very truly yours, G.W. Hendry (GWH:MK) Inc.–1"

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Prof. of Agronomy, Univ. of California, College of Agriculture, Agric. Exp. Station, Berkeley, California.

336. Morse, W.J. 1919. Re: Letter from Mr. Evans concerning fertilizer experiment. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], April 29. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: With regard to the attached letter from Mr. Evans [probably E.E. Evans, West Branch, Michigan] relative to the soy bean fertilizer experiment to be conducted in cooperation with the Bureau of Chemistry at three different stations, will say that the place Mr. Evans prefers to have the experiment located is entirely suitable for the purpose for which the crop is to be grown. The matter of location of the experiment is of but little importance so long as a small amount of seed of each of the various plots is obtained.

"The variety to be planted, however, is the Mandarin of which we are endeavoring to increase the supply of seed this season and upon which I desire to obtain a little information as to yield in northern Ohio. The entire amount of work connected with each of the fertilizer experiments will not amount to so very much and I feel rather that we are indebted to Dr. [J.A.] LeClerc to some extent for the very large amount of work he has done for us in analyzing all of our varieties of soy beans. In our cooperative work throughout the southern States two years ago he analyzed seed of nearly a thousand samples for us in our oil and protein work with different varieties.

"Very truly yours,..."

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: Ass't. Agrostologist, Bureau of Plant Industry, USDA, Washington, DC.

337. Morse, W.J. 1919. Re: Letter from Mr. Evans. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, April 29. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: With regard to the attached letter from Mr. Evans relative to the soy bean fertilizer experiment to be conducted in cooperation with the Bureau of Chemistry at three different stations, will say that the place Mr. Evans prefers to have the experiment located in entirely suitable for the purpose of the crop to be grown, The matter of location of the experiment is of but little importance so long as a small amount of seed of each of the various plots is obtained.

"The variety to be planted, however, is the Mandarin of which we are endeavoring to increase the supply of seed this season and upon which I desire to obtain a little information as to yield in northern Ohio. The entire amount of work connected with each of the fertilizer experiments will not amount to so very much and I feel rather that we are indebted to Dr. LeClerc [head, USDA Bureau of Chemistry] to some extent for the very large amount of work he has done for us in analyzing all of our varieties of soy beans. In our cooperative work throughout the southern States two years ago he analyzed seed of nearly a thousand samples for use in our oil and protein work with different varieties.

"Very truly yours, Ass't. 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

338. Smith, J.W.R. 1919. The Virginia no. 32906 soy-bean. *Bean-Bag* (*The*) (*St. Louis, Missouri*) 1(11):15. April.

• ***Summary:*** "Having grown this great legume for several years, testing by plot and field culture over twenty five of the

better varieties, I have selected 'The Virginia' as the best sort to grow to produce the largest yield of hay, grain and straw of the highest quality for feeding all kinds of live-stock–sheep, horses, cattle and swine–as well as having frost and drought resisting qualities. Its seed commands almost double the price per bushel of most varieties where it is known for its merits, while it is easily cured for hay or grain as compared with bush varieties and unequaled in germinating qualities.

"In 1912 I received a two pound package from Prof. Morse, of the Bureau of Plant Industry [USDA], for testing, along with a number of other varieties. I planted on June 24 and harvested during the first week of October. It yielded double the amount of forage and excelled all the others is grain production.

"Mr. C.W. Deselms tested it along with the following varieties, planting a pint of seed in hills one foot apart, in rows three feet apart, producing as follows: Mongul, 52 lbs.; Virginia, 45 lbs.; Ohio 9035, 42 lbs.; Austin, 35 lbs.; Chestnut, 27 lbs.; Medium Green or Guelph, 25 lbs.; Haberlandt, 25 lbs., and Ebony, 25 lbs. The yield of hay or foliage was a third more than any of the others, and four times more than Ebony and Chestnut.

"The unexcelled quality of hay or straw is produced because it has fine stems, grows erect until it is about 40 inches tall, then it often reclines and twines and grows on and over when on rich soil, until it reaches a growth of 50 inches or more. Many varieties growing on rich soil settle down, near the base of the plant, on the ground, injuring the pods and quality of foliage, while the Virginia has a tapering center stem that supports all the useful parts of the plant well up from the ground, while the developing ends grow on and twine on until their season closes. This is a most unique quality. Another is the wavy, twining, wavy stems and fine leaves. These stems make open swaths, windrows and bunches, through which the air and sunlight pass freely, while curing.

"It is preeminently the variety for the farmer who has rich soil and grows large crop yields; while on sterile soil it does not demonstrate its high-yielding qualities in such great degree.

"The early September frosts of 1917 and 1918 cut short the development of the grain in the pods near the tips of the stems, thus reducing the yield of grain; yet the pods underneath developed good grain. While the frost injured corn near by, the Virginia's foliage was not damaged.

"When planted with corn it twines up on the stalks, with but little loss in harvesting, for ensilage or otherwise. Seed more than a year old is much more likely to germinate than 'Medium Green' or other large round beans. Such varieties as the Mongul, Hollybrook, Ohio 9035, Austin or Haberlandt in some cases produce more grain per acre. Mr. E.R. Cole, of Jefferson County, Ohio, grew 30 bushels of Hollybrook per acre on rich, moist limestone soil. They look attractive in the seedman's catalog to the farmer, who estimates their merit on grain production alone; to the seed men who sell seed alone; yet to the grower who feed's live stock and threshes part or all of his crop of soy beans, feeding the excellent straw and selling the grain for seed, the seed of such a high dual yielder as the Virginia is worth even double the price that he pays for other varieties.

"The Virginia flourishes as far north as Central Ohio, Indiana, Illinois and Missouri. It was among the five highest grain yielding varieties at Columbia (Missouri) Station. How far north it may become acclimated is not known. Every farmer interested in growing the great legume should test a few varieties each year to ascertain those best adapted for producing great yield of grain and forage in his locality.

"A few years ago in testing Ebony and Hollybrook for early maturing the result at the Ohio Experiment Station at Wooster. a degree north of Jefferson County, was just the reverse of my trial. Therefore a trial is the only correct method. Make one this spring and include the Virginia in your list. I expect to test the high-as-your shoulder 'Biloxi' from Mississippi, and the 'Hahto' from Arlington U.S. Experiment Station this year. What greater cause can we promote than this line of agriculture?" Address: [Adena, Ohio].

339. Morse, W.J. 1919. Re: Sample of soy bean seeds you sent. Letter to Prof. George W. Hendry, Univ. of California Experiment Station, University Farm, Davis, CA, May 5. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Hendry: I have your letter of April 28 enclosing a sample of soybean seed labeled Ito San from the C.C. Morse Co. of San Francisco. The sample of seed is anything but the Ito San, in fact, it appears to me to be an imported lot of seed, as it contains a large amount of different strains that can be easily detected from the seed characters alone.

I am enclosing herewith a sample of pure Ito San which was grown in March in 1918. In comparing this true Ito San with the sample from the Morse Co., you can easily detect the differences.

"Very truly yours, Ass't Agrostologist (WJM/ML)."

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. Ala.–Calif. Box no. 2.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Asst. Agrostologist, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

340. Morse, W.J. 1919. Re: We do not have a sample of Yokotenn. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, May 9. 1 p. Typed,

without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: In looking over our collection of samples of the various name varieties of soy beans, I find that we do not have a sample of the Yokotenn [Yokoten]. I am wondering if you will be able to supply me with about one ounce of this variety for our collection.

"Very truly yours, Ass't. Agrostologist."

Note: Initials at the upper left of the sheet of paper indicate that the "Ass't Agrostologist" was W.J. Morse.

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.

341. *Madison Survey* (*Madison, Tennessee*). 1919. Beans. 1(12):4. May 14.
• ***Summary:*** "From the United States Department of Agriculture, the school has received one and one-half bushels of the soy bean lima [for use as a green vegetable], description of which was given earlier in *The Survey* [probably March 5, p. 5]. It has received, also, 15 pounds of a new, edible, yellow-seeded soy bean [probably Hahto or perhaps Easy Cook], similar to Mammoth Yellow, but better for table use as it cooks more readily than any other soy bean known. Of this yellow-seeded soy bean Professor [sic, Mr.] Morse writes that the Department was testing the cooking qualities of about 800 varieties of soy beans when it discovered that this particular bean cooked in about twenty minutes, while other soy beans needed to be cooked from three to six hours."

342. Morse, W.J. 1919. Re: Received the sample of Yokoten. Letter to Prof. C.A. Mooers, Tennessee Experiment Station, Knoxville, TN, May 15. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Mooers: I have your letter of May 13 stating that you were sending us under separate cover an ounce of Yokoten soy bean. This seed has been received and I appreciate very much your kindness in sending it. In connection with the Hahto soy bean, seed of which I sent you this spring, I am wondering if you are planning to test any of it at your West Tennessee station/ I would like very much to see what this variety will do under West Tennessee conditions as to yield. We still have a limited quantity of seed on hand and if you will have the room available, we will be very glad to send you a few pounds of seed for trial purposes.

"Very truly yours, Ass't. Agrostologist."

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.

343. Morse, W.J. 1919. Re: Work of the Office of Forage Crops at Arlington Farm. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], June 5. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Piper: Relative to the work of the Office of Forage Crops at Arlington Farm this season, will say that our acreage of land will remain the same with the exception of turning back to the farm about three acres (Section G, South 2) used by Mr. Coe in his sweet clover work."

"At present we are using for experimental work with soy beans, cowpeas, miscellaneous legumes, sorghums, millets" about 9 acres in four locations. "For the Office of Seed Distribution there will be between 20 and 25 acres of soy beans and cowpeas grown this season. These varieties are the Hahto, Easy Cook, Mandarin, Wilson-Five, and Peking soy beans, and Buff Catjang, Early Buff, and Victor cowpeas.

"In taking the matter up with Mr. Oakley and Mr. Connor, they said that they would take care of the entire expense of the seeding part of the work. The work this season with soy beans, cowpeas, and miscellaneous legumes is confined to a smaller area than in previous years and should result in a decreased cost for this office. I think that Mr. Lee with the help of Mr. Lynn will be able to care for the work this season and we will not need any additional help for hoeing as in former seasons.

"Very truly yours,..."

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: Ass't. Agrostologist, Bureau of Plant Industry, USDA, Washington, DC.

344. Morse, W.J. 1919. Re: Trip to Indiana. Letter to Prof. C.O. Cromer, Indiana Experiment Station, Lafayette, Indiana, July 17. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Cromer: In arranging my field trip regarding soy beans and cowpeas, I have decided to take the northern and western trip during the month of August. According to my schedule I will be in Indiana about the 10th or 12th of August. I am writing you to see if you will be in

Lafayette at that date as I would very much like to go over with you the soy bean work being conducted at your station and what is being done throughout Indiana."

Note 1. Morse now has moved up in title from "Scientific Assistant" to "Ass't. Agrostologist."

Note 2. Cromer responds, in a letter of July 29: "If you can write me in advance I think I can arrange to be at the Station at any time..."

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–#7.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Asst. Agrostologist, Bureau of Plant Industry, Washington, DC.

345. Morse, W.J. 1919. Re: Analyses and results of soy bean variety tests suited for Indiana. Letter to Prof. C.O. Cromer, Indiana Experiment Station, Lafayette, Indiana, July 24. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Cromer: I am enclosing herewith copy of analyses of varieties of soybeans grown at Lafayette in 1917. You will recall that we conducted rather extensive variety tests of soy beans for the purpose of finding varieties adapted to Indiana conditions, and having analyses made for the protein and oil content to learn of the high yield in oil sorts."

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–#7.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Asst. Agrostologist, Bureau of Plant Industry, Washington, DC.

346. Piper, C.V. 1919. Re: Send soy beans to Lieut. Frank Micka, Cecho-Slovak Consulate. Letter to W.J. Morse, [USDA], July 30. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Will you kindly pack up and have shipped within the next four or five days one-pound packages of soy beans to be addressed to Lieut. Frank Micka, Cecho-Slovak Consulate, Tribune Building, New York, N.Y.

"These seeds are for experimental purposes in Bohemia [the area around Prague in today's Czech Republic], and judging from Haberlandt's results in Vienna, the only ones which they can hope to mature will be the early and medium varieties. I would suggest that you send them at least a dozen of these varieties, perhaps as many as twenty. They will have to go through the Federal Horticultural Board. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

347. McKee, Roland. 1919. Re: Display of forage crops at International Livestock Show. Letter to W.J. Morse, [USDA], Sept. 23. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** This letter was written from General Delivery, Yahoo, Mississippi. "Dear Mr. Morse: Re: This office [of Exhibits] is going to make a display of forage crops at International Livestock Show. similar to the one being made at the Dairy Show. I believe you are informed regarding this matter and have prepared some material for the same.

"Among other things, we wish to display at the International Livestock Show, bales of hay of as many different kinds as we can get together. Included in our list are cowpeas, soybeans, Sudan grass, Japanese clover and velvet beans are not baled for the commercial market, or even for local use, but are fed loose on the farm or in the community where they are raised. I am therefore not certain as to where we can get bales of this material put up most conveniently or even get it done at all. If you can arrange at some of the points at which you may visit, or with an experiment station or some individual to have bales of 50-pound or 10-pound size made of these crops, I wish you would do so and advise me.

"With such crops as timothy, clover, alfalfa, etc., we will buy small bales of 10-pound size in the open market. These will either be displayed entire or by cutting in halves. I presume with miscellaneous crops it is going to be impossible to get a uniform size bale made, so that you will understand that a bale of 50 pounds or more, somewhat in the shape of the usual commercial bale, is what is wanted.

"Any expense in connection with this will be paid through the Office of Exhibits here. Of course all I wish for you to do now is to make arrangements at some place where we can secure the material and have the bales made, and instructions regarding the time and place of shipment will be sent to the parties later.

"Very truly yours..."

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: Asst. Agrostologist, Office of Exhibits [USDA, Washington, DC].

348. Morse, W.J. 1919. Re: Report on inspection tour to Mississippi. Letter to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA], Washington, DC, Sept. 26. 2 p. Handwritten, with signature on letterhead.
• ***Summary:*** Morse is writing from Gulfport, a coastal city west of Biloxi, Mississippi. "Dear Prof. Piper: Have just returned from a visit to Mr. [G.A.] Swan's place near Lyman [Mississippi]. I saw a very considerable acreage of soya, mostly Biloxi, some Barchet and some Otootan (Laredo–our black). The varieties all appeared very promising and no doubt Mr. Swan will have considerable of the Biloxi. He has ordered one of the Carolina Harvesters.

"Spent Thurs. with Mr. Abbott, Mobile, Alabama. I like Mr. Abbott's plantation very much. He also will have considerable Biloxi seed and also some Bush Velvet [a variety of velvet bean].

"The soys at all places visited thus far look very good. Am very much pleased with the Victor cowpea. At Raleigh [North Carolina] and Monetta [South Carolina] it appeared very promising in comparison with other sorts. At Athens, Georgia, the Victor led in hay yield, 2.07 tons to the acre, and the next day the Brabham, with 1.87 tons. The seed yields have not yet been calculated or rather weighed at the time of my visit. Am sure we have a good thing in this new variety.

"I do not remember whether I told Mr. Lee to order 30 cylinder teeth or spikes for the harvesters at Arlington or not. Will you please have Lydenberg look the matter up and if they have not been ordered, to order them from Hardy & Newsome [Newsom], La Grange, North Carolina–Little Giant Bean Harvester. Very truly yours,..."

Note: This is the earliest document seen (July 2013) that mentions the soybean variety Laredo.

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

349. Morse, W.J. 1919. Re: Hay made from legumes. Letter to Mr. Roland McKee [Assistant Agrostologist, Office of Exhibits, USDA], Washington, DC, Sept. 28. 2 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** Morse is writing from Beaumont, Texas. "Dear Mr. McKee: Yours of the 23rd inst. received at Baton Rouge, Louisiana. At once took up the matter of the different legume hays with Prof. A.A. Kerr. We will be able to obtain bales of soy bean, cowpea, velvet bean, and kudzu hays. Prof. Kerr said the matter would be handled by Prof. Kidder and he says that he did not think there would be any trouble getting what we wanted. Very fortunately they received a new hay press while I was there.

"Really do not know of any other station or planter that I am yet to visit where we could obtain the four kinds or a hay press is at hand. Prof. Kerr will write you in a day or two and you can take the matter directly up with him. Very truly yours,..."

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: Crosby House, Hageman-Kidd Hotel Co., Beaumont, Texas.

350. Piper, C.V. 1919. Re: Photographs to be taken of soy beans at Arlington Farm. Letter to W.J. Morse, [USDA], Oct. 4. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I have instructed Mr. Ricker with Lee's assistance to arrange to have various photographs taken at Arlington about October 6th or 7th, as there may be danger of frost destroying the plants before you get back. These photographs will include Kudzu, Bush Velvet Bean, Victor cowpeas, and both general and close-up views of all the soy beans which you have in large plots. When you get back, look over these photographs, as it may be desirable to get some additional ones.

"Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

351. *Madison Survey* (*Madison, Tennessee*). 1919. Soy bean lima. 1(35):4. Oct. 22.
• ***Summary:*** "Professor [sic, Mr.] W.J. Morse, forage crop expert of the United States Department of Agriculture, spent the day with the School family not long ago, and soy bean limas, one of the new variety of beans which he introduced into the country, were served for dinner that day. Professor Morse sent us the seed last spring, about one-half bushel of it. This was the largest amount of seed furnished to any one outside Government experiment stations, consequently the School will have the largest stock of seed this fall to be found anywhere in this country aside from that grown directly by the Government.

"The soy bean lima as it grows is hard to shell, but Government tests demonstrate that if the green beans are immersed in boiling water for three to five minutes they shell easily. We have tried it, and it is true. This bean is about the

size of the Sieva lima, or the Southern butter bean, and it is the mildest and best flavored of all soy beans." Note: This is the earliest English-language document seen (Jan. 2009) that uses the word "Sieva" in connection with lima beans, or that uses the term "Sieva lima" to refer to a type of butter beans.

352. Morse, W.J. 1919. Re: Desire to secure bales of three types of hay. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Auburn, Alabama, Oct. 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Cauthen: We are desirous of securing if possible bales of hay of about 100 pounds weight of each of Kudzu, cowpea, and soy bean. These bales are to be used in an exhibit of hays at the International Live-Stock show to be held at Chicago, November 29 to December 6. We had expected to get this material through the Louisiana Experiment Station at Baton Rouge, but Prof. Karr just advised me that on account of breaking of their baler, they were unable to go ahead with this work. If it is possible for you to have a bale of each of these mentioned hays put up for me, I wish you would go ahead with the work and advise me at your early convenience. Any expense to which you may be put in supplying these hays will be borne by the Office of Exhibits here.

"The bales of hay will need to be crated and shipped by express collect to Mr. A.A. Ormsby [?], U.S. Dept. of Agriculture, c/o Motor Service Corporation, Union Stock Yards, Chicago, Illinois.

"Yours truly, Ass't. Agrostologist."

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: Assistant Agrostologist [USDA].

353. Le Goff, Jean. 1919. Le soja: Un aliment précieux pour diabétiques [The soybean: A valuable food for diabetics]. *Gazette des Hopitaux* 92:1120-21. Nov. 18-20. [3 ref. Fre]

• ***Summary:*** "In two preceding articles in this journal (22 May 1910 and 7 March 1911) I have called attention to the use of soya in diabetic diets, I have demonstrated that it is to cultivate this plant in France, and I am hopeful that some day there will be interest in cultivating the soybean as a garden vegetable." In the United States the soybean is being introduced to many states under the direction of Mr. W.J. Morse, who has also written various bulletins dedicated to the study of the soybean, its cultivation and usage.

From the viewpoint of food, the soybean has been neglected up until the present. However I noticed in the *New York Herald* (May 1916) the name of this seed among the substances that the Germans have fed to our poor prisoners of war. And these soybeans came from France!

"Here, in effect, is what one reads in the *Journal de Genève* on Thursday, 10 August 1916, page 6, 1st edition. "Export of soybeans." Berne (Switzerland): "The *Nouvelle Gazette de Zurich,* in its issue no. 1238, has published the following note: 'We have said that Mr. G. Liechti, in Zurich, is the importer from France of 2,000 railway cars (*wagons*) of soybeans. At a later date, these soybeans were re-exported to Germany. He submitted to us the file of this case in which the press took such great interest.'" Note: These soybeans were probably not grown in France (or even Europe), but rather imported to France from East Asia.

"We would like to know what the role of our Minister of Blockade (*Ministère du Blocus*) has been in this affair, which I brought to their attention.

"Food uses of the soybean.–The soybean can be used in either the dry or fresh state. To date, it has been used only in the dry state in Europe: (1) As a flour, with which one can make biscuits, pastries, and bread. (2) As an edible oil. (3) As a vegetable milk with which one can make a cheese [tofu], that can be consumed fresh, dry, smoked, or fermented. (4) A coffee substitute, after roasting.

"In the fresh state, the soybean is rarely used because agriculture does not take enough interest in this plant, which not only fertilizes the soil by fixation of atmospheric nitrogen, but also furnishes forage and an edible seed of the first order. This is the vegetable of choice for those with diabetes mellitus." Soybeans harvested fresh in France are very easy to cook–quite unlike dry soybeans. A table shows the chemical composition of 3 samples of dry soybeans.

Two photos by Dr. Le Goff show: (1) A mature soybean plant with pods, harvested in the suburbs of Paris; it bears 38 pods containing 90 soybean seeds. (2) A portion of the roots of a soybean plant with nodules. Address: Dr.

354. Hackleman, J.C. 1919. Re: Request for information on soybeans. Letter to W.J. Morse, Bureau of Plant Industry, Washington, DC, Nov. 25. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "My dear Mr. Morse: As you will notice I have changed my location somewhat [from the Missouri Agric. Exp. Station] but have not changed my sources of soybean information so I am coming back to you with some questions.

"I am preparing a talk on soybeans to be given at one of our county institutes, December 10th and I am trying to assemble as much data as I can concerning the yield of soybeans in the neighboring states and also get as full information as possible concerning the effect upon the yield of corn when soybeans are grown as a companion crop.

"With this as a tip will you kindly give me some information which will assist in presenting this matter in the best way possible as I am anxious to summarize the data that is assembled up to date.

"Your assistance in this matter will be greatly appreciated and if I can help you at any time with similar information from this institution I shall certainly consider it a favor to be called upon."

Note: Morse responded on Nov. 29 by sending Hackleman four publications on soy beans. He adds that Hackleman might obtain additional information from Prof. H.D. Hughes, Ames, Iowa. When Morse visited the Iowa station this past summer he found that they were doing much research to determine the effect of soy beans on the yield of corn.

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#2.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

355. *Bulletin Mensuel des Renseignements Agricoles et des Maladies des Plantes* (*Rome*). 1919. Le soya: culture et emplois [The soybean: Cultivation and utilization (Abstract)]. 10(10-12):1173-74. No. 1132. Oct/Dec. [1 ref. Fre]

• ***Summary:*** A French-language summary of the following English-language article: Morse, W.J. 1918. "The soy bean: Its culture and uses." *USDA Farmers' Bulletin* No. 973. 32 p. July.

356. Rouest, Léon. 1919. Contribution à l'Étude sur le soja [Contribution to the study of the soybean]. *Genie Rural* (*Le*) 11(99-100):23-26. (New Series Nos. 39-40). Continued: See Rouest 1920. [Fre]

• ***Summary:*** Gives a brief overview of the history of the soybean in Europe and France, starting at the top left of page 24: It was introduced into Europe, where it has been cultivated at the Museum of Natural History since 1779.

In 1855 M. de Montigny sent, from China, several soybean varieties to the National Society for Acclimatization (France), which used them for trials in various localities in France.

At the Vienna World Exposition of 1873 there were soybeans from Japan, China, and Mongolia.

In 1874 soybean cultivation was undertaken at Etampes.

In 1875, and during the following years, agronomic trials with its culture were conducted in Austria.

In 1888 it was introduced into the United States and adopted as a forage crop in the southern states. From 1880 to 1896 it was discussed in many agricultural bulletins in the USA. The soybean was also studied in Russia.

In 1905 Mr. Li Yu-ying foresaw the use of soya in France as a commercial food. He established a laboratory and a factory named *La Caséo-sojaine* was established at Colombes (Seine).

Also discusses: Dr. Bloch, the Soyanna [sic, Soyama] Werke near Bockenheim, Messrs. Paillieux, Sagot, Raoul, and Jumelle, and the various soyfoods from China and Japan that they describe (Miso, shoyu {*Shoyua*}, tofu {*Tofou*}, dried frozen tofu {*Kouri Tofou*}, yuba {*Uba*}), and the potential threat of soya to the French cheese industry. "Finally in 1910-11 numerous soy products were presented at the expositions in Brussels [Belgium], Turin [France], and Dresden [Germany]."

Describes work on the *Ferme Expérimentale de Néoculture du Sud-Est,* at Villardonnel, Aude. Mr. Semichon, Director of the wine station at Aude, sent this experimental farm some soybean seeds which he received from the USDA accompanied by a bulletin written by William Morse (probably "The soy bean: Its culture and uses," 1918). Rouest translates the Bulletin into French (p. 25-26). The most important varieties mentioned are: Mammoth, Hollybrook, Ito San, Guelph, Haberlandt, Medium Yellow, Wilson, Peking, Tokio, Manchu, Black Eyebrow, Barchet.

Note: This is the earliest document seen (Nov. 2014) by Léon Rouest about soybeans. In earlier years he had been a journalist in the French colonies of North Africa (Tunisia, Algeria, etc.).

Rouest was born on 11 Nov. 1872 in Paris; he died on 27 Feb. 1938 in Chartres, France. Illustrations (line drawings, both non-original) show: (1) Soja hispida plant, with close-up of a cluster of pods. (2) Soja Hato [Hahto] soybean plant. Address: Director, *Ferme Expérimentale de Néoculture du Sud-Est,* at Villardonnel (Aude), France.

357. Hackleman, J.C. 1920. Re: A soybean variety well suited for the Corn Belt. Letter to W.J. Morse, Bureau of Plant Industry, Washington, DC, Jan. 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "My dear Mr. Morse:... Do you have any new variety or strain of soybeans that you think especially promising and which you would like to have propagated here in the Corn Belt? I am going to do all I can to foster soybean production in Illinois and the county advisers are already working on the subject very vigorously, and I feel that it will be very largely a matter of keeping up with them rather than pushing them. If you have something that you think would be especially good I will endeavor to help you place it in the hands of some good farmers and in a county where the adviser will give it special attention.

"I want you to feel free to call on us at any time when you want such assistance as this, as we will be more than pleased to help you in the distribution of any of your good strains of seed."

Morse responds on Jan. 13. "I think it will be possible to conduct some such work with you in Illinois if not too extensive, as our supply of seed of the various varieties is

somewhat limited... I might say that our cooperative work with the State of Illinois has not been very extensive."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#2.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

358. Williamson, J.T. 1920. Re: Where can we purchase a soybean harvester that thrashes the beans? Letter to Mr. W.J. Morse, Scientific Assistant, Office of Forage Crop Investigations, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, Jan. 10. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "My dear Sir: We are in receipt of a letter from C.F.E. Munger, Sunny South, Alabama, who wants to know where he can purchase a soybean harvester that thrashes the beans. He has in mind especially the thrashing machine on page 7 of *Farmers' Bulletin* 886 ["Harvesting Soy-bean Seed," by W.J. Morse, 1917]. In case you can give him any information on this, I shall be glad to have you write him in regard to it. We are very much interested in these machines, and will be glad to receive a copy of your letter to him at this Station.

"Thanking you in advance for any assistance that you can give him, I am

"Yours very truly, Field Agent.

"JTW/s. Copy to Mr. Munger"

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: Field Agent, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

359. Morse, W.J. 1920. Re: OK to Reprint Farmers' Bulletin 886. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Jan. 15. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: Concerning the attached memorandum from Mr. Rockwell stating that it is proposed to reprint at an early date *Farmers' Bulletin* 886, 'Harvesting Soy Bean Seed,' will say that I see no reason why it should not be reprinted as it is. Very truly yours,..."

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: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

360. U.S. Department of the Interior, Census Office. 1920. William J. Morse and Edna (his wife) in the 1920 U.S. Census in Washington, DC. Washington, DC. Jan. 20.

• ***Summary:*** State: District of Columbia. Incorporate Place: District of Columbia, Precinct 10 (Part of), Supervisor's District 40; Enumeration District 335, Sheet 9B, Taken 20 January 1920 by Enumerator Clarence S. Durand.

6809 Fifth St. [6809 5th St.] 172nd house enumerated, 188th family enumerated.

William J. Morse. Head of Household. Owned their home with a mortgage. White. Male. Age 35 years. Married. Can read and write. Born in New York. Father and mother both born in New York. Speaks English. Occupation: Agrostologist with US Department of Agriculture. Worked for wages.

Edna B. Morse. Wife. Female. White. Age 35. Married. Can read and write. Born in District of Columbia; Parents both born in Virginia. Speaks English. She had no occupation.

361. Morse, W.J. 1920. Re: Work conducted with soy beans and cowpeas at Whitehall, South Carolina. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Jan. 24. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: With regard to your request for a memorandum on the work conducted with soy beans and cowpeas at Whitehall, South Carolina and also any suggestions for work along this line, I submit to you the following.

"In summarizing the work carried on at Whitehall, South Carolina, in 1916 and 1917 with soy beans, Mr. Westover in his report states that in general this crop made a very satisfactory growth and the yields of forage were somewhat greater on the rice lands than on the upland. Attempts to grow seed met with failure, probably due to climatic conditions, but Mr. Westover suggests that further work will have to be done along this line to settle this problem.

"In looking over a more detailed report of the soy bean work, the matter of seed maturing properly appears to be the same for all varieties except the Hollybrook. Attempts were made to grow two crops the same season of early varieties, namely the Manchu and Ito San. The first seeding was harvested for forage on July 21 and the varieties were again seeded July 30. The second crop produced an abundance of pods but they contained very few good seeds.

Al other varieties tested, such as the Mammoth, Hollybrook, Virginia, Biloxi, Chiquita, Barchet, Black Eyebrow and Manchu, although producing an abundance of pods, did not mature the beans properly. The beans instead of hardening as they normally do, remain soft, the seed coats drying and shriveling. With the Hollybrook, the seeds filled out well.

"Before any considerable field work should be conducted on the rice lands or uplands, further work should be carried on with the soy bean along the following lines.

"(1) Date of planting, beginning April 1 and continued at intervals of 2 weeks up to August 1. The date of planting test should include early, medium, medium late, and late varieties. (2) Variety tests. Rows or small field plots including all varieties now grown commercially and some of our improved sorts such as the Hahto, Easy Cook, Laredo, Biloxi, Mandarin, and Otootan. With such experiments, studies can be made to see if time of planting has any effect on the normal development of the seed and if all varieties behave the same in seed production.

"Relative to the cowpea, which I suggested growing for production of seed, I note that although good forage in 1916 was produced, little seed was obtained. The reason given is that there was an abundance of rain at the time of bloom. In 1917, however, seed was produced quite abundantly but it rotted as badly and was so infected with weevil that no yields were obtained. If it is deemed desirable to grow cowpeas for seed, I would suggest much the same line of experiments for cowpeas as has been noted for soy beans, namely, date of planting and variety tests.

"As a forage proposition, both cowpeas and soy beans do very well and give excellent yields. The soybean was found to range from 2750 pounds of cured hay with the Tokyo variety to 5,600 pounds of cured hay with the Chiquita variety. The cowpea with the Brabham variety gave 2750 pounds of cured hay, the Groit 4010 pounds of cured hay per acre.

"Very truly yours, Assistant 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

362. Cromer, C.O. 1920. Re: Results of soybean variety trials at Indiana. Letter to W.J. Morse, Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, Jan. 27. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "We have had the Mandarin 36653 in our test the last four years. It has produced on the average 1.6 bushels more seed than the Ito San. We also have the Hoosier 30746, which has produced for the last four years an average of 1.4 bushels more seed than the Ito San. The following is a statement of the average yields of the numbered varieties which we received from you in 1915."

A table shows the variety number or name (for Hoosier, Mandarin, and Ito San), height, days required to mature, and yield in bushels per acre for 19 varieties. The yields range from 17.6 (for #28050) to 12.8 (for #28051).

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–#8.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Associate in Crops, Purdue Univ., Lafayette, Indiana.

363. Feb. 2–Edwin T. Meredith (D), Iowa, becomes U.S. Secretary of Agriculture under President Woodrow Wilson (1913-1921) (Important event). 1920.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

364. Morse, W.J. 1920. Re: Obtaining soybean varieties from Mukden, southern Manchuria. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Feb. 12. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Piper: In a recent issue of the *Bean Bag Magazine,* there is an article by Consul General E. Carlton Baker, Mukden, China, on marketing the eastern bean crop. In looking over the article I note that it stated that the Mukden Consular district comprises the greater part of southern Manchuria and produces enormous quantities of soy beans. Although we have received samples of varieties from this district, I feel quite sure that there are a great number that we have not as yet had. Do you not think it advisable to take this matter up through the Consular Service and see if Consul General Baker cannot obtain a large number of varieties for us?"

In a follow-up to this memorandum dated Feb. 16, Morse continues: "I think it would be well if we can obtain all the varieties possible through Consul Douglas Jenkins, Harbin, Manchuria, Consul General Albert W. Pontius, Mukden, Manchuria, and Consul John K. Davis, Nankin, Manchuria. I feel sure that by obtaining the large number of varieties through the above three sources we can obtain some new sorts. The great soy bean region is about Mukden and Harbin, and to some extent around Nankin."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

365. Morse, W.J. 1920. Re: Article by Consul General E. Carlton Baker, Mukden, China, on marketing the eastern bean crop. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Feb. 12. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Piper: In a recent issue of the Bean Bag Magazine [Jan. 1920, p. 38-40], there is an article by Consul General E. Carlton Baker, Mukden, China, on marketing the eastern bean crop. In looking over the article I noted that it stated that the Mukden Consular District comprises the greater part of southern Manchuria and produces enormous quantities of soy beans. Although we have received samples of varieties from this district, I feel quite sure that there are a great number that we have not as yet had. Do you not think it advisable to take up this matter through the Consular Service and see if Consul General Baker cannot obtain a large number of varieties for us?

"Very truly yours, Assistant Agrostologist."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

366. Williamson, J.T. 1920. Re: Request for names of reliable growers of soybean in Alabama. Letter to Mr. W.J. Morse, Scientific Assistant, Office of Forage Crop Investigations, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, Feb. 12. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir: This Station has made tests if several varieties of soybeans with seeds which were furnished by your department. We are anxious to make further tests with some of these varieties in our cooperative work over the States, and as we do not know the best sources of some of these seed, I am writing to ask that you please furnish us with names of reliable growers. I realize that it may be impossible to get some of these seed in the United States. The varieties which we wish to test are Black Beauty, Otootan, Virginia 32906 and Biloxi.

"Thanking you in advance for this favor, I am

"Yours very truly, Field Agent."

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: Field Agent, Agricultural Department, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

367. Hackleman, J.C. 1920. Re: Request to send soybean varieties to Illinois county farm advisers. Letter to W.J. Morse, Bureau of Plant Industry, Washington, DC, Feb. 14. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "At a recent conference of farm advisers of Southern Illinois it was decided that B.W. Tillman, County Farm Adviser at Belleville, Illinois, St. Clair Co. would take this particular project for his work along crop lines this year." Hackleman asks Morse to please send to Mr. Tillman seed of 3-4 varieties that look "especially promising for the St. Louis territory." He would like farmers to grow one plot of each for seed and a second for silage or to be hogged off.

"We have another farm adviser, Mr. F.A. Gougler, Quincy, Illinois, who would be glad to cooperate along similar lines. Mr. Gougler is just across the river from Hannibal, Mo. [Missouri]. We had demonstrations near Hannibal last year and such varieties as the Wilson, Virginia, and Mikado did exceedingly well."

Morse responds on Feb. 19 that his supply of seed of improved soy bean varieties for cooperative work is rather limited. "It is possible that we can supply one peck of each of three or four of our varieties but we would prefer to have them used entirely for seed purposes, as seed of all the improved varieties is in demand and it is our policy to try to get farmers to increase the seed supply." He will try to send at least 15 pounds of each of four varieties to Mr. Tillman and to Mr. Gougler.

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#2.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

368. Morse, W.J. 1920. Re: Expenses at Arlington Farm. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Feb. 16. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Piper: With regard to the attached memorandum on expenses at Arlington Farm..." up to July 1. "Dr. Peters [probably A.J. Pieters] states that $100 will be ample for his work." Mr. Cates will need $50.00, and Mr. Ricker $300.

"I have planned to cut down considerably on the soy bean and legume work at Arlington. It is doubtful if I will require more than $200.00. This will be merely for fitting and planting work. I have planned to release some of the land which I have used for experimental work with cowpeas and soy beans."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

369. Morse, W.J. 1920. Re: Obtaining soy bean varieties from Manchuria. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Feb. 16. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: With regard to the attached memorandum (Feb. 12 to Prof. Piper), I think it would be well if we can obtain all the varieties possible through Consul Douglas Jenkins, Harbin, Manchuria, Consul General Albert W. Pontius, Mukden, Manchuria, and Consul John K. Davis, Nankin, Manchuria. I feel sure that by obtaining the large number of varieties through the above three sources we can obtain some new sorts. The great soy bean region is about Mukden and Harbin, and to some extent around Nankin.

"Very truly yours,..."

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: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

370. Morse, W.J. 1920. Re: How much seed do you want? Letter to Mr. J.T. Williamson, Field Agent, Agricultural Experiment Station, Auburn, Alabama, Feb. 17. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of February 12 making inquiry as to where you can obtain seed of the Black Beauty, Otootan, Virginia and Biloxi varieties of soy bean. We have limited quantities of seed of these varieties and if you will kindly state what amounts of each you desire, it is possible that we can supply you from this office. However, if you desire large quantities, I will be very glad to furnish you with the names of growers handling seed of the varieties mentioned.

"Very truly yours, Assistant Agrostologist."

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: Assistant Agrostologist [USDA].

371. *Good Health* (*Battle Creek, Michigan*). 1920. The soy bean. 55(2):71-73. Feb.

• ***Summary:*** Contents: Introduction. Soy-bean milk. Soy-bean cheese. Soy sauce. Soy-bean sprouts." Photos show: (1) A typical soy bean plant with leaves and pods. (2) A large basket full of "sprouted soy beans, which are sold and used as a green vegetable" [in China].* (3) "Large blocks of freshly made bean curd, 'Tofu' [on a round wooden table], ready to be cut up into squares and sold to the housewife."*

Note 1. This article consists mainly of long quotations from the following article: Morse, W.J. 1918. "The soy-bean industry in the United States." *Yearbook of the U.S. Department of Agriculture* p. 101-11. For the year 1917. * = Photographed by Frank N. Meyer, USDA Plant Explorer.

Note 2. The cover of this issue reads: "Edited by John Harvey Kellogg, MD, LLD. Devoted to race betterment and biologic living."

372. Williamson, J.T. 1920. Re: Request for soybean seed and names of reliable growers of soybeans in Alabama. Letter to Mr. W.J. Morse, Scientific Assistant, Office of Forage Crop Investigations, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, March 3. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir: I have your letter of the 17th in which you offer to supply us with a limited quantity of seed of your most promising soybeans. We shall need for our soybean experiment over Alabama about one-half bushel of each variety. In case you can furnish us with this quantity, or less, I shall be glad to have you send them to me at Auburn. The varieties which you named were Black Beauty, Otootan, Virginia and Biloxi.

"I will be glad to have you furnish me with the names of some of the growers of seed of these varieties.

"Yours very truly, Field Agent."

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: Field Agent, Agricultural Department, Experiment Station, Alabama Polytechnic Inst.,

Auburn, Alabama.

373. Piper, C.V. 1920. Re: Send soy beans to Porto Rico. Letter to W.J. Morse, [USDA], March 8. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Would you kindly send some soy bean seed to Mr. E.E. Barker, Chief Agronomist of the Insular Experiment Station, Rio Piedras, Porto Rico. These are to be sent for some work by Messrs. Garner and Allard, and they suggest that the varieties Mandarin, Peking, Tokyo, and Biloxi be sent. When you are ready to send these, advise Dr. Garner so that he can write directly to Mr. Barker. I imagine a pound of each seed will be ample."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

374. Morse, W.J. 1920. Re: Sending seed and names of growers. Letter to Mr. J.T. Williamson, Field Agent, Agricultural Experiment Station, Auburn, Alabama, March 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of March 3 with reference to obtaining one-half bushel each of the Black Beauty, Otootan, Virginia and Biloxi varieties of soy beans. I regret to say that we do not have any Black Beauty variety. We do have seed of the Peking and Wilson-Five sorts and I think you will find these varieties do better under Alabama conditions than the Black Beauty, as I recall during some of my visits to the Alabama station the Wilson gave very good results from the stand-point of a forage variety.

"I do not know just what amount of seed of the Otootan I can send you. I have taken up the matter with Prof. S.M. Tracy, Biloxi, Mississippi, but have not obtained any supply of seed of this variety yet. Of the Virginia and Biloxi sorts I am sending you today 30 pounds of each and will shortly send you 30 pounds either of the Peking or Wilson-Five varieties,

"As to growers handling Otootan and Biloxi, I refer you to Mr. G.A. Swan, Lyman, Miss., for the Otootan and Biloxi varieties, Mr. J. Lloyd Abbot, Mobile, Ala. for the Biloxi, and Mr. J.M. Jenkins, Crowley, Louisiana for the Biloxi. I cannot put you in touch with any growers of the Black Beauty and Virginia varieties as I have learned that their supply of seed has been exhausted. The Virginia, however, is handled by T.W. Wood & Sons, Richmond, Virginia, and William G. Scarlet & Co., Baltimore, Maryland.

"Very truly yours, Assistant Agrostologist."

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: Assistant Agrostologist [USDA].

375. Morse, W.J. 1920. Re: Prof. C.C. Newman wants to work with cowpeas and soybeans. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], March 13. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Prof. Piper: With regard to the attached letter from Prof. C.C. Newman relative to work with cowpeas and soy beans at Whitehall, I submit the following.

"The two varieties, Tokyo and Hollybrook which Prof. Newman desires for growing large acreages are really grain varieties. I note that he desires soy beans for forage. For such a purpose I would suggest the Laredo, Virginia, and Biloxi varieties. Concerning parties having the Tokyo and Hollybrook for sale, I know of only one grower, Mr. F.P. Lathan [sic, Latham], Belhaven, North Carolina handling the Tokyo, while the Hollybrook may be obtained from the following:

"T.W. Wood & Sons, Richmond, Virginia

"Hickory Seed Co., Hickory, North Carolina

"J.B. Cahoon, Columbia, North Carolina

"Concerning the testing out of different varieties in order to have information another season, I would suggest at least tenth acre plots of the Laredo, Virginia, Hahto, Haberlandt, Wilson-Five, Chiquita, Mandarin, Ito San, Black Eyebrow, Biloxi, and Otootan. As to the cowpeas, the Groit as stated in Prof. Newman's letter produced the best yield of hay.

"In my recent trip to Baltimore I found that the Belt Seed Co., Baltimore, Maryland, has about 400 bushels of the Groit variety on hand. As to the variety of cowpea most suitable for growing with the idea of selling the seed, most any of the varieties bring rather high prices for the seed at the present time and it appears to me that the cowpea seed market will command high prices for a few seasons at least. Of the varieties suited for growing for seed, in my mind the Groit and Brabham are most suitable. I think that we will be able to supply Prof. Newman with the seed of the Victor for at least an acre and possibly two acres.

"Very truly yours,..."

Note: Who is Prof. C.C. Newman and where does he work? In 1909 Prof. C.L. Newman, M.S. was a professor of agriculture in the School of Agriculture, North Carolina College of Agriculture and Mechanic Arts, West Raleigh, North Carolina. He corresponded with Dr. C.V. Piper and tested varieties of soybeans and kudzu that Dr. Piper sent to him.

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: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

376. Morse, W.J. 1920. Re: Report by Mr. F.R. Jones and Mr. W.B. Tisdale entitled "The Effect of Soil Temperature upon the Formation and Development of Nodules on Legumes." Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, March 13. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: I have read over the report by Mr. F.R. Jones and Mr. W.B. Tisdale entitled 'The Effect of Soil Temperature upon the Formation and Development of Nodules on Legumes', paying special attention to the parts relating to the soy bean. Although it is stated by the authors that the report is only a preliminary report on the work done in 1919 to 1920, I do not think the data obtained sufficient for a publication at this time.

"In the first place, there is a lack of sufficient replication of different legumes, resulting in too few plants being used in the test. For instance, results are obtained for only six soy bean plants.

"Secondly, the check or control pots should have included the different legumes without the inoculation. The check or control pots used by the authors did not contain any legumes.

"Thirdly, I think it would be well to use another summer legume such as the cowpea for checking up with the soy bean.

"Finally, would it not be well to make some field observations on the different legumes, planting under different conditions such as shading, depth of plant, etc.? An observation made during my visit to some soy bean variety plots near Roanoke, Virginia, may be of interest.

"Eight varieties of one-fourth acre each were planted out on a farm, the varieties representing sorts from early to late maturity. I had occasion to examine these plots about the first of September. The Tokyo and Mammoth varieties had made a very heavy growth, averaging about 4 feet high, completely shading the ground, while the earlier varieties such as Black Eyebrow and Manchu made a growth of about 2 feet but did not shade the ground entirely. An examination of the plots showed the roots of the Tokyo and Mammoth varieties to be very abundantly supplied with nodules. The soil of these plots was very moist and the roots in a large number of cases were at the top of the ground, showing a very large number of nodules exposed. The plots of the early varieties had no roots exposed and the soil was much drier than that of the Tokyo and Mammoth plots. Although the day of my visit was very warm and there had been no rain for a number of days, the soil of the Mammoth and Tokyo plots was moist and cool.

"Very truly yours, Assistant Agrostologist."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

377. Hackleman, J.C. 1920. Re: Perley's Mongol soybeans. Letter to W.J. Morse, Bureau of Plant Industry, Washington, DC, April 16. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "I have a small sample of the original Perley's mongol soybeans. The sample I have was produced in 1913 by Mr. Perley from seed which he selected in the field from an individual plant in the fall of 1912. I have just written to the Wing Seed Company to get their information on the naming of this variety, and they give us the following information.

"'We found great confusion in the naming of the soy beans, and also much need of work to bring out pedigreed varieties. We named the Mongol [Perley's Mongol] when we had satisfied ourselves of its value. It was a selection of our own out of the Hollybrook. The Hollybrook sample came from one of the experiment stations, either yours [Illinois] or Purdue [in Indiana]. My own memory on this matter is very clear and I do not think it is even necessary to look up our records.'"

Hackleman then asks Morse for clarification. Note 1. Perley lived in Missouri, where he made his selection. Hackleman worked at the Missouri Agric. Exp. Station before coming to the Illinois station in Sept. 1919.

"Doubtless you will be interested to know that we have formed here in this county what, I believe, is one of the first soybean seed growers organizations in the United States. I would like, also to get your opinion of that. Do you know of any other group of farmers in the United States who are organized on this basis? These farmers are pledging themselves to grow only approved beans to handle them in the best way possible and to make possible field certification of their seed this fall. I believe that we will have in the neighborhood of 600 acres of seed beans produced in this county this year. Practically every man producing beans will be a member of the Champaign County Soybean Club. Membership in this club is restricted to Farm Bureau members. Note 2. This is the earliest document seen (June 2005) concerning certification of soybean seed.

"We are planning on at least two and probably three meetings of the membership this year. Our next meeting will be in the nature of a county tour, going in automobiles

from one farm to the other, in order to see how the beans are handled and how successful the different cultural practices are. This will be made about the 10th of June. We will make another trip perhaps in August and final meeting at the time of the field certification, which will be later in September.

"I am writing to invite you to come to Champaign County on your western itinerary this year. We would very much like for you to be here this fall, if possible, so as to make the tour with us and see the soybean men of this county. I shall appreciate an early reply and hope that you will plan on paying us a visit."

Note 3. It was the arrival of J.C. Hackleman at the Illinois station in Sept. 1919 and his subsequent major creative work with soybeans that, more than anything else, got Illinois moving on commercial soybean production–at a rather late date.

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

378. Piper, C.V. 1920. Re: Exhibiting soy beans and cowpeas. Letter to W.J. Morse, [USDA], May 1. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: In connection with the exhibition of the Office of Exhibits, there is certain other material from this office that it is very desirable to obtain. From your office we would like the good specimens, to be mounted in riker mounts 6 by 14, representing about ten varieties of soy bean and about 6 varieties of cowpea. With each of these specimens we will want an appropriate label and also a small map of the United States with the region indicated to which it is adapted, preferably painted in color. It will take some inequity to get really desirable specimens to occupy this space, but I think that with a little care you can do this, and I wish you would see that these specimens are secured during the season. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

379. Piper, C.V. 1920. Re: A banquet at which soybeans will be served. Letter to W.J. Morse, [USDA], June 9. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: It is proposed to give a banquet in the Department to the editors on June 17, in which it is desirable to have dishes which have been developed as a result of the Department's work. In this connection it would be highly desirable to have soy bean muffins and also green soy beans for the bill of fare in case the flour and the canned beans can be obtained. Langworthy will attend to the cooking of the food. Will you try to advise Dr. Taylor by noon today whether this material can be secured and in time for the banquet? They want to be certain about it, on account of the bill of fare."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

380. Morse, W.J. 1920. Re: Editorial in the *Rural New Yorker,* May 15, 1920, on the soy bean in Manchuria. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, June 18. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: Relative to the Editorial Article, page 974, in the *Rural New Yorker,* May 15, 1920, on the soy bean in Manchuria, will say that the facts of the matter are somewhat different than are stated in this article."

In fact Morse sent the contents of his reply to Prof. Piper to the Rural New-Yorker, where it was published as an article, "The soy bean in Manchuria," on July 17, 1920, p. 1208.

"Very truly yours, Assistant Agrostologist."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Assistant Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

381. Morse, W.J. 1920. Re: Mr. J.D. Grimes asks for information on grasses suitable for grazing stock in North Carolina. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], June 26. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "With regard to request of Mr. J.D. Grimes, as stated in the attached letter, for information on any grass suitable for stock grazing on land bordering on Pamlico Sound, Hyde County [North Carolina], will say I am afraid I will not be able to give much information. Although I have

visited Hyde County on Soy bean work at various times it has generally been anywhere from the middle of October up to the first of November. I have not been on the land bordering the Pamlico Sound. The section devoted to Soy bean growing is located principally on the ridge surrounding Lake Mattamuskeet [the largest lake in North Carolina]. Of course, this ridge is much higher than the land situated near the Sound. In the eastern part of Danfort [sic, Beaufort] County, bordering on the Pungo River, which empties into the Pamlico Sound, there is some stock grazing on the low lands, which I judge are much the same as those long Pamlico Sound. I would not care to make any suggestions as I think the matter should be taken up by some one who has gone over the land in question. Very truly yours,..."

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: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

382. Piper, C.V. 1920. Re: Soy bean meal. Letter to W.J. Morse, [USDA], June 28. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Will you please endeavor to secure as quickly as possible about 50 pounds of soy bean meal? If you are in touch with sources, take it up with Mr. Lydenberg and Mr. Reed so that it can be secured as promptly as possible."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

383. Morse, W.J. 1920. The soy bean in Manchuria. *Rural New-Yorker* 79:1208. July 17.

• ***Summary:*** "Relative to the editorial article, page 974 [May 15], on the Soy bean in Manchuria, the facts are somewhat different from those stated.

"It is stated that at the time of the war between China and Japan, Manchuria was poverty-stricken in soil and in people, and that the Japanese introduced the culture of Soy beans, and the industry grew. Although the exact date of the introduction of the Soy bean into Manchuria is unknown, the probability is that it came north from the Central Provinces of China many centuries ago. The bean trade was of ancient standing when the first Westerner visited 'Manchoo Tartary.' At the time the first British consul took up his residence at Newchwang, Manchuria, trade in beans, bean oil, and bean cake was an ancient and flourishing institution. Newchwang since 1832 had been a growing port of shipment for the great coastal trade in beans, bean oil and bean cake, on which Manchuria's prosperity has always depended. It is thus seen that long before the Chinese and Japanese war the Soy bean occupied an important part in the agricultural industry of Manchuria. During the Russian-Japanese war [1904-05] vast armies which occupied the whole of southern and central Manchuria depended for their cereals largely upon local supplies, and a great impulse was given to Manchurian agriculture at that time, but after the withdrawal of the troops the cessation of local demand called for the discovery of a new market, and especially so for the money crops of wheat and beans. Japan offered the first market, but with the post-bellum wave of depression sweeping over Japan it became necessary to find other markets.

"Japanese merchants were the first to try to introduce the Soy bean into Europe. In 1908 shipments of Soy beans were made to England by Japanese firms... During 1909 over 400,000 tons of beans were exported to Europe from Manchuria. At first nearly all of the exportations went to England, but within a short time Germany took the lead in importing Soy beans, Soy bean oil and Soy bean cake. The article referred to states that on the Pacific Coast, in parts of the Central West, and also in some sections of the South, the crop is working in. The Soy bean is grown only to a very limited extent on the Pacific Coast. However, large importations of Soy beans are coming into the Pacific Coast States, most of which seed is handled by oil mills in Seattle [Washington], Portland [Oregon] and a few other coast cities." Address: Asst. Agrostologist [USDA, Washington, DC].

384. Morse, W.J. 1920. Re: Letter from A.P. Mathesius requesting information concerning Mr. Thomas Meyer; substitute milk and substitute chocolate. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Aug. 5. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: With reference to the attached letter from A.P. Mathesius requesting information concerning Mr. Thomas Meyer who claims to have perfected a method for making a substitute milk and a substitute chocolate, will say that the gentleman referred to was connected with the Soy-Lac Products Company, London, Ontario, Canada.

"No doubt you will recall that at various time I have talked with you regarding the products that were being experimented with by the Soy-Lac company. In fact, Mr. Meyer sent us various products and different members of the office have had samples of them.

"With reference to the substitute chocolate and other

samples which are stated to have been sent to the department and reported favorably upon, will say that the samples were sent by Mr. Meyer in January, 1918. The samples were tested by different members of the office and in a letter to Mr. Meyer February, 1918, I stated that the samples had been received and that it was our opinion that they were all very good quality, and that I did not see why the product could not be used by chocolate manufacturers in this country as it was said to be produced much cheaper than the ordinary chocolate. I am attaching herewith my full correspondence with the Soy-Lac Food Company.

"Very truly, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agronomist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

385. Morse, W.J. 1920. Re: Visit with Hackleman. Change of itinerary. Letter to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Aug. 21. 2 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** "Dear Prof. Piper: Prof. Hackleman met me at St. Louis this morning and we spent the day at a soybean growers' meeting in St. Clair Co., Illinois. After going to Columbia, Missouri, Prof. Hackleman has planned soy bean trips which will keep me in the field a little longer than I expected when I left Washington. If to-day is a sample of the remainder of the trip it will be well worth my while. Am enclosing an itinerary for the next two weeks.

"The Virginia and the Wilson-Five were the favorites at the soy bean meeting today. The Blackeye Brown and the Manchu are leading in Iowa."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: The American [hotel], Saint Louis, Missouri.

386. Morse, W.J. 1920. Re: J.C. Hackleman, Urbana, Illinois. Tour of Soy Bean clubs. Letter (telegram) to Prof. C.V. Piper, Forage Crop Agriculture, Washington, DC, Aug. 21. 1 p. Typed, without signature on letterhead.

• ***Summary:*** Telegram sent from St. Louis, Missouri. "Send five transportation requests care J.C. Hackleman Urbana Illinois by August 30. Will be in Columbia, Missouri August 23. After will spend 20 days on tour of Soy Bean clubs. Sending itinerary by letter."

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: [Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC].

387. Morse, W.J. 1920. Re: Trip report. Letter to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Aug. 31. 2 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** "Dear Prof. Piper: Received the transportation requests O.K.

"My trip this far has been one of the best soy bean trips I have ever experienced. It is remarkable how interest in the soy bean has increased throughout the northern and central states. It is rather gratifying to note how the varieties sent out by our office are taking hold. The Virginia especially is coming into favor. Near Quincy, Illinois last week I saw an eight acre field of the Virginia. It would average 6 feet easily and was a pretty sight, and needless to say the grower is mighty proud.

"The Morse variety which I thought was being grown to only a slight extent is one of the coming ones. One county in Missouri will produce about 7,000 bushels of seed of it this season.

"Varieties at stations and in the hands of many growers are somewhat of a mess. I think it would be an excellent idea to publish either a departmental Bulletin or Farmers' Bulletin just on varieties, and if at all possible to have colored plates.

"Expect to visit the Meharry Farms at Tolono, Illinois, tomorrow where they have 170 acres of soy beans for seed.

"Thursday I leave with Prof. Hackleman by auto for Camden, Indiana, for a visit to the famous soy bean farms of the Fouts Bros. They call it 'Soyland.' Will probably reach Washington Sunday Sept. 5. Very truly yours."

Note: This is the earliest document seen (Oct. 2012) that mentions "Soyland."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: The Beardsley [hotel], Champaign, Illinois.

388. Morse, W.J. 1920. Cowpeas: Culture and varieties. *Farmers' Bulletin* (*USDA*) No. 1148. 26 p. Sept. See p. 20-21, 25-26.

• ***Summary:*** Begins with a good history of the cowpea. The

section titled "Cowpeas in mixtures" includes a section on "Cowpeas and soybeans" (p. 20-21). They "afford a very satisfactory combination, either for hay or for pasture, and the yield is nearly always greater than that of either crop alone. Only the tall strong-growing varieties of soy beans are desirable, as they assist very materially in supporting the viny cowpeas. Varieties of these crops maturing at about the same time should be selected... A mixture of soy beans and cowpeas should have more soy-bean plants than cowpeas, so that the cowpea vines may be properly supported."

The last section is titled "Cowpeas, soy beans, and velvet beans compared" (p. 25-26). All are summer annuals. The soy bean grows over a more extended area and further north; it is much less sensitive to cold and can stand considerable frost. Cowpeas and velvet beans both succeed on poor soils better than the soy bean. The soy bean is preferred for forage purposes on account of its upright growth; it is more easily harvested and cured. "For the production of seed, the soy bean has many advantages over the cowpea and velvet bean. The soy bean matures all its seed at one time and can easily be handled by machinery. Hand picking is most commonly practiced in gathering cowpea seed, although machinery can be used to advantage. It is necessary to pick velvet beans by had because of the abundant, tangled mass of vines."

"The seeds of velvet beans, cowpeas, and soy beans are all excellent feed for cattle and hogs. Cowpea seed, however, is rarely cheap enough for feed, but it is extensively used, especially in the Southern States, for human food. Soy-bean seed, in addition to its value for feed, is valuable for the production of oil and meal, and its use for human food is increasing." Address: Agronomist, Office of Forage-Crop Investigations.

389. Morse, W.J. 1920. Cowpeas: Utilization. *Farmers' Bulletin* (*USDA*) No. 1153. 23 p. Sept. See p. 22.
• ***Summary:*** Table IX (p. 22) lists fertilizing constituents in 100 pounds of dry substance of the tops and roots of important legumes: Red clover, alfalfa, crimson clover, cowpea, soy bean, velvet bean, and common vetch. In the tops, the soy bean contains 2.18 lb of nitrogen, 0.61 lb of phosphoric acid, and 1.68 lb of potash. In the roots, the soy bean contains 1.05 lb of nitrogen, 0.34 lb of phosphoric acid, and 0.67 lb of potash.

Of all these legumes, common vetch has the most nitrogen in the tops (2.99 lb), whereas red clover has the most nitrogen in the roots (2.74 lb) per 100 pounds dry substance. Address: Agronomist, Office of Forage-Crop Investigations.

390. Morse, W.J. 1920. Re: Otootan soy bean variety and Everett Seed Co. Letter (memorandum) to Mr. R.A. Oakley [USDA, Washington, DC], Oct. 9. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Oakley: With reference to the attached letter from the Everett Seed Company [Macon, Georgia] inquiring whether or not the Department would be interested in buying seed of a new soy bean, will say that they refer to the Otootan.

"The Otootan is not new by any means as it was brought into this country several years ago by Professor C.K. McClelland, Agronomist of the Georgia Experiment Station, Experiment, Georgia. It has been tested out by nearly all the southern experiment stations and, although it gives a heavy crop of seed and a very good yield of forage, it has not proved to be any wonder bean.

"The claims put forth by the Everett Seed Company in the first paragraph of the attached letter are rather extravagant and in my opinion the Otootan is not superior to the Biloxi. In a recent letter from Prof. John R. Fain of the Georgia Experiment Station, Athens, Georgia, it is stated that neither the Biloxi or the Otootan varieties are outstanding with them yet although he states, 'we have more hope for the Biloxi than for the Otootan.'

"Furthermore, regarding this letter I note that only two men in the United States have had them up at all until this season.

"I am planning to visit Mr. G.A. Swan of Biloxi, Mississippi, who has a very considerable acreage of this crop. Very truly yours,..."

Note: This is the earliest document seen (May 2012) in which W.J. Morse gives his title as Agronomist; previously he was "Assistant Agrostologist."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

391. Hackleman, J.C. 1920. Re: Soybean varieties. Letter to W.J. Morse, Forage-Crop Investigations, USDA, Washington, DC, Oct. 13. 2 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I want to thank you for your haste in answering our letter and identifying the three samples of beans. I am sending these to Mr. Walworth this morning together with a copy of your letter. Mr. Walworth has something interesting in his county in connection with this bean which he calls Medium Yellow but which we have both designated as typical Ito San. He tells me that it is distinctly later than some of the other so-called Medium Yellow which he has in the county, is making more total growth and will make considerable more seed."

"Remember, we want help to recast our entire soybean

work. We will want you to help us locate pure seed of all of our varieties that we have in the test as there is nothing there that is not mixed with at least one and for the most part three or four different varieties. Dr. Burlison told me some time ago that he wanted me to take charge of the soybean work and recast it for all of the state. So I am depending on you to help me locate pure seed of the varieties needed."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

392. Morse, W.J. 1920. Re: Report of inspection trip to Georgia, Alabama, and Mississippi. Letter to Prof. C.V. Piper, Washington, DC, Oct. 22. 4 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** Morse is writing from Biloxi, Mississippi. "Dear Prof. Piper: I went out to Prof. Tracey's place to-day but was unable to see Mr. Cook. It was thought that he would not be back until evening. I will not get a chance to see him tomorrow as Mr. Swan calls for us early tomorrow morning and no doubt will spend the entire day with him on his plantation near Lyman [Mississippi]. It looks as though some of the seed of Alysicarpus had been gathered but there is considerable more mature.

"I had occasion to see plots of the Otootan soy beans at Athens, Georgia, and Auburn, Alabama. At the Georgia station Mammoth Yellow and a few others excelled it in yield of seed. At Auburn it stood erect and was about five feet high. It seemed to be though as rather shy in seed. At both places, the fault of broken branches was much in evidence. I understand the Hastings Seed Co., Atlanta, and the Everett Seed Co., Macon [both Georgia] are pushing / furnishing [?] it rather strongly.

At Auburn, Alabama, I found things much upset. Couldn't find any one as the entire agricultural building was thoroughly gutted by fire the fore part of the week.

"Here at Biloxi I went in a coffee roasting establishment to observe the process. Was rather interested in seeing how they got rid of the fumes in the process of roasting. In talking with the manager of the company about the possibilities of roasting soy beans for coffee he was very much interested. I promised to send him some of our Mammoth Yellow seed. He said he would roast the beans and send us some samples. I told him about the high oil content of the soy bean but he said the fine grade coffee beans ran from 15 to 18 per cent oil.

"Mr. Oakley has a large quantity of Mammoth Yellow seed which is of low germination. Could you not send this company a bushel of that seed for roasting. The address is:

"Columbia Coffee & Tea Co., 118 E. Howard Ave., Biloxi, Mississippi.

"It is quite possible that we can get something started with them although at the present time it is a small concern. I understand they are to enlarge in the near future.

"At the Florence, South Carolina, substation, the superintendent told me he considered the Victor cowpea the best it had ever grown. At Monetta, South Carolina, it looked fine and will produce an abundance of seed although I was told other varieties in that section would not give many peas.

"Will be with Mr. Greene at McNeill Monday. Very truly yours,..."

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: The Kennedy [Hotel], John J. Kennedy, proprietor, Opposite L&N Depot, Biloxi, Mississippi.

393. O'Brien, Harry R. 1920. A visit to Soyland: Enthusiasts say this wonder crop fills a gap in Corn Belt rotations. *Country Gentleman* 85(44):11, 30. Oct. 30.

• ***Summary:*** The article begins with the lyrics to a song in praise of soy beans: "Oh, my name is Soja-bean; its a good name, don't you see? / And we're growing soy beans to get along. / They are good for lambs and piggies and for all you folks and me, / So we're growing soy beans to get along.

Chorus: Soy beans, oh soy beans, we are growing soy beans to get along. / Soy beans, oh soy beans, we are growing soy beans to get along. / For the land's sake grow more soy beans, in this Corn Belt, don't you see? / 'Twill make fat pocketbooks and credits long. / But if you haven't any money, then we'll let you have 'em free, So you'll grow soy beans to get along."

"Four middle-aged Indiana farmers stood up before an audience of nearly a thousand people one day in early September and sang, to the tune of Kindling Wood, the above song. The four men who comprised this quarter, Taylor Fouts, Garfield Todd, Vern McCloskey and J.E. [Jacob Emmet] Kitchell, are all soy-bean growers, and they sang with all the fervor of a choir at a Methodist revival meeting. And like unto an old-fashioned revival meeting it was.

"But the church was the lawn at Soyland, the home of Taylor Fouts, the one who wrote the song. The preacher was W.A. Ostrander, farm crops extension specialist from Purdue University. The head deacon was A.L. Hodgson, county agent of Carroll County, Indiana.

As visiting talent there were assembled on the platform Prof. G.I. Christie, director of the Purdue Agricultural Experiment Station; Dr. W.L. Burlison, head of the

The Conference Crowd Lining Up for a Soy-Bean Dinner

Department of Agronomy at the University of Illinois; W.J. Morse, in charge of soy-bean investigational work for the U.S. Department of Agriculture; and A.T. Wiancko, head of the Agronomy Department of Purdue University.

"There were also George Briggs of the University of Wisconsin–'Soy Bean Briggs, whose story appeared in a recent issue of *The Country Gentleman;* Dean J.H. Skinner, of the College of Agriculture at Purdue; Prof. Wallace E. Hanger, from Ohio State University; J.C. Hackleman, of the University of Illinois; C.R. Megee, from the Michigan Agricultural College; and Dr. R.S. Smith, head of the Soil Physics Department, from the University of Illinois. There were county agents there by the dozen, including I.J. Matthews, of Pulaski County, Indiana; C.H. Oathut, from Champaign County, and I.S. Brooks, of LaSalle County, from Illinois; and C.G. Fiedner, of Williams County, Ohio, who had driven 150 miles in an auto to be present at the big gathering.

"For audience, there were nearly 1000 farmers and their families, assembled from at least six states...: Ohio, Michigan, Wisconsin, Kentucky, Illinois, and Indiana.

"The occasion was a Corn Belt soy-bean conference held on the Fouts' brothers' farms at Camden, Indiana, south of Logansport, by the extension department of Purdue University in cooperation with the Carroll County Farm Bureau and Fouts Brothers. The purpose was for the leading soy-bean growers of the Middle West to get together, become acquainted, exchange ideas as to growing, handling and marketing soy beans and, if possible, lay the groundwork for an Indiana organization, and perhaps a Corn Belt organization, that would work toward standardization of varieties and business methods in a wider distribution of good seed... If we are to believe what we heard, the soy bean is destined to sweep the country... Speakers declared that it was destined to become the second biggest crop in America, second only to corn."

"It was particularly fitting that this meeting should be on the farms of the Fouts brothers. For these three men, pioneer growers, have been the means of setting the whole country for miles round to growing the beans until at least seventy-five per cent of the farms in Carroll and Cass counties have beans on them–10,000 acres in Cass County and 4000 acres or more in Carroll County–this year.

"So firmly convinced are the Fouts brothers that their salvation lies in soys that they have built their whole system of farm management round the crop.

"They bake 'em and feed 'em to the children. They roast 'em and eat 'em in place of salted peanuts. For at the dinner which was served by the good ladies of the Presbyterian Church there were baked soy beans and parched soy beans furnished, with the compliments of Fouts Brothers, sufficient for the whole crowd. They tasted right good too."

Taylor Fouts, the youngest son, heard about soy beans while at Purdue University. "So when he came home and, in 1903, went to farming on the home place for himself, he put out some beans and began to talk them up to his brothers and neighbors. He began in a small way. His brothers planted beans also" [starting in 1908]. His neighbors thought the idea

The Fouts Brothers. Left to Right: Taylor Fouts, F. E. Fouts and Noah Fouts

of trying to grow beans by the acre was crazy. "They just laughed at Taylor Fouts and his fool notions–his high-toned college ideas."

"But the three brothers stuck to it. Their crops grew larger in yield. The neighbors saw the Fouts lambs top the market and bring special fancy prices year after year. So gradually the soybean idea soaked into the heads of the farmers round that part of Indiana, and they began to grow the beans too.

"On our trip we first drove round Soyland, the 160-acre farm of Taylor Fouts. Next came the 225-acre farm of Noah Fouts, and then the 160-acre farm of Finis E. Fouts, where the same characteristics were noticeable.

"In the fields where soys were grown with corn, the corn was tall, green and thrifty looking. But across the road, in fields on exactly the same soil, corn without the soys was not nearly so tall; it was somewhat fired and of a sickly-yellow color.

"The three brothers own separate farms and are not in any partnership except that they pool their soy-bean seed and sell it under the name of Fouts Brothers.

"Last year round 2000 bushels of beans were sold for seed at an average of about eight dollars a bushel. They averaged twenty-six bushels to the acre."

"The Ito San seemed to have no opposition for being the best smaller, early variety and for hogging or lambing down. Fully half of the men present were in favor of the Hollybrook for a larger, later variety that could be grown for seed. Others spoke up for the Mongol, which was decided by the experts to be practically the same as the Hollybrook. All told, there are only about thirty or forty good varieties.

"The enthusiasm of all the soy-bean growers present at this meeting cannot be described. Soy beans to them are a wonder crop destined to work a change in Corn Belt agricultural rotations, particularly on the lighter types of soils, and run alfalfa a close race. For the soy bean furnishes hay. It provides a good concentrate as well as silage. It makes the land more fertile. Finally, it seems to put pep and optimism into the growers."

Photos show:

(1) "The conference crowd lining up for a soy-bean dinner" beside a big white barn on which is painted "Soyland–Taylor Fouts."

(2) The three Fouts brothers (from left to right): Taylor (owns a 160 acre farm), Finis E. (160 acre farm), and Noah (225 acre farm); they are standing in front of a large sign that says "Soyland–Taylor Fouts."

(3) People in a rowboat on a large pond, with many ducks on the water, in Noah Fouts' front yard.

Note 1. This is the earliest document seen (Oct. 2012) which states that Taylor Fouts has "Soyland" written on a large sign on his barn.

Note 2. Jacob Emmet Kitchell, a physician in Deer Creek, was a relative of the Fouts family. He was the brother of Finis Fouts' second wife, Louanna Kitchel.

394. Morse, W.J. 1920. Re: Article entitled "Soy-Bean Recipes." Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Nov. 17. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Professor Piper: Relative to the attached letter from the Bureau of Chemistry calling our attention to an article entitled 'Soy-Bean Recipes' giving various recipes for the utilization of the soy bean, will say that I do not quite see the reason for any great amount of comment on the matters referred to.

"Most assuredly any manufacturer before putting out an article such as a substitute for coffee made out of soy beans would take the matter up with the Federal Food and Drugs

Act and comply with the regulations. As stated in the letter, the recipes were intended primarily for the information of the housewife during the war period. If we have occasion for any reprints, we will be glad to make any changes that will comply with the Federal Food and Drugs Act regulations. Very truly yours,..."

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: Asst. Agrostologist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

395. Morse, W.J. 1920. Re: Trip to Urbana. Letter to J.C. Hackleman, Dep. of Agronomy, Univ. of Illinois, Urbana, Illinois, Nov. 29. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Hackleman: I have your letter of November 18 advising that you desire to have me come to Urbana in January to give an address at one of your farmers' meetings dealing with the soy bean crop. I am taking up the matter with Professor Piper. He advises that it would be agreeable for me to accept your invitation and that we could make it an official trip from this office.

"As to the subject, I really have not given much thought to it as yet. It has occurred to me, however, that it might be well to choose rather a broad subject taking in the general utilization of the soy bean not only in this country but in the Orient and then deal with the possibilities of the soy bean in this country.

"If it could be arranged, I would prefer to have the address illustrated with lantern slides. We have a very large number of lantern slides here at the office illustrating the different phases of the soy bean industry. Many of the photographs from which the slides were made were taken in Manchuria and China by our agricultural explorer [Frank N. Meyer].

"It is quite possible that I will be able to spend two or three days with you to go over the soy bean investigations project of your station. No doubt at the time of my visit that the Champaign [hotel] will be rather crowded, and I wish you would have a room reserved for me at the Beardsley for at least two or three days."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

396. Morse, W.J. 1920. Re: Sending canned soybeans for use as a green vegetable. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Dec. 1. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "I am sending you today one can each of the Easy Cook and Hahto varieties of soy beans.

"These beans were picked, grown, and canned at the Arlington Farm, Virginia, during the past fall. No doubt I have talked with you concerning the use of the Hahto and Easy Cook for use as a green vegetable, that is, in the same manner as you would use green peas or green limas.

"I will be very glad to have you try these two varieties out and report to me your opinion of them as a food. I have planned to write Dr. Burlison but instead of writing another letter I will simply say that I am sending two more cans of these beans which I wish you would give to Dr. Burlison and obtain his opinion as to their merits."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

397. Hackleman, J.C. 1920. Re: Thanks for accepting our invitation. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Dec. 7. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "We are certainly delighted to know that you have accepted our invitation to appear on our program in January and are doubly pleased to know that Professor Piper has approved of the trip. This will give us an excellent opportunity to work out some of our soybean project work, and I am sure will be of great value to us."

"You will notice that I have chosen for your the topic 'The Utilization of the Soybean at Home and Abroad (Illustrated).'

"The corn belt farmers and I believe your eastern and southern farmers as well, are beginning to realize that the soybean must be studied and some uses found for the seed in addition to its present use which is almost one hundred percent for seed."

"Personally I feel that the soybean growers organization perfected in Chicago should get busy and probably put on an active campaign to increase the consumption of soybeans just as soon as the investigational work provides them with the necessary information.

"I have written Harlan Smith, director of Exhibits, asking him for nine exhibit cases, the most of which were at

Chicago at the International. This list includes your case on soybeans and cowpeas."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

398. Morse, W.J. 1920. Re: What is the soy bean growers' organization perfected in Chicago? Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Dec. 14. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** Morse will be very glad see Prof. Hackleman again and to help him work on his soy bean projects. "I figure that such cooperation will result in the greatest good to the introduction of the soy bean not only in your state but in other states as well.

"I note you refer to a soy bean growers' organization perfected in Chicago. This is the first that I have heard of such an organization and am wondering if it is the result of the meeting at the Fouts Bros Farm, Camden, Indiana, the fore part of the September and if the same minds are behind this proposition as led the one at Camden. I will be very glad if you can give me further information regarding this subject as I endeavor to keep in touch with anything that has to do with the soy bean and its possibilities."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

399. Morse, W.J. 1920. Re: Companies in Virginia and the Carolinas that are using soy beans to make oil and cake. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Dec. 14. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Replying to your letter of December 6 requesting names and companies in Virginia and the Carolinas who are utilizing soy beans for the production of bean oil and bean cake, will say that I do not know of any at the present time. In so far as I know, no oil companies in the South have handled soy beans since about 1917. Seed raised in the Carolinas has brought such good prices for planting purposes that the oil mills have not been able to purchase any seed for crushing.

"In 1917 the seed that was crushed for oil was not domestic grown seed, but was imported seed that was originally intended for Sweden or Germany by the submarine route and the vessel was held up in the Panama Canal. The company was forced to sell the seed in this country to oil mills in eastern North Carolina and one oil company in South Carolina obtained all of the seed which was used for oil and oil meal. If you are to take up the matter with the companies that did the handling of soy beans and obtain information as to their methods, etc., I refer you to the following:

"Farmers Cotton Oil Co., Wilson, North Carolina,

"Hartford Cotton Oil Co., Hartford, North Carolina,

"Newbern Cotton Oil Co., New Bern, North Carolina,

"Sea Island Cotton Oil Co., Charleston, South Carolina."

Note: This is the earliest document seen (Feb. 2009) concerning soybeans in the Canal Zone or the Panama Canal. The soybeans were on a ship which passed through the Panama Canal in 1917. The Canal Zone was owned and operated by the United States at this time. This document contains the earliest date seen (1917) for soybeans in the Canal Zone.

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

400. Morse, W.J. 1920. Re: The forage crop entries at the International Grain and Hay Show held at Chicago. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Dec. 14. 3 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Professor Piper: I am giving below a short statement regarding the forage crop entries at the International Grain and Hay Show held at Chicago, November 27–December 4, 1920 in connection with the International Live Stock Show. The exhibits or entries of hay were small and comprise but three crops as follows:

"Red clover–5 entries

"Alfalfa–11 entries

"Timothy–10 entries

"These were for the most part put up in commercial size bales though there were several odd sized and odd shaped bales among the lot. In this respect the entries were much better than in 1919 when all sorts of bundles and bales were entered. One thing noticeable at last year's show was that the blue ribbons were given for hay cut at quite an early stage of growth and much earlier than would be practical in regular farming operations.

"The entries of forage crop seeds were much larger

and covered a wider range of crops than was the case with hay. The samples were about one peck [= 8 quarts = ¼ bushel = 8.81 liters] in size. The following is a list of the crops together with the names and addresses of the persons winning prizes:

"Soy Beans–65 entries

"First prize,–H.E. Shrock, Kokomo / Kakamo [?]. Indiana.

"Second prize,–Johnson Seed Farm, Stryker, Ohio.

"Third prize,–Johnson Seed Farm, Stryker, Ohio.

"(Out of the 65 entries, 36 were yellow seeded and 19 black seeded).

"Field Peas–35 entries.

"Names of prize winners not secured.

Milo–7 entries (6 heads each)

"First prize–R.E. Getty, Hays, Kansas.

"Kaffir–19 entries

"Names of prize winners not secured.

"Cowpeas–10 entries... The prize-winning varieties were as follows: 1. Whippoorwill. 2. New Era. 3. Small Blackeye. 4. Groit. 5. Large Blackeye.

"Alsike Clover–28 entries.

"Red clover–43 entries.

"Timothy–33 entries.

"Alfalfa–30 entries...

"Yours truly, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agronomist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

401. Hackleman, J.C. 1920. Re: The soy bean growers' organization perfected at Chicago. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Dec. 18. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "The Soybean Growers' Organization perfected at Chicago was a definite outgrowth of the Indiana meeting. Officers elected were: Will Riegel, Tolono, Illinois, President; Taylor Fouts, Camden, Indiana, 1st vice-president; C.T. Newton, Bowling Green, Ohio, 2nd vice-president, and W.A. Ostrander, W. Lafayette, Secretary. The main reason for perfecting an organization was merely to have a committee working on arrangements for a summer meeting next year. Campaign County has been selected as the meeting place and we're planning on having a much larger meeting than they had in Indiana and hope to have the cotton belt as well as the corn belt soybean men in attendance. We have already extended invitations to the Kentucky, West Virginia and Carolina growers asking them to keep this matter uppermost in their minds and put Champaign county on their itinerary if they are planning a western trip. You should also keep this in mind, as needless to say, we are expecting you to be at the meeting."

Note: This is the earliest document seen (Oct. 2007) concerning officers of the American Soybean Association–originally named the National Soybean Growers' Association (until 1925).

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#3.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

402. Morse, W.J. 1920. Re: Soy bean recipes. Letter (memorandum) to Mr. R.A. Oakley [USDA], Dec. 18. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Oakley: Referring to the attached letter of Dr. Alsberg to Dr. Taylor regarding the multigraphed page of soy bean recipes, will say that the corrections suggested by Dr. Alsberg have been incorporated in the sheet, and if we obtain any more of the sheets they will be along the lines suggested by Dr. Alsberg. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

403. Morse, W.J. 1920. Re: Sources of soy bean seed. Letter (memorandum) to Mr. R.A. Oakley [USDA], Dec. 18. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Oakley: Referring to the attached letter from Mr. A.B. Ross requesting sources of seed, will say that I will be able to furnish him from our files the names of a large number of reliable growers of different varieties of soy beans.

"The matter of good seed and pure varieties of this crop is being taken up by some of the States such as Iowa, Missouri, Illinois, Wisconsin and Ohio. It is quite possible for Mr. Ross to obtain the names of reliable growers also from the State experiment stations of the above States. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

404. Morse, W.J. 1920. Re: Cooperating with County Agents in testing soy bean varieties. Letter (memorandum) to R.A. Oakley, Forage Crop Investigations, Washington, DC, Dec. 29. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Oakley: With regard to the attached letter from Mr. M.V. Barnes, County Agent, St. Johnsbury, Vermont, will say that I think it rather desirable to cooperate in testing out varieties of soy beans with County Agents. I have had experience–especially this last summer–in putting out varieties under the direction of County Agents and have had most excellent results."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

405. W.J. Morse and USDA co-workers in the 1920s (Photographs). 1920.

• ***Summary:*** (1) 1920–Division of Forage Crops. Shown left to right are F. McDonald, C.W. Reed, Arthur Jones, A. Lydenberg, P.L. Ricker, Lyman Carrier, A. Hansen, and H.L. Westover. A note by Joyce Garrison next to the photo reads, "Harvey L. Westover: A very good friend of my parents. I called him Uncle "H." He roomed and boarded at my father's parents' house." (2) 1920–Division of Forage Crops. Shown left to right are L.W. Kephart, B.C. Connor, W.J. Morse, C.V. Piper (Chief of the Division), A.J. Pieters, R.A. Oakley, Roland McKee, and H.N. Vinall.

(3) 1923 Sept.–W.J. Morse talking to farmers on Soybean Field Day in Effingham, Illinois. (4) 1928–Morse with others at the American Soybean Association meeting in Lafayette, Indiana. (5) 1928–W.J. Morse with Glenn McElroy of Ohio at the American Soybean Association meeting in Lafayette.

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).

406. W.J. Morse standing with members of USDA's Division of Forage Crops (Photograph). 1920.

• ***Summary:*** Morse appears to be 3rd from the left. This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

407. Piper, C.V. 1921. Re: Dr. Bigelow wishes to postpone conference. Letter to W.J. Morse, [USDA], Jan. 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Dr. Bigelow has just phoned me that he wishes to postpone the conference on soy beans and will advise by telephoning a date that will be convenient. In the meantime I suggested it would be well for them to examine the product that we wish to discuss, and I would therefore suggest that you send him one can each of Easy Cook and of Hahto green soy beans. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

408. Morse, W.J. 1921. Re: Soy bean oil. Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Jan. 14. 2 p. Typed, with signature.

• ***Summary:*** "Dear Professor Piper: Concerning the request of Mr. McRae relative to the soy bean and its new products [such as "oil meal and flour"] as a basis for an industry to be used in developing a community... Eastern North Carolina strikes me as one of the best localities for the carrying out of

such an idea. At the present time North Carolina produces over one-half of the soy bean seed of the United States. The oil mills of that State have shown in previous years that it is possible to utilize the soy bean for the production of oil and meal without any great changes in the cotton oil mill equipment. In the erection of a community mill no doubt much could be learned from the experience of the several cotton oil mills which have utilized soy beans extensively in the past."

"From statistics furnished by the Food Administration, it was shown that soy bean oil is employed very extensively in the manufacture of lard and butter substitutes and quite largely in the manufacture of soap and paints. That the demand for soy bean oil in this country is very large is borne out by the large importation of the oil from the Oriental countries."

Morse attaches a table showing the steady rise of imported soy beans, soy bean oil, and soy bean meal since 1910. Large amounts of the meal are apparently being used in the manufacture of feeds. The large quantities of soy beans are quite likely being used, for the most part, by oil mills of the Pacific Coast. Morse calculates that the 67,000 bushels of soy beans imported in 1920 cost about $3.20 a bushel. "The latest quotations I have of Mammoth Yellow soy beans in the South show seed in lots of 100-500 bushels at $2.00 per bushel. Therefore, it is quite likely the farmer is getting somewhere around $1.50-$1.75. With the development of an oil mill the community is provided with a market that will undoubtedly aid the soy bean in becoming a staple. Such a mill should be fitted not only to crush oil but to be in a position to furnish the meal as a feed. There is no doubt in my mind that with a little advertising in the dairy regions of the North that almost unlimited quantities of soy bean meal would find a ready market. Later on possibly a little more advertising would develop the soy bean flour industry all of which could be readily handled by the community mill.

"Another factor which might enter into such a community where soy beans would be largely grown is the matter of different varieties seed of which is constantly in demand for forage purposes. Such varieties as the Virginia, Wilson-Five, Peking and Sable are varieties which a community might handle and be counted upon as a reliable source of seed of these varieties.

"At the present time I do not think that suggestions as to other soy bean products would be feasible. The oil and oil meal appears to me to be the one best thing for such a community."

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. Folder–Morse, W.J.–#2 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

409. Morse, W.J. 1921. Re: Enclosing Hahto and Virginia soybean varieties. Letter to Mr. Adrian A. Parsons, Plainfield, Indiana, Feb. 8. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Parsons. No doubt you will recall that during my visit with you last September I promised to send you a small amount of seed of the Hahto and Virginia varieties of soybeans. The Hahto variety is being recommended for use as a green vegetable the same as you would use the green lima or green garden pea. The Virginia is strictly a forage variety and gives not only an excellent yield of forage but also of seed also.

"We will be glad to have you try out these varieties and give us your opinion as to their merits in comparison with the others which you have grown.

"Very truly yours,... 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–General Correspondence, 1905-29. Box 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

410. Wiancko, A.T. 1921. Re: Request to name soybean varieties. Letter to W.J. Morse, Agronomist, Bureau of Plant Industry, Washington, DC, Feb. 8. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "We have been testing a lot of numbered varieties for the last five years and a few of the most promising have been multiplied somewhat. Among these, we are especially interested in #28050, #30600, #30601, #30747, #36846, and #36918, and are wondering if any of these have been named or multiplied elsewhere and put out in commercial quantities. If not, would there be objection to our naming one or more of the better of these and multiplying them for general use? If you have any suggestions regarding naming or any other point in this connection, I should be glad to hear from you."

On Feb. 23 Morse writes back that "none of these varieties have been given common names. There will be no objection to your naming one or more of the better numbers, and in naming them I will be very glad to have you write me so that I can keep a record in our files and thus prevent any other station from giving them another name.

"In the naming of the varieties, I might suggest that it would be preferable not to give any such names as Medium Yellow, Medium Green, but to give some distinctive Indiana name showing the origin."

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–#8.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Chief in Soils & Crops, Purdue Univ. Agric. Exp. Station, Lafayette, Indiana.

411. Morse, W.J. 1921. Re: Dealing with confusion in soy bean variety names. Letter to Prof. A.T. Wiancko, Chief in Soils and Crops, Indiana Experiment Station, Lafayette, Indiana, Feb. 12. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "In view of the large number of varieties of soy beans that are being grown and the confusion that is resulting from the increasing number of varieties, we are planning to make a thorough classification of all varieties now in the hands of seedsmen and growers. We are planning to conduct this classification test at Arlington Farm [Virginia] this coming summer and are obtaining all varieties now handled by seedsmen. Our request to the various seedsmen has been well responded to and we are obtaining a large number of varieties.

"In addition to the varieties handled by the growers and seedsmen, I thought it might be well to include the different named varieties that each of the experiment stations handled in their variety trials during 1920. We will appreciate it very much if you will be kind enough to send us about a two-ounce sample of each of the named varieties included in your variety trials the past season."

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–#8.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

412. Morse, W.J. 1921. Re: Article entitled "Hahto Beans are Promising Crop for Northern States." Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Feb. 23. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Professor Piper: With regard to the attached article for press service entitled, 'Hahto Beans are Promising Crop for Northern States' [sic, 'Hahto Soy Bean a Promising New Variety for Food'], will say that after reading the article over I have not attempted to make any corrections thinking it would be better to rewrite the whole article.

"In the first place, the article is rather misleading as it might be construed that this variety is a new sort especially adapted to northern conditions. This is not the case as the variety is especially adapted to the northern part of the cotton belt and the southern part of the corn belt. The Hahto, however, can be grown in the Northern States as a green vegetable bean. I am attaching herewith the article as I have rewritten it. Very truly yours,..."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

413. Morse, W.J. 1921. Hahto soy bean a promising new variety for food. Washington, DC. 2 p. Unpublished manuscript. Feb. 23. 28 cm.

• ***Summary:*** "Attention farmers in the Southern and Central States is being attracted to the Hahto variety of soy beans as a most palatable and nutritious green vegetable similar to lima and butter beans. A small packet of seed of this variety was obtained by a missionary at a county agricultural exhibition in Japan about five years ago and sent to the Department. In the variety trials it appeared exceedingly promising for use as a green vegetable and was found very prolific. During the past two years it has been grown extensively by the boys' and girls' canning clubs of the Southern states and the past year was in general distribution. Reports indicate a large number of successful results with the Hahto 'both for man and beast' as stated in many of the reports. Its popularity has caused it to be listed the present season by two large seed houses in the Eastern States.

"Although the Hahto is best adapted to the Southern States and the southern part of the corn belt, it may be successfully produced as a green vegetable much further North. As a green vegetable, the pods should be picked when the seed is almost full grown. These beans may be canned like green peas and make an excellent green vegetable for the winter.

"The Hahto is a bush variety, very prolific and suitable for forage and produce. It requires about one hundred and thirty days to reach full maturity but may be used as a green vegetable in about one hundred and fifteen days. In addition to its use as a green bean, the mature seeds make an excellent dried bean more easily cooked and a better flavor than the varieties of soy beans ordinarily obtained on the market."

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: Agronomist, Forage-Crop

Investigations, Bureau of Plant Industry, USDA, Washington, DC.

414. March 5–Henry C. Wallace (R), Iowa (Iowa State College), becomes U.S. Secretary of Agriculture under President Warren G. Harding (1921-1923) (Important event). 1921.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

415. Oakley, R.A. 1921. Re: Varieties of soy beans and cowpeas suitable for Long Island, New York. Letter (memorandum) to W.J. Morse, [USDA], March 7. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I will be greatly obliged if you will indicate two or more varieties of soy beans and cowpeas that would be suitable for Long Island. We would like to send 2 or 4 pounds each of these two varieties to Mr. Joseph L. Delafield, Quioque / Quogue [?] Point Farm, Westhampton Beach, Long Island, New York. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

416. Morse, W.J. 1921. Re: Article on "Soy Bean Oil May Prove an Industry in the Future." Letter (memorandum) to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, March 21. 3 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Piper: With regard to the attached under [?] article, "Soy Bean Oil May Prove an Industry in the Future", will say that at your suggestion I have rewritten the article. I have this matter up so that I might get some information from oil mills and importer regarding the present situation of the soy bean and its products. As far as I have been able to find, no soy beans have been crushed in the United States during the past two years. This refers to both domestic and imported soy bean seed.

"With regard to Dr. Taylor's question on the importation of soy bean oil for 1920, will say that the figures given in the news letter were obtained from the Commerce Reports. Relative to the difference in the statistics as given by Senator Stevens [?], February 24, will say that the difference [?] to our figures for the year ending June, 1920, and those of Senator Stevens for the calendar year of 1920.

"As to the average price of oil, about 12¢, will say that even at this price it would hardly render the soy bean crop profitable to grow in this country for crushing...

"Very truly yours, Agronomist."

"Soy Bean Oil Production: The large annual importations of soy beans and its by-products, oil and meal, and the rapidly increasing acreage of soy beans in this country, would seem to indicate the possibilities of a future industry for domestic grown soy beans. For the year ending June 30, 1920, 4,022,552 pounds of soy beans valued at $213,693,195, 195,773,594 pounds of oil valued at $25,235,590 and 16,273,785 pounds of cake valued at $408,695 were imported. Soy bean oil suitable for various commercial purposes is used principally in the manufacture of lard and butter substitutes and soaps and to some extent of many grades of paint. The cake is used in the manufacture of cattle feed and has become quite popular in the Pacific Coast States.

"Soy bean oil was first manufactured from imported beans about 1911 by oil mills on the Pacific coast and from domestic grown beans in North Carolina in 1915. According to available Census statistics, no soy beans were crushed for oil in this country in 1919 or 1920. The failure of a soy bean industry to become established may be ascribed to the prevailing high price of seed due to the rapid increase in acreage which has taken practically all domestic grown seed. With the large acreage devoted to soy beans, it might be assumed that a large production of seed would result in a large surplus of seed and correspondingly low prices Under such conditions oil mills would be in a position to crush domestic grown beans profitably. As yet, however, the soy bean in looked upon in the United States primarily as a forage crop. The extensive production of seed is confined to only a few localities. In many states, especially north of the cotton belt, from 75 to 95 per cent of the soy bean acreage is utilized for pasture, ensilage and forage.

"With the present low prices of oil and cake and the high price of domestic grown seed, oil mills are not in a position to crush soy beans profitably. The soy bean is now on an established footing throughout the eastern half of the United States and is a staple crop in many sections, especially the Southern States. The production of soy beans as an oil seed will undoubtedly be confined to the cotton producing states. Although the crop will probably never attain such importance as cotton, it will be raised on a large or small scale with respect to the local conditions, proximity to oil mills, and the farm uses to which it is put."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agronomist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

417. Piper, C.V. 1921. Re: Send soy bean varieties to Dr. C.S. Hillspaugh. Letter to W.J. Morse, [USDA], March 22. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I wish you would send one-pound lots of seed of as many varieties of soy beans as you have available to Dr. C.S. Hillspaugh, Field Museum of Natural History, Chicago, Illinois. Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

418. Morse, W.J. 1921. La industria del "soy bean" en los Estados Unidos [The soybean industry in the United States]. *Revista de Agricultura, Comercio y Trabajo* (*Cuba*) 4(3):521-24. March. [1 ref. Spa]
• ***Summary:*** This is a translation of Morse 1918, from the USDA *Yearbook of Agriculture* (1917). Contents: Early history of the soy-bean industry. The soy bean in the United States. Cultural requirements. Varieties. Soya as forage. Soya for oil. Soy-bean meal (*Harina de "Soya"*). Soy beans for human food: Dried beans (*frijoles de soya secos*), green vegetable soybeans (*frijoles de soya verde*), soy-bean milk (*leche de frijol de soya*), soy-bean cheese (*queso de frijol de soya*), soy sauce (*salsa de soya*), soy-bean sprouts (*brotes de frijol de soya*). Possibilities of the soy-bean industry in the United States.

A table shows the quantity and value of soybeans (*Frijoles de soya*), soybean cakes (*Tortas de soya*), and soybean oil (*Aceite de soya*) imported by the United States from 1910 to 1917, inclusive.

Note 1. This is the earliest Spanish-language document seen (June 2009) that uses the term *frijoles de soya verde* to refer to green vegetable soybeans.

Note 2. This is the earliest Spanish-language document seen (April 2012) that uses the term *salsa de soya* to refer to soy sauce.

Note 3. This is the earliest Spanish-language document seen (Jan. 2013) that uses the term *brotes de frijol de soya* to refer to soy sprouts. Address: USDA, Washington, DC.

419. Westover, Harvey. 1921. Re: Arrange for various silage crops. Letter to W.J. Morse, [USDA], April 8. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I wish you would kindly make arrangements to have one-twentieth-acre plots of the following crops for silage put out at our Arlington Farm this season.

"Beggar Weed, Hemp, Russian Sunflower, Jack Beans, Velvet Beans, Corn, Sorghum, Soy Beans, Cowpeas, Buckwheat.

"Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

420. Hackleman, J.C. 1921. Re: Request for soybean varieties. Soybean menu for next August. Letter to W.J. Morse, Bureau of Plant Industry, Washington, DC, April 27. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "This will confirm our night letter which read as follows: Final plans soybean work here at Experiment Station approved. Necessary for us to secure pure seed of most varieties. Can you furnish us 12 pounds each of the following varieties: Hongkong, Haberlandt, Virginia, Mandarin, Columbian, Arlington, Wilson-Five, Morse, Hahto?

"I hope that you can furnish us with all of this seed as we are very anxious to get just as much of it as possible from Washington [DC] realizing that we will get authentic samples and seed that is true to name.

"I have just had a call from the Home Economics people and they are beginning to work on the soybean menu which will be used at our Soybean Day next August. They have asked me to get from you all the recipes you have available on soybean dishes. Will you kindly send these at your earliest convenience.

"We have promised to get from them some soybean flour. Will you kindly let me know what it would cost us to get 25 pounds of this flour. We have a machine here for grinding grain samples and I am wondering if we could grind up the whole soybean and use it or would the hull be troublesome until it is bolted out.

"I would also like to bother you for the name of the Canning Company in Ohio that are going to can the Hahto soybeans. I am wondering if we could not interest them in furnishing us with canned soybeans for our dinner next summer instead of drawing on our friend Heinz of the 57 Variety Fame [H.J. Heinz Co. of the "57 Varieties" fame].

Note. This is the earliest English-language document seen (June 2013) that contains the term "canned soybeans" or the term "whole soybeans."

"I realize that no one bothers you more than I do nor has the nerve to ask more questions, but I hope you will appreciate that I bother you so much because I always get service and information then I write you. With kindest personal regards and best wishes..."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: In Charge, Farm Crops Extension, Agric. Exp. Station, Urbana, Illinois.

421. Morse, W.J. 1921. Re: Soybean varieties. Letter to J.C. Hackleman, Dep. of Agronomy, Univ. of Illinois, Urbana, Illinois, April 29. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "I have your letter of March 22 enclosing a list of soy bean variety demonstrations for counties in Illinois the coming season." Morse does not have a few of the varieties Hackleman requested, namely Ohio 9035, Columbian, Black Beauty, and Ebony. He suggests alternatives, based on the county where each is to be grown.

"No doubt you will recall that during my visit with you last January I mentioned the matter of arranging a variety trial which might be of interest to the members of the National Soy Bean Growers' Association which meets at Urbana and Tolono about the 1st of September. As suggested then, I thought perhaps an eight-rod row of all the important varieties now being grown in the United States would give the soy bean growers some idea of the characteristics and general merit of the different sorts. Of these varieties, I submit to you the following list and would like to have you advise me just what your opinion of this plan is. We can furnish seed of a good share of the varieties as it will not take from one-quarter to one-half pound of seed of each for seeding an eight rod row.

"Yellow varieties–Mandarin, Ito San, Manchu, Elton, Soysota, Hoosier, A.K., Mongol, Hollybrook (north), Hollybrook (south), Mikado, Chiquita, Haberlandt, Easy Cook, Mammoth.

"Olive Yellow (yellowish green)–Tokio, Lexington, Hahto, Morse.

"Green–Columbian, Medium Green.

"Brown–Chestnut, Minsoy, Early Brown, Virginia, Ohio 9035, Mammoth Brown, Biloxi, Barchet.

"Black–Wisconsin Early Black, Ebony, Peking, Sable, Wilson-Five, Wilson, Laredo, Shanghai, Otootan.

"Bicolored–Black Eyebrow."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Note: This is the earliest document seen (July 2013) that mentions the soybean varieties Minsoy or Soysota.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry [USDA], Washington, DC.

422. Morse, W.J. 1921. Re: Soybean varieties, recipes, and flour. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, May 4. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "I would suggest that you write to the Missouri Experiment Station for seed of the Morse and also the Columbian [varieties]. As to the Hongkong variety, I do not know of any station having seed of this variety.

"With reference to a soy bean menu for the Home Economics people... We have a very large number of recipes for all sorts of dishes made from soy beans. I have been collecting these for the past few years and a large number of them I know you would not care to make use of... I will also include a menu which was made up for a member of the Garden Club of America and which was used at a soy bean dinner about a year ago.

"Relative to soy bean flour, I will say that I do not know at present just where you can obtain this. I know that the Waukesha Food Products Co., Waukesha, Wisconsin, were manufacturing this flour [Hepco Flour] two or three years ago but recently I have not had any word from them."

The company in Ohio which is planning to can the Hahto soy beans is the DeGraffe Canning Co., DeGraffe, Ohio. However, Morse thinks he will be able to supply Hackleman "with a fair quantity of green canned Hahto soy beans if your request is not too large. We have a number of cans that were put up last fall..."

"Please do not think you are bothering me with questions or that your requests trouble me as I am always very glad to aid you in whatever way I can. I certainly do appreciate the many ways in which you and your station are aiding in the soy bean work and it is no more than right that I respond."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

423. Hackleman, J.C. 1921. Re: Testing soybean varieties in Illinois. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, May 11. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "I am going to take up the question of these additional varieties up with Dr. Burlison and see what he thinks about adding them to our list. As I understood the request made by the soybean growers at Chicago, they

wanted us to grow soybeans, seed for which would be furnished by each of the several states here in the Middle West. Each state was to send only two or three varieties and these were to be their best. Indiana, for instance, sent us Ito San and Holly Brook [Hollybrook]; Michigan furnished Manchu, Ito San, Black Eye Brow; Ohio furnished Ito San, Manchu, and Ohio 9035; etc. I doubt if they would be interested in seeing a large number of new and perhaps uncommon varieties. I think they are more interested in the common standard types."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

424. Morse, W.J. 1921. Re: Request for named soybean varieties to conduct classification study. Letter to Parsons-McKinnis Co-operation, Camby, Indiana, May 13. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Attention: G.P. McKinnis. Gentlemen: Your circular letter of recent date advising that you had a large stock of leading varieties of soy beans has been received.

"In our work at Arlington Farm, Virginia, this year we are planning to conduct a classification study of all named varieties of soy beans. We have taken the matter up with leading seed growers and seedsmen in this country and all of the experiment stations. It has been our plan to obtain from each of the above one or two ounce samples of all of the named varieties that they are handling. Up to the present time we have received a very large number of samples.

"We will appreciate it very much if you will send us small samples of the varieties which you have in stock so that we may have them for our tests. I might say that we are very glad indeed to obtain your notice and will be glad to refer inquiries regarding sources of soy bean seed to you."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

425. Morse, W.J. 1921. Re: The best man to represent soy bean growers of Ohio. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, May 16. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "With reference to a suggestion as to the best man to represent soy bean growers of Ohio, will say that Mr. Edward Johnson of Stryker, Ohio, perhaps is one of the most extensive growers in varieties. There is also a Mr. J.W.R. Smith who has been doing a very considerable amount of work with soy beans for several years. Mr. Smith's address is Adena, Ohio. Probably Professor C.G. Williams, Wooster, Ohio, or Dr. J.B. Park of the Ohio Agricultural College, Columbus, Ohio, can put you in touch with somebody other than the two mentioned above."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

426. Wiancko, A.T. 1921. Re: New names for four soybean varieties. Letter to W.J. Morse, Agronomist, Bureau of Plant Industry, Washington, DC, May 20. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir:–Referring again to the matter of naming some of the numbered varieties of soybeans furnished by the Bureau some years ago, I beg to report that we have decided to increase and commercialize #28050; 30600; 36576; 36846, and have named them as follows:

"#28050... Pinpu

"#30600... Wea

"#36576... Feldun

"#36846... Dunfield

"If these names are agreeable to you, kindly record them in case others who have received seed of these numbers, should purpose names for them."

Note: After the name "Feldun" Morse writes in "Aksarben." On May 24, Morse writes Wiancko: "With the exception of #36576, the other names are agreeable to us. Concerning #36576 will say that this number was given the name "Aksarban" [Aksarben] by the Nebraska Experiment Station in the spring of 1919. It seems, therefore, this number should have the name 'Aksarban.' In fact, during the summer of 1919 and during the years 1920 and 1921 a considerable amount of seed of this variety has been distributed. The other names you have given have been recorded so that no other names can be given them."

On July 27, R.A. Oakley (Acting Agrostologist) writes Wiancko to ask whether he or any of his collaborators are employees of commercial organizations–such as seed companies. Only July 1, Wiancko writes back that they are not.

Note: This is the earliest document seen (July 2013) that mentions the soybean varieties Dunfield, Pinpu, or Wea. Morse wrote the variety names by hand on Wiancko's

letter of May 20. Then typed "Aksarban," intending to type Aksarben, in his reply of May 24.

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–#8.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Chief in Soils & Crops, Purdue Univ. Agric. Exp. Station, Lafayette, Indiana.

427. Morse, W.J. 1921. Re: The market for soy bean harvesters in China. Letter (memorandum) to R.A. Oakley, Forage Crop Investigations, Washington, DC, June 7. 1 p. Typed, with signature on USDA letterhead.

• ***Summary:*** "Dear Mr. Oakley: No doubt you will recall that a few days ago I gave you a letter from Mr. Roland P. Baile [an inventor, from Maryland] in which he asked me regarding the possibility of the Department aiding him in developing a soy bean harvester for China."

"From my way of thinking, China would be about the last place I would want to go if I had a soy bean harvester which I wished to put on the market. As you well know, Chinese labor is rather a cheap commodity throughout China and also on account of the labor problem I doubt very much if a labor-saving soy bean harvester would be received with open arms by the Chinese.

"As I recall, in conversation with the late F.N. Meyer, the Chinese farmer's holding is rather small, in fact, each farmer has rather a small piece of land devoted to soy beans and in many sections of central and southern China the soy bean is planted around the borders of the farm and around the rice paddies; in fact, they sort of utilize the soy bean for taking up any vacant space that may result from different causes. Even in Manchuria which is really the soy bean region of China, I have my doubts about the harvester being successful from Mr. Baile's point of view, that is, in selling them."

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. Folder–Morse, W.J.–#3 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

428. Cauthen, E.F. 1921. Re: Request for literature on soy beans. Letter to Mr. W.J. Morse, Agronomist, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, July 20. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse:–In reply to your request for copies of any literature published by this Station on soybeans, I am sending you under separate cover bulletin #203 and bulletin #154. These bulletins are about all that has been published from this station on soybeans. There is a short form of bulletin #203 published on #204 [sic, as #202]. This does not contain anything that is not included in #203. I am sorry that I cannot send you two copies. It is by chance that the Station has copies of these and can spare one of each, as you may know the Station had the misfortune last fall of losing all of its bulletins by fire.

"Yours very truly, Agriculturist."

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.

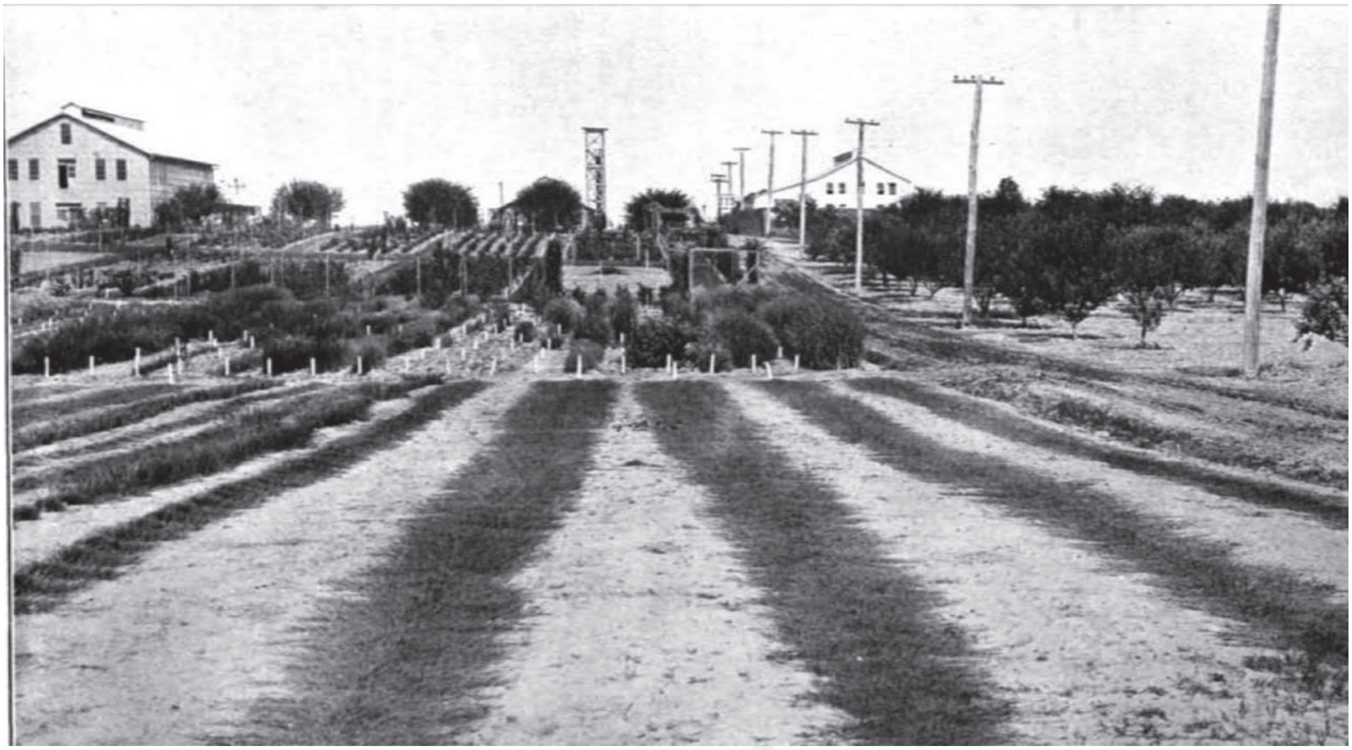
Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agriculturist, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

429. Piper, C.V.; Oakley, R.A. 1921. Vegetative propagation of putting green grasses. *Bulletin of the Green Section of the U.S. Golf Association* 1(7):124-26. July 20.

• ***Summary:*** "Any grass can be propagated in at least two ways, one by seed, the other by a portion of the parent plant. In bunch grasses a tuft can be subdivided into many portions each of which will grow readily. In creeping grasses a new plant can be produced easily from a single joint of a rootstock or runner. This can indeed be done with nearly any grass, but it is particularly easy with creeping grasses. Indeed, it has long been employed by farmers in planting fields to such grasses as Bermuda and Para. This method of planting is called *vegetative propagation.*

"Some years ago, in studying the behavior of creeping bent–all in all, the best of putting green grasses–we discovered that a single plant, under favorable condition, would make a mass of turf six feet in diameter in a single year. The turf really consisted of innumerable runners, or stolons, radiating from the start at the center and rooting at each joint. It was at once evident that this grass could easily be propagated vegetatively. The runners were lifted, chopped into joints about two or three inches long, scattered over well-prepared soil, rolled in, and then covered lightly with soil. The quickness of growth of the joints thus planted is truly astonishing. At first only small plots of turf 8 by 8 feet were thus produced, the turf from each parent plant being perfectly uniform in color and texture. The finest of these were selected for further investigations."

"Already a considerable number of putting greens have been planted by the vegetative method. It can safely be said that some of these greens, notably No. 9 at the Columbia Country Club, and No. 9-A at the Potomac Golf course, both in Washington, are covered with the finest turf ever grown



anywhere at any time.

"But there is the inevitable fly in the ointment. The bents are greatly subject to the 'brown-patch' disease which so greatly injures putting greens in July and August and which, indeed, is the most serious menace to fine turf that we have to confront."

On page 125 is a full-page photo of Arlington Farm, Virginia, with two large buildings, telephone poles, many plants growing in plots, and perhaps a clock tower in the background.

Note: William Morse did all of his early investigations with soybeans at Arlington Farm. Address: Chairman and Vice Chairman, respectively, of the Green Section of the USGA [Bureau of Plant Industry, USDA].

430. Morse, W.J. 1921. Re: Article entitled "Soy Beans Satisfy Critical Farmers." Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Aug. 25. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Professor Piper: Relative to the attached News Letter article, 'Soy Beans Satisfy Critical Farmers,' will say that I have looked over the manuscript and made several corrections. As the material now stands, I see no reason why it cannot be published. Very truly yours,..."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

431. Pieters, A.J. 1921. Re: Letter from Ralph M. Johnston of Brookings, South Dakota. Letter to W.J. Morse, USDA, Sheldon-Munn Hotel, Ames, Iowa, Aug. 31. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. Oakley has referred to you and me a letter from Ralph M. Johnston, Extension Agronomist, Brookings, South Dakota.

"He asks for information on growing and harvesting and threshing soy bean seed with the ordinary machinery that the small farmer may have and possibly the addition of some home made machine or attachment.

"Will you kindly answer Mr. Johnston?

"Very truly yours,..."

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: Agronomist, Charge Clover Investigations [Bureau of Plant Industry, USDA, Washington, DC].

432. Dungan, George H. 1921. Soybeans again assert their value: The Second Annual Corn Belt Soybean Day–September 1, 1921. In: R.W. Judd, ed. 1979. 50 Years with

Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 68-71. Also In: Windish 1981, p. 181-84.

• ***Summary:*** "When Old 'Sol' first peeped between the swiftly moving clouds on the morning of September first, He saw a yellow road sign on a highway in eastern Illinois. We can imagine that His eye followed down the road, because the yellow card bore a big black arrow and carried the words 'Soybean Day,' in bold type. And as he sought out the sign at the next crossroad, He saw a Ford drive up and stop. The driver was looking about, seemingly, to get some suggestion as to which road to take. Presently his eye, too, caught sight of the yellow card. A happy smile spread over his face, his left leg straightened and then bent again, our driver and his family were on their way. The lapse of time gave the solar observer a wider view. His eye moved rapidly down the road and then from road to road throughout central Illinois. All crossings were marked with a Soybean Day card. The arrows pointed to a common center–Champaign. Many automobile drivers are following them, eager on their way, and with an expectant look on their faces.

"The results was that by a little after 8:30 on the morning of the first of September, 350 people were assembled on the Agronomy South Farm, University of Illinois. There were those in this crowd who had grown beans extensively for many years; those who had just recently taken up the culture of soys; some who would be soybean growers but desired further information; newspaper reports; moving picture men, etc. There were representatives from Washington, D.C., 35 counties of Illinois, 9 counties of Indiana, 3 counties of Kentucky, and one county each of Missouri, Ohio and Wisconsin.

"Dr. W. Burlison first explained the layout of the Agronomy South Farm, dwelling particularly upon the rotations on which soybeans appeared. Professor J.C. Hackleman outlined the experimental work that is being done with soybeans. The soybean series in the Northwest rotation is devoted to a preliminary variety trial of new and untried strains. The tour led along the end of these plots. Such observations as the following were easily made: The Arlington, the Columbian and Wilson No. 5 promise to be good for hay. The Morse, Hahto, and the Christian County soys because of their coarseness will likely be better for seed than hay. The Hahto has such large seed it may be difficult to thresh without injury. The Manchu is an early bean, similar in some respects to the Ito San. The extremely early Mandarin has no place in the corn belt alongside our better varieties.

"On the South Central Rotation older well established varieties are grown. Of these the Sable is the most beautiful. The Virginia and the Illinois 13-19 are the best for hay. Other good hay beans are the A.K., Mongol, Haberlandt, Hongkong and Ebony. The early beans in this rotation include the Ito San, the Manchu and the Black Eyebrow.

"In another plot the choice soys from all the corn belt states were being grown side by side. This demonstration showed that Ito San from Wisconsin is slightly earlier in maturity than the same variety from Iowa and the states south. It also seems quite clear from these tests that Mongol, Medium Yellow and Hollybrook are practically one and the same bean. The Lexington bean makes a very promising showing under Illinois conditions. It attains more than average height and bears many branches and possesses a much less hairy leaf than most beans.

"Under the topic 'How New Varieties of Soys are Made,' Dr. C.M. Woodworth discussed the tendency of beans toward natural variation. He showed between 20 and 25 different plant types that he had selected out of the one variety, A.K. Natural crossing helps to bring about the occurrence of this multiple of types. In some special experiments conducted by Dr. Woodworth, he learned that hybridization occurred in nature l6 times in 10,000. This does not seem frequent enough to be significant, but if two varieties were grown side by side they would be hopelessly ruined as to purity in the course of a few years. New varieties are made then by plant selection which may or may not be preceded by hybridization

"From the South Farm the procession moved to the Stock Judging Pavilion where prominent animals of the Dairy Department passed in review, as they were introduced by Mr. Mason Campbell. Dean Davenport then gave a wholesome, helpful address in which he advised the farmer to stick close to the Agricultural College and especially the experiment station, to familiarize himself with its needs as well as what it could do for him, and to continue his industriousness and level headedness.

"The road from Tolono to 'Embarrass Farm' was indicated by soybean markers. Bean plants had been dropped in the middle of the road about every fifty yards. This trail led through the farm just past Mr. Riegel's soybean varieties, alongside some A.K.s to be used for seed and by a patch grown for silage. One hundred acres of soys were growing in corn for pasture, and for soil improvement. Three hundred acres were growing alone to be used for hay and seed principally. A field of Mongols on the south side of the farm took the eye of all who saw them. They were absolutely free of weeds and almost as tall as rye.

"Demonstrations on the 'Embarrass Farm' included the rotary hoe in operation and the threshing of soys with a wheat separator. Some beans had been seeded on August 8 and on Soybean Day these were 3 inches high and ready for cultivation. The rotary hoe will kill some small weeds but its greatest value as a soy cultivator lies in breaking the soil crust, enabling 100% seedling emergence and furnishing proper soil aeration. The principal adjustment necessary on a wheat separator to make it handle soy the reduction of the speed of the cylinder to about 350 revolutions per minute and maintaining the separating machinery at normal speed.

"It is reported that during the noon hour, 1627 people were counted on the grounds. After lunch, which consisted of sandwiches, soybeans in various forms, pie, ice cream and coffee served by the Crittenden Unit of the Champaign County Home Bureau, came the program and reports from various states.

"Professor Hackleman as chairman first introduced Chas. E. Meharry who described the crop rotation system, thanked the people who had participated in making soybean day possible and welcomed all in to Embarrass Farm.

"Henry J. Waters, Editor, *Weekly Kansas City Star* and former President Kansas Agricultural College, gave the principle address of the day. He emphasized the need of sanity and clear thinking in these days of shifted price equilibrium and predicted that the farmers` twelve hour day and general frugality would carry him through.

"The soybean part of the program consisted of five minute talks by representatives from Washington, D.C. and six of the corn belt states. Professor Ralph Kenney, Lexington, Kentucky, reported variety uses in his states as follows: Mammoth Yellow for hay; Haberlandt, Lexington, and Virginia for seed; and Haberlandt for growing with corn. He introduced Mr. Chas. Caldwell of Danville, Kentucky, who praised the Lexington very highly. The Lexington has one third more leaves and finer stems than any other variety. According to Mr. Caldwell it is the best soy for hay production for one engaged in the beef cattle business.

"Taylor Fouts, Camden, Indiana, spoke of the increasing importance of the soybean and predicted that it would have been impossible to have had such a meeting as the present one in the interest of any other crop.

"Missouri was represented by Prof. C.E. Carter of Columbia. He felt it was important to reduce the number of best varieties, and reported that in Missouri they were recommending Morse and Medium Yellow for seed and Wilson and Virginia for hay.

"That the dairy business is quite well adapted to soybean utilization and that in Wisconsin soys are decidedly on the increase was reported by Prof. Geo. H. Briggs of Madison. Bean growing is becoming a sign of good farming. 'A Wisconsin farmer who had never grown soys went hunting and to escape a storm crawled into a hollow log. The rain continued for some time and when the farmer attempted to crawl out he found himself fast in the rapidly swelling log. Naturally in this predicament his mind reviewed the past and when he thought of never having grown soybeans he slipped out without difficulty.'

"C.B. Newton of Bowling Green, Ohio, stated that he found the sugar beet drill and cultivator very satisfactory for soys. These tools handle four rows at a time, making the rows 22 inches apart.

"Dr. W.J. Morse, Washington, D.C. gave the principal use of soys as hay and pasture. The possibility of utilizing soy oil on a large scale is a problem for the future. Soybeans are a legume crop and their usefulness as such has many aspects without attempting to develop the commercial uses of the grain.

"'Soybeans take the place of tankage when grown with corn for hogging down' said W. E. Riegel, manager of Embarrass Farm. 'Farmers can make no mistake in growing more soybeans for feed.'

"At the close of the day's program all in attendance had profited by the information they had gathered thru both eye and ear and by the inspiration of those who have pioneered and attained success in soy growing. Thanks are due the University Illinois Extension Service, the Corn Belt Soybean Growers, the Champaign County Soybean Club and the A.P. Meharry farms who have cooperated in making this day possible." Address: Associate in Crop Production, Univ. of Illinois.

433. Morse, W.J. 1921. Re: Request for letter of authorization for Mr. Lee. Letter to Prof. C.V. Piper, USDA, Washington, DC, Sept. 5. 2 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** Morse is writing from Ames, Iowa. "Dear Prof. Piper: I wish you would put through a letter of authorization for Mr. Lee as I would like to have him go about Sept. 15 to Florence and Monetta, South Carolina, and also Athens, Georgia, to look after our special experiments with cowpeas and soy beans, and collections of Early Velvet Beans. I will not be able to go early enough as I have a considerable amount of note taking at Arlington [Farm] when I return. Therefore I will not be able to leave for the South before the latter part of September. I want to spend more of my southern trip in Mississippi, Louisiana, Texas and the southwest looking after our non-filling of pod experiments. I feel [?] rather hopeful of this work from the reports I have had thus far from Thompson in Arizona. For Mr. Lee about 10 transportation requests and a period of ten days or 2 weeks–I should think about $150 would be ample.

"Had a great soy bean time in Illinois. Our Manchu and Black Eyebrow are sure taking the North. The Virginia is also becoming a great favorite in Illinois. At Ames the Manchu is the best with the Black Eyebrow a close second. The station here is raising a very large amount of seed of these two varieties. The value of seed alone of these two varieties would carry our Forage Crop Office for a few years. It is certainly surprising how these varieties have spread. Very truly yours,..."

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: [Agronomist] Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington,

DC.

434. Lloyd, W.H. 1921. Possibilities of the soybean: Farmers from three states gather to study and learn this promising legume. *Ohio Farmer* 148(12):255, 275. Sept. 17.
• ***Summary:*** "Michigan, Indiana and Ohio joined in tribute to the soybean as a legume last Friday [Sept. 16 or Sept. 9] at the Johnson seed farms [at Stryker] in Williams County, Ohio... Soybeans form the major part of the rotation on the main farm because of the production of seed, while on other parts of the Johnson estate it is used because of its value as a protein supplement in hogging and in making silage, and its value as a hay crop.

"Soybeans have formed one of the principal crops of the Johnson farms for 14 years, and the present manager, E.F. Johnson, is continuing their development as an integral part of his scheme of farming largely because of the statement of an instructor of his in college who stated that a grain farm could not be maintained in fertility at a profit."

"A legume is grown by Mr. Johnson every year on every field. On the main or home farm of 160 acres a four-year rotation of soybeans, soybeans, wheat or oats, followed by sweet clover, and corn is followed."

"Mr. Johnson, after 10 years observation of corn and soybeans for hogs, is authority for the statement that one acre of soybeans with six acres of corn is superior as a hog feed to nine acres of corn by itself without a protein supplement."

Five varieties were planted to demonstrate those best adapted to Ohio conditions: Manchu, Elton, Black Eyebrow, Mammoth Yellow, and Ito San. Manchu is perhaps the best all-around bean. Medium Green makes a beautiful hay, but the seed shatters badly.

In the variety plots, 40 varieties of soybeans were being grown and studied. There was surprising variation among varieties, long and short plants, stocky and lean plants, little beans in big pods and big beans in little pods. These varieties are: Minsoy, Soysota, Manchu, Early Brown, Elton, Ohio 7420, Johnson's Manchu Selections, Ito San, A.K., Aksarben, Otootan, Mammoth Yellow, Hahto, Mandarin, Pekin [Peking], Columbian, Medium Green, Chestnut, Biloxi, Ohio 9035, Mongol, Haberlandt, True Hollybrook, Indiana Hollybrook or Northern Medium Yellow, Ebony, Johnson 4, Laredo, Sable, Meyer, Wilson 5 [Wilson-Five], Wilson, Virginia, Early Wisconsin Black, and Jet.

W.J. Morse, the soybean expert of the United States Department of Agriculture (USDA), stated that the average soybean growing season in Ohio was 115 days, however many varieties require a much longer growing season. An interesting exhibit showed "the Hahto variety, which is being developed by the USDA as a possibility for human consumption. It has a large flat seed that bears a great resemblance to a lima bean. No great work has been done yet in this country along this line but there are exceptional cases such as religious cults and sanatoriums that are making extensive use of the soybean as human food. It is also a well known fact that the Chinese and Japanese have used soys for years in various forms as a means of sustaining life. They are a very valuable source of protein and are destined to have wide use in America."

"The demonstrations and conference were arranged thru the untiring efforts of E.F. Johnson and Ralph Schreiber, the assistant manager of the Johnson farms, in cooperation co-operation with the soils and crops department of the Ohio State University."

Also discusses soybeans and corn for hogs, planting methods, soybeans for silage, etc. Photos show: Plots on the Johnson Seed Farms (Williams County, Ohio) where 40 varieties of soybeans are growing. A field of soybeans and corn planted together.

Note: This is the earliest document seen (July 2013) that mentions the soybean varieties Early Wisconsin Black (a synonym for Wisconsin Black) or Indiana Hollybrook. Address: Ohio.

435. Morse, W.J. 1921. Re: Standardization of soybean variety nomenclature. Testing varieties at Arlington Farm. Letter to Mr. W.E. Riegel, A.P. Meharry Embarrass Farm, Tolono, Champaign County, Illinois, Oct. 15. 3 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Riegel–I have your letter of September 27 in regard to the appointment of the committee on standardization and nomenclature of soybean variety [sic]. I am very glad indeed to know that the matter of varieties is to receive your attention. One of the most important things in regard to varieties I think is the standardizing of the names of the most popular varieties. As to the states that should be represented on your committee I would like to suggest the following: Illinois, Iowa, Ohio, Indiana, Missouri, Wisconsin, Kentucky, Michigan, Pennsylvania, and possibly Minnesota and South Dakota. I suggest these states in view of the fact that there is more confusion in varietal names and a larger number of varieties grown in these states than in the southern states. Throughout the South the mammoth yellow, biloxi, otootan, Tokio, and mammoth brown [sic, Mammoth Yellow, Biloxi, Otootan, Tokio, and Mammoth Brown] are most generally grown and there is no confusion to these sorts."

"Varieties which I think should receive your attention in the matter of standardization are the Pekin, Mongol, Ito San, and Guelph. Each of these varieties is grown or sold under several different names..."

"We have been doing a very large amount of work in the classification of soybeans at Arlington this season. In our classification tests we have about 700 samples of named varieties of soybeans which were obtained from growers and seedmen throughout the United States. Of course I do not mean that we have 700 different varieties as in many cases we have five or ten samples of the same variety from

County Agent P. T. Brown. Ray Atkinson. Chas. Bower. John Jansen. Prof. R. S. Thomas.

SOME OF INDIANA'S AGRICULTURAL LEADERS AT THE SOYBEAN MEETING ON THE FARM OF CHAS. BOWER IN BENTON CO., IND.

different sources."

Morse encloses (p. 3) a list of 19 men (mostly from colleges or experiment stations) from eleven states who he believes are qualified and would be interested in serving on the committee to standardize soybean nomenclature: Illinois–J.C. Hackleman, Urbana. C.M. Woodworth, Urbana. Iowa–F.S. Wilkins, Iowa College of Agriculture, Ames. Ohio–C.G. Williams, Ohio Experiment Station, Wooster. J.B. Park, Ohio College of Agriculture, Columbus. E.C. Johnson, Stryker. J.W.R. ["John"] Smith. Indiana–A.T. Wiancko, Indiana Experiment Station, Lafayette. Taylor Fouts, Camden. Missouri–W.C. Etheridge, Missouri Experiment Station, Columbia. C.E. Carter, Missouri Experiment Station, Columbia. Wisconsin–E.J. Delwiche, Green Bay. R.A. Moore, Wisconsin Experiment Station, Madison. Kentucky–E.J. Kinney, Kentucky Experiment Station, Lexington. Michigan–O.R. Megee, Michigan Experiment Station, E. Lansing. E.E. Evans, West Branch, Michigan. Minnesota–A.C. Arny, Minnesota Experiment Station, St. Paul. South Dakota–A.N. Hume, South Dakota Experiment Station, Brookings. Pennsylvania–C.O. Cromer, Pennsylvania Experiment Station, State College.

Note: This is the earliest document seen (Jan. 1999) that mentions E.C. Johnson of Stryker, Ohio. William Morse almost certainly knew him personally. It seems very unlikely that Morse confused E.C. Johnson with Elmer S. Johnson, another soybean pioneer from Stryker, Ohio, who had died 1½ years earlier, on 22 Feb. 1920.

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, 1905-1929. Box 88. Folder–Meharry Farms #1 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, USDA.

436. Dungan, George H.; Brown, P.T. 1921. Soybeans as an aid to stock-farming: Recent field demonstrations and discussions of varieties, culture and uses indicate the multiple virtues of this legume crop in many states. *Breeder's Gazette* 80(16):553-54. Oct. 20.

• ***Summary:*** The first half of the article is by Dungan and the second half by Brown. The article begins: "Taylor Fouts of Soyland Farm in Indiana explained the future of the soybean crop on the occasion of the recent second annual cornbelt Soybean Day in Champaign County, Illinois. The University of Illinois extension service, the cornbelt Soybean Growers' Association, the Champaign County Soybean Club and the A.P. Meharry Farms cooperated in planning, advertising and directing this successful and inspiring meeting. The 'seeing is believing' idea was carried out, so far as possible. Varieties grown on the University of Illinois plots: Mandarin (short season), Wilson, Virginia, Illinois 13-19, and Arlington (hay), and Sable (beauty and hay), Hollybrook, Mongol, Medium Yellow, Ito San, Haberlandt, Morse, Hahto, and A.K.

Dr. C.M. Woodworth of the plant breeding division, Univ. of Illinois, discussed soybean breeding and the importance of choosing good varieties. "On the A.P. Meharry farm in Champaign County, Illinois, the soybean was observed in all its glory. Four hundred acres of deep-brown silt loam soil is growing soybeans on this farm There are 300 acres of beans growing alone–some for hay and others for seed. One hundred acres of soybeans were growing in corn, to be used for pasture, for silage, and for soil improvement. The varieties most extensively used are the Mongol and the A.K.

Prof. J.C. Hackleman of the University of Illinois was chairman of the formal meeting, at which various experts

spoke. These included Chas. L. Meharry (crop rotation), Taylor Fouts of Indiana (soybeans as a substitute for clover), Geo. H. [sic, M.] Briggs of Wisconsin (using soybeans to build up a good dairy herd), Dr. [sic, Mr.] W.J. Morse of the USDA (expansion of soybean acreage in South Dakota from 200 acres a few years ago to more than 4,000 acres in one county today), and W.E. Riegel (the value of soybeans as feed).

"Prof. Ralph Kenny of the University of Kentucky says that Mammoth Yellow is the best variety in his state for hay; Haberlandt, Lexington and Virginia are valued, in that order, for seed; while Haberlandt stands as a choice bean for combination with corn."

"C.E. Carter of Missouri listed Morse and Medium Yellow as the best seed varieties for Missouri; the Wilson and Virginia make the best yields of hay."

The second half of the article describes the recent soybean meeting on the Margaret Lake Farm of Chas. Bower in Union township, Benton County, Indiana. Some 120 men from nearby counties attended. "R.S. Thomas, soils and crops extension man from the experiment station at Purdue University, declared that this was the largest and most enthusiastic of the eight soybean meetings conducted in Indiana this year. He pointed out the necessity of including legumes in rotations, in order to help maintain soil fertility, and furnish cheap protein feed for live stock."

A photo shows some of Indiana's agricultural leaders at that meeting: County agent P.T. Brown, Ray Atkinson, Chas. Bower, John Jansen, and Prof. R.S. Thomas. Address: 1. Univ. of Illinois; 2. County Agent, Benton County, Indiana.

437. Hackleman, J.C. 1921. Re: Growing kudzu in Illinois. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, Oct. 21. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Through the columns of the *Country Gentleman* and one or two national papers, Kudzu has been thoroly [sic] advertised in the Corn Belt. We have many farmers in this section of the country who have read of the crop and are interested in knowing what it will do and many are considering seeding it on a rather large acreage. Personally, I am trying to hold back on that sort of an experiment just as much as possible."

"If you do not have the investigational work in charge on this legume, will you please refer my letter to the man in charge of this investigation with the request that he send me several copies of each of the available publications on the subject and also I would appreciate a personal letter stating the opinions of those in charge of the work as to the possible future for this crop in the Corn Belt."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

438. Hackleman, J.C. 1921. Re: Looking for a speaker on soybean utilization. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Oct. 22. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "We are looking for a man who can come to our Farmers' Conference as you did last year and talk on the subject of the 'Commercial Utilization of Soybeans from the Standpoint of the Manufacturer or Mill Operator'."

Hackleman asks Morse for suggestions. How about "the man who is in charge of the investigational work on soybeans at the Huntington Factory at Huntington, Indiana... I have also had some very fine letters from Mr. David Wesson, of the Southern Cotton Oil Company, of New York City, also one of the most interesting letters I secured on this subject, from Mr. George Aspergren of Aspergren and Company, Produce Exchange, New York. I am wondering also what you know of the man who is in charge of this feature of the Paint Manufacturer's Association. I used to know a young man who was with the Mound City Paint Company of St. Louis [Missouri] when they were doing considerable work with soybeans."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

439. Piper, C.V. 1921. Re: Letter from H.G. Hastings Co., Atlanta, Georgia. Letter to W.J. Morse, Kennedy Hotel, Biloxi, Mississippi, Oct. 24. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I am enclosing a copy of a letter from H.G. Hastings Co., Atlanta, Georgia. As you will undoubtedly pass through Atlanta, will you not call on them and tell them about the Otootan soy bean. If you cannot do this you can write them on your return. Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

440. McKee, Roland. 1921. Re: Phone call from Mr. W.A. Orton. Letter to W.J. Morse, Kennedy Hotel, Biloxi, Mississippi, Oct. 25. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Yesterday Mr. W.A. Orton called by 'phone to find out whether or not it would be possible for him to get a half bushel or more of Hahto soy beans almost matured in the pod for use in some dietary studies. As I understand you furnished Mr. Orton with seed last year for some of his experimental work and it is this I believe that he wishes to continue. I am going over to the farm today and will see Mr. Lee and it is possible that he may know whether or not you have any of the Hahto variety that can be spared for this purpose. Mr. Orton also wishes to know if you can advise him the names and addresses of any boys' or girls' club members, or others, who may be canning green the Hahto or Easy-can [sic, Easycook] varieties. He wishes to get in touch with such parties for the purpose of purchasing these varieties canned.

"Will you kindly write Mr. Orton direct giving him such information if you have it. Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

441. Piper, C.V. 1921. Re: Kudzu. Letter to Prof. J.C. Hackleman, Agric. Exp. Station, Urbana, Illinois, Oct. 25. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have your letter of the 21st to Mr. Morse in regard to kudzu. I am taking pleasure in sending you a number of the circulars we have dealing with this crop.

"In regard to the future of kudzu, I am very optimistic, at least in this latitude and from here southward on clay soils. I see no reason why it should not succeed northward to our northern boundary, but the data are very scanty. Kudzu has not made much progress as a farm crop, partly, I think, because it is so different from other crops, and partly on account of Massey's absurd articles regarding the danger of the plant as a weed. Here at Arlington [Farm, Virginia] we have been able to get double the yield of hay from kudzu than we have been able to get from soy beans or cowpeas. Of course, kudzu is not suited well to rotations, and one should put it in the fields where it can remain a long time, as the cost of establishing it is rather high and not much of a crop is gotten until the second year. The only place where kudzu has been grown very extensively has been in the neighborhood of Tallahassee and Monticello, Florida, where there are very large fields."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist in Charge, Bureau of Plant Industry, Washington, DC.

442. Ostrander, W.A. 1921. Re: Request for list of companies making soybean products, and for statistics on soybean production in various states. Letter to W.J. Morse, Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, Washington, DC, Oct. 31. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Morse: I am trying my best to get information from commercial concerns as to the utilization of soybean products. Have you at your command any lists of concerns that are used them? Also, have you any information at hand as to the number of products soybeans are made into? Any suggestions you can give me as to how best to get a collection of soybean products will be appreciated.

"I expect you will be at the International and I have some very urgent questions to talk over with you at that time.

"Have you any data at hand as to the relative crop of soybeans this year? Our men are asking for this kind of service and I am trying to get it for them.

"We had three pickers this year in operation in Indiana. All of them developed since our meeting at Fouts' a little over a year ago. One of them proved very successful. Another one that was not quite completed, I believe was good. The third one still had the same old faults."

Note: On 7 Nov. 1921 Morse sends Ostrander a list "giving the names and addresses of firms that are engaged at the present time in the manufacture of products involving the use of soybean cake, meal or oil." He asks if the three pickers "are the types obtained from eastern North Carolina or if they are something new, developed by Indiana growers."

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–#9.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Assoc. in Soils and Crops Extension, Purdue Univ., Dep. of Agricultural Extension, Lafayette, Indiana.

443. Morse, W.J. 1921. Re: Speaker on soybean utilization. Letter to J.C. Hackleman, Univ. of Illinois, College of Agriculture, Urbana, Illinois, Nov. 10. 1 p. Typed, without

signature (carbon copy).
• ***Summary:*** "For the soybean oil business, perhaps Mr. G.H. Pickard of 111 West Monroe Street, Chicago, Illinois, is better acquainted with the situation than anyone I know of. He investigated to a considerable extent the production of soybean oil at the cotton oil mills in North Carolina. Mr. Pickard is a chemist and obtained a very considerable amount of data on the production of soybean oil, and I feel sure he could manage better from the mill standpoint than anyone I know of.

"Regarding the utilization of soybeans for food, the President of the Lancaster Mechanical Products Co., Hudson Terminal Bldg., 50 Church Street, New York City, has had considerable correspondence with this office and a short time ago enclosed a leaflet giving a list of different soybean products which he is now manufacturing."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

444. Ostrander, W.A. 1921. Re: Soybean pickers developed in Indiana. Letter to W.J. Morse, Agronomist, Bureau of Plant Industry, Washington, DC, Nov. 10. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "The [soybean] pickers in question are home talent construction [i.e., developed in Indiana]. One of them I think a lot of as it beats the beans against the side rather than at the bottom, and not near as many are lost through the opening that is necessary to allow the beans to come into the machine. Walter Sturdevant, Noblesville, Indiana, has this one. One of his neighbors has a different type, Taylor Fouts of Camden, Indiana, does not as yet have his perfected, and Rev. P.L. Marks, Westerville, Ohio, also has one."

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–#9.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Assoc. in Soils and Crops Extension, Purdue Univ., Dep. of Agricultural Extension, Lafayette, Indiana.

445. Morse, W.J. 1921. Re: Request for seed of the wild soybean. Letter to C.M. Woodworth, Univ. of Illinois, Urbana, Illinois, Dec. 12. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Replying to your letter of December 6 requesting seed of the wild soybean, will say that our supply of seed of this is very limited indeed. We have grown it two or three times at our Arlington Experiment Farm [Virginia], but the seed shattered so badly that we were able to save only a small amount. The past season I grew a few plants in the greenhouse in an endeavor to save some of the seed. I am enclosing herewith a small packet."

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, 1899-1928. Box 10–Idaho-Illinois. Folder–Illinois–#4.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

446. Hayes, Herbert Kendall; Garber, Ralph John. 1921. Breeding crop plants. 1st ed. New York, NY: McGraw-Hill. xvii + 328 p. Illust. 24 cm. [270 ref]
• ***Summary:*** In the chapter titled "Mode of reproduction in relation to breeding" in the section on "Natural crossing with self-fertilized plants" the subsection titled "Peas and beans" states: "Natural hybrids of soybeans have been observed at the United States experimental farm in Virginia and also at the Kansas experiment station (Piper 1916 [*Forage Plants and Their Culture. Revised Edition,* p. 533]). They were detected by the peculiar color of their seed. Varieties of soybeans were interplanted at the Wisconsin station and the amount of natural crossing was determined by testing the progeny. More than 10,000 plants were tested and only a fraction of 1 per cent. of natural crossing was found."

Chapter XI titled "Cowpeas, soybeans, and velvet beans" (p. 143+) has a 2½ page section on "Soybeans (Soja max)" (p. 146-48) which discusses: Origin, classification and inheritance, and breeding. "Little work has been done on the inheritance of characters in soybeans. Beans with green cotyledons may have green seed-coats, while beans with yellow cotyledons may have either green or yellow seed-coats" (p. 147).

"Pure-line selections of soybeans have been made on the basis of oil content, yield (both of seed and forage), persistence of leaves, and other economic characters... Considerable artificial hybridizing has been done by Morse of the United States Department of Agriculture... As the real value of the soybean becomes more generally appreciated, it will undoubtedly receive more attention from the breeding standpoint" (p. 148).

Note: This is the earliest document seen (Dec. 2008) that uses the word "hybridizing" (or "hybridize," "hybridized," "hybridizes") in connection with soybeans. Address: 1. Prof. of Plant Breeding, College of Agriculture, Univ. of Minnesota; 2. Formerly Asst. Prof. of Plant Breeding,

College of Agriculture, Univ. of Minnesota; Now Associate Prof. and Head of the Dep. of Agronomy, Univ. of West Virginia.

447. Kellogg, John Harvey. 1921. The soy bean. Composition of the soy bean (Document part). In: J.H. Kellogg. 1921. The New Dietetics: What to Eat and How... Battle Creek, Michigan: The Modern Medicine Publishing Co. 950 p. See p. 299-302. 24 cm.

• ***Summary:*** In the chapter on "Legumes," the section titled "The Soy Bean" (p. 315-21) has the following contents: Introduction and history (incl. a long extract from a publication by W.J. Morse (1918), and discussion of soy beans and diabetic diets). Composition of the soy bean (according to Bailey and Street 1915). Soy bean milk. To fu (tofu). Soy sauce. Soy bean sprouts. Composition of soy bean sprouts compared with mung bean sprouts.

The section begins: "The soy bean has been used in China since 2838 B.C. It was introduced into France in 1740, England 1790, and this country not until a century later. This bean requires a long season and does best in the Southern states on this account. It is quite hardy, however, and some varieties have been found which mature as far north as Canada.

"The soy is the best of all beans. It differs decidedly from other beans in its composition. It contains 40% protein, practically no starch, and nearly 20 per cent fat, giving it characteristics approaching those of the peanut more closely than those of ordinary beans.

"More than one thousand varieties have now been tested by the U.S. Department of Agriculture. Twenty varieties are at the present time being handled by growers and seedsmen in this country. The green and yellow varieties are best adapted for food. The black and brown are chiefly for forage.

"In China, the soy bean is very little used in the manner in which beans are used in this country. Instead, according to W.J. Morse [1918], of the U.S. Department of Agriculture, 'the beans are soaked in water and roasted, the product being eaten after the manner of roasted peanuts.'" Dr. Kellogg then quotes two passages from Morse; one about roasted soybeans, and the other about soy beans which, when three-fourths or more grown, can be used as "a most palatable and nutritious green vegetable."

"This bean not only contains a large amount of protein, more than is found in the same weight of beef, but its protein is of a particularly fine quality. Heretofore, the casein of milk has enjoyed a unique reputation as a protein of finest quality, but now 'the protein of the soy bean appears to be as valuable as the casein of milk.' In view of the shortage of milk, which is likely to increase, it is gratifying to know that a protein has been discovered equally valuable as casein, and one which may be produced in unlimited quantities.

"For promotion of growth, it is not only necessary for the food to contain 'complete' protein in proper amount, but it must also contain a sufficiency of the two vitamins, designated as fat-soluble A and water-soluble B. Osborne and Mendel demonstrated that the soy bean contains an adequate supply of both fat-soluble and of 'water-soluble vitamins,' in which respect it is superior to all seeds heretofore examined, with the possible exception of flaxseed and millet.

"The soy bean is destined to become one of the great food staples, not only of this country but of the world. It is capable not only of supplying the essentials for growth and maintenance, but may also act as a complement to other imperfect foods, such as corn for example, in combination with which it has shown most excellent experimental results.

Composition of the soybean: A table shows the composition of the soy bean, compiled from various sources. "The above analysis clearly shows the soy bean to be a most remarkable food product. Its composition is in some respects more like that of a nut than that of other legumes. In this respect it very much resembles the peanut. Its protein content, nearly 40 per cent, is higher than that of any other foodstuff. Even lean meat affords but half as much. Its high percentage of fat gives it a very high food value and makes it a rich source of oil for various industrial purposes as well as for food.

"The soy fills the place of meat as well as milk in the dietary of many millions of sturdy Orientals. Since the composition of the soy has been understood, it has been much used as a food for diabetics. It is evident from the above [table] that it contains little which can be objectionable in diabetes. The small amount of dextrin and sugar may be easily removed, when necessary, by parboiling.

"Experiments by Holmes [1920], of the office of Home Economics, U.S. Department of Agriculture, have shown that the well cooked soy bean (cooked for two hours under steam pressure) is very easily digestible, and is an exceptionally wholesome article of food, superior to most other legumes.

"The soy bean may not become really popular until the pressure cooker comes into general use, which may be some time. In the meantime, while the patent pressure cooker is coming, any resourceful housewife may improvise a perfectly good and satisfactory pressure cooker from inexpensive materials close at hand. Get a stone jug or jar that can be hermetically sealed. The little stone jars in which apple butter is sometimes sold are well adapted to the purpose. After soaking the beans over night put [them] in the jug with a little salt and enough water to cover, seal up tight and secure the cover well, remembering that the pressure will be from within. Set the jug in a saturated solution of common salt, place over a smart fire and boil for one to two hours. The salt solution boils at a temperature of 220ºF. and so the beans are exposed to a higher temperature than in ordinary boiling... Cooking at the higher temperature not only softens the cellulose and so renders the foodstuffs tender, but greatly improves the flavor.

Note: This is the earliest document seen (Sept. 1996)

that uses the term "pressure cooker" in connection with soy beans. Address: Battle Creek, Michigan.

448. McKee, Roland. 1922. Re: Professor R. McBride, Riverside Experiment Station, Riverside, California. Letter to W.J. Morse [USDA], Jan. 7. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Mr. Morse: Professor R. McBride, Riverside Experiment Station, Riverside, California, requests in a recent letter for continuing our cooperative experimental work in covering green-manure crops:

"100 pounds of seed of Virginia soybean

"20 pounds of seed of Wilson Five soybean

"4 pounds each of a number of other varieties

"that we recommend for experimental trial. I have written Professor McBride that this seed would be sent him so that he might have it for making his early plantings the latter part of March. Very truly yours,..."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

449. Ostrander, W.A. 1922. Re: Indiana companies making soybean oil. Letter to W.J. Morse, Agronomist, Bureau of Plant Industry, USDA, Washington, DC, Jan. 9. 1 p. Typed, with signature on letterhead.

• ***Summary:*** The plant which is planning to produce soybean oil in Huntington, Indiana, "will probably wait until next fall before installing their machinery. A company started at Peru [Indiana] about a month ago and I was there the evening they were to order their machinery. I have written a couple times since but have not heard whether it has been shipped or not. I have word from the Toledo Seed and Oil Company of Toledo, Ohio, that they are going to use a couple thousand bushels [of soybeans] in an experimental way this year. We also have two more oil companies in Indiana that will probably start work within the next sixty days.

"Soybean seed in Indiana is not moving at all, a little is moving for $1.25 or $1.50 a bushel. In a few isolated localities they are asking and getting as high as $3, but it is because they know no better. I think considerable beans will move for $1.35 to $1.50 a bushel if it is offered."

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–#9.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Assoc. in Soils and Crops Extension, Purdue Univ., Dep. of Agricultural Extension, Lafayette, Indiana.

450. Morse, W.J. 1922. Re: Letter from Dr. J.A. Bonsteel, Franklinville, New York. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Jan. 19. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Professor Piper: With regard to the attached letter from Dr. J.A. Bonsteel, Franklinville, New York, concerning the soybean work that he has been doing at his farms, will say that the results obtained by Dr. Bonsteel look very good. I would like very much to obtain samples of the seed which were grown by Dr. Bonsteel.

"Relative to our aid in starting a community seed growing project for soybean seed in Dr. Bonsteel's county, will say that it seems to be a very good idea. Similar work was done in Illinois for the past two or three years and excellent results were obtained. Professor Hackleman supplied the names of different farmers interested in soybeans and this office supplied them with varieties. During the Summer county meetings were held at the various places and the work has resulted in a greatly increased acreage in soybeans, and a number of county soybean clubs formed throughout Illinois. I think that it would be a very good idea if Dr. Bonsteel could supply us with the names of about six good men in his county, and we supply them with seed of the Black Eyebrow, Mandarin, and Virginia varieties, say sufficient seed for one-half acre each of these varieties to each man. sometimes during the latter part of August or forepart of September a county meeting might be held under supervision of the county agent, making sort of a tour to the different men who are growing the experimental plots. The idea of Dr. Bonsteel for home-grown seed is a mighty good one, and I think we should do as much as possible to help him along with this work. Very truly yours,..."

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: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

451. Parsons, A.A. 1922. Re: Hot summer weather killed some soy beans. Thank you for the ride. Letter to W.J. Morse, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, Jan. 31. 1 p. Handwritten.

• ***Summary:*** "My Dear Mr. Morse. A part of the last growing season was the most unfortunate we have had for many years as to soybeans; they were just blooming when the hot spell

came on. We did not lack moisture but the intense heat of the wind and sun seemed to scald the tender shoots so they withered and died, and no others came until the late rains. This condition was not general and most of our growers had good crops.

"The Virginia and Hahto was more affected than the Micado [Mikado] from which we secured a good crop of seed. The Virginia were threshed the 27th of Nov. and were not near dried out then but I think we handled them so they will grow all right as there has been no hard freezing.

"The Hahto was just in good condition to eat green when the freezing weather came. I put some in basement where the furnace heat dried them out so I think they will grow. They are a great bean and surely will be a leader as they will be heavy seeders and good to eat. The Virginia in our location will be ideal for the corn and silage crop. They actually twist round the corn a little and go to the top of it.

"We surely will give both of them a chance to adjust themselves to all of our conditions."

"Thanking you again for the pleasure you gave me in our long ride [in Sept. 1920 to the Fouts family farm in Carroll Co., Indiana] with our live wire McKinnis.

"I am yours truly. A.A. Parsons.

Note: Lee Parsons (June 2014) guesses that Morse went to Indianapolis by train, went to visit Adrian's farm, and from there McKinnis drove them to the Fouts' farm where the American Soybean Association was founded. Adrian and McGinnes were business partners in a co-operative named Parsons-McKinnis Corporation. McKinnis handled the business side of their soybean enterprise. McKinnis spoke at the Fouts' meeting; Adrian was a fairly old man by that time; he didn't speak.

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Plainfield, Indiana.

452. Morse, W.J. 1922. Re: Soybean varieties. Analysis of soybeans for fat content. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Feb. 2. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** Concerning the samples from Hackleman's variety trials which he sent to Morse for identification: "Sample No. 100 appears to be Elton. Sample No. 1112 appears to be Haberlandt."

"It may interest you to know that I am doing considerable work on the analysis of soybeans with reference to the fat content. In looking up my records I have found that we have no oil content of a very large number of the old varieties." Since the Bureau of Chemistry is too busy, Morse has decided to conduct the analyses himself, with the help of an assistant from the Arlington Farm [Virginia]. Their data shows that the variety AK [A.K.] contains 19.3% oil. "During the fall of 1921 I made a very large number of selections of the Blackeyebrow [Black Eyebrow], Manchu, AK, Elton, and some new introductions from the oil producing regions of Manchuria. Some of these selections look as though they might be rather rich in oil, and I thought perhaps it might be worth while to analyze from the fat content of these sorts."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

453. Hackleman, J.C. 1922. Re: Collecting data on soybean varieties grown throughout Illinois. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Feb. 8. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "We are assembling the seed from as many of the demonstrations around over the state as possible. Of course in some cases, the farmer did not save the seed but we are getting it from at least six to eight counties and in most cases we will have an average of about six varieties from each place. For instance, the Manchu which you furnished, we are getting from practically every county where the seed was harvested and saved. We are also getting Haberlandt from all counties but one where the seed was used. We are getting the Virginia and others. You can see, therefore, when I get this together and get our data on the oil content it will give us a good average for this year. We will be glad to send you a copy of this material as soon as we can get it out."

Hackleman adds in a letter dated Feb. 21. "I think we can figure on at least twenty different counties featuring soybeans." He would like to test 6-8 of the varieties that do best in Illinois in each section of the state this year.

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

454. Morse, W.J. 1922. Re: Sorry to hear of poor results. Enclosing more Hahto seed. Letter to Mr. Adrian A. Parsons, Plainfield, Indiana, Feb. 13. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have your letter of January 31 reporting on

the results you obtained with the varieties of soy beans sent you the past season. I am very sorry indeed to learn that conditions were such that you did not obtain the best results with these sorts. I had occasion to attend the Soy Bean Growers' Association meeting November 30 in Chicago, and nearly all of the growers present from Indiana, Illinois, Ohio, and Missouri, reported yields considerably above those of any previous year that they had grown the crop. However, I know that in certain localities in these States climatic conditions were such that very poor results were obtained with most crops. I do not know in just what condition your Hahto seed will be for germination, so I am sending you four pounds of seed that was grown at Arlington Farm [in Virginia] in 1921. I am very glad indeed to know that you think so highly of the Hahto variety."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

455. Morse, W.J. 1922. Re: Letter from Dr. J.A. Bonsteel. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Feb. 13. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Professor Piper: Referring to the attached letter of Dr. J.A. Bonsteel [Franklinville, New York], concerning some cooperative soy bean tests in his country, will say that I think we will be able to supply seed of the Black Eyebrow and Virginia for six cooperators each. In so far as I can find out I do not believe there are more than a half dozen growers producing seed in New York state and these only in very small quantities. I think this is an excellent opportunity to establish the seed production of the Black Eyebrow and possibly the Mandarin varieties in Doctor Bonsteel's county. We have available some of the Mandarin seed and I think it might be well to send Doctor Bonsteel at least sufficient seed for one sore. I am under the impression that Doctor Bonsteel is figuring on one acre each for the 12 operators. This will require about 6 bushels of seed, but under his supervision I feel that it will be well worthwhile to put that amount of seed in the county. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

456. Morse, W.J. 1922. Re: Sending Department Circular No. 89, "Kudzu." Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama, Feb. 15. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Cauthen: Replying to your letter of February 9th to Prof. Piper, requesting two copies of Department Circular No. 89, 'Kudzu,' we are taking pleasure in complying with your request.

"Yours very truly, 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–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: Agronomist [USDA].

457. Morse, W.J. 1922. Re: Letter from Dr. Fruwirth. Letter (memorandum) to Prof. C.V. Piper [Agrostologist in Charge, BPI, USDA, Washington, DC], Feb. 20. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Piper: Referring to the attached letter from Dr. Fruwirth, in which he requests seed of the Hahto and Easycook [Easy Cook] varieties of soy beans, I am handing you herewith two pounds of seed of each of these varieties. The old stock of our Easycook variety seems to have gone down somewhat in viability. The 1921 seed germinated very poorly, somewhere around 40 per cent. Seed of 1920 germinated around about 70 per cent. Two years ago I made two or three elections from the Easycook which looked rather promising. During the season of 1921, I planted out the best of these selections, and obtained a very excellent quality of seed giving a high germination, and it was not mixed with any other color as the old Easycook variety. I am very much interested in the brown variety that Dr. Fruwirth sent you, and shall include it in our variety trial this season to compare with similar varieties, as the Chestnut Early, Ogemaw, and others. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

458. Piper, C.V. 1922. Re: Send Easy Cook soy bean seed to Mr. Hugh MacRae. Letter to W.J. Morse, [USDA], Feb. 20. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: At the proper time this spring please send to Mr. Hugh MacRae, Wilmington, North Carolina, 10 pounds of seed of Easy Cook soy bean. Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

459. Piper, C.V. 1922. Re: Prof. Mooers [of Tennessee] is interested in mung beans. Letter to W.J. Morse, [USDA], Feb. 25. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Prof. Mooers is just now very much interested in mung beans, as these seem to be immune to the Mexican beetle which is proving so destructive to cowpeas and soy beans. He would like to test out an extensive series of varieties during the coming season. Will you kindly do whatever is possible in connection with this matter? It may be after all that we have a place for the culture of this crop. Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

460. Piper, C.V. 1922. Re: Seeds promised to Mr. C.F. Leach, Monticello, Florida. Letter to W.J. Morse, [USDA], March 1. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I have promised Mr. C.F. Leach, Monticello, Florida, seeds as follows:

"Biloxi soy bean.

"Barchett [Barchet] soy bean.

"Otootan soy bean.

"Victor cowpea."

"If they can be spared I think you had better send him 4 pounds of each."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

461. Piper, C.V. 1922. Re: Send Hugh MacRae seeds of a very early soy bean. Letter to W.J. Morse, [USDA], March 1. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: I promised Hugh MacRae, Wilmington, North Carolina, for this spring, 10 pounds of Easy Cook soy beans, regarding which I think I have already advised you. Also he would like a few seeds of a very early soy bean, one of your very early selections from Arlington [Farm, in Virginia]."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

462. Morse, W.J. 1922. Re: Sending you Victor cowpeas and Laredo soybeans. Letter to Mr. J.T. Williamson, Field Agent, Agricultural Experiment Station, Auburn, Alabama, March 7. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: Replying to your letter of February 28th to Professor C.V. Piper, requesting information as to where you can purchase one-half bushel each of Victor cowpeas and Laredo soybeans, will say that I am unable to give you the names of any growers of these varieties. I might say that these varieties are comparatively new and as yet are produced only in a limited amount. Growers who obtained small amounts advise that they are keeping all of their seed for a larger acreage. We have available a limited quantity of seed of these varieties, and I am sending you 30 lbs. each of Victor pea and Laredo soybean seed for your work.

"Yours very truly, 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–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: Assistant Agrostologist [USDA].

463. Hackleman, J.C. 1922. Re: Soybeans unknown in parts of southern Illinois. Request for updated information on soybean harvesters. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, March 10. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "I had my conference in southern Illinois and found two counties where soybeans are practically unknown. The farm advisers were rather reluctant to start soybeans but I think we will be able to put on one or two plots."

"I would like to know what progress you think has been made on the soybean harvesters in the past year or two and what machines you consider best. Will you give us the

names of the different machines and the companies which manufacture them? I understand most of the machines are made in the Virginias and Carolinas."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

464. Morse, W.J. 1922. Re: Soybean harvesters. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, March 18. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** The following companies manufacture soybean harvesters: "Hardy and Newsome [Hardy and Newsom], La Grange, North Carolina. Scott Sales Co., Elizabeth City, N.C. Pritchard Harvester Co., Elizabeth City, N.C. Gordon Harvester Co., Elizabeth City, N.C.

"The North Carolina Experiment Station, Raleigh, N.C., issued a publication relating to the efficiency of the different types of harvesters being used in southern Virginia and North Carolina. I would suggest that you write Prof. C.B. Williams, asking for the publication just referred to."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

465. Morse, W.J. 1922. Re: Your soybean cooperator in Foley, Alabama. Letter to Mr. J.T. Williamson, Field Agent, Agricultural Experiment Station, Auburn, Alabama, March 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: Your letter of March 21st, to Prof. C.V. Piper with reference to your cooperator at Foley, Alabama, especially interested in varieties of soy beans, has been handed to me for attention. In looking over the list of varieties which you are able to furnish your cooperator, I do not think that we can add more than one variety, namely the Hahto. We would be able to supply one of the earlier sorts such as the Manchu, Black Eyebrow, but as a rule we have not had much success with the early northern sorts in the Southern States. If you will send us the name of your cooperator, we will be very glad to send him seed of the Hahto variety and some of the others if you wish to have him try them out.

"Yours very truly, 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–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: Agronomist [USDA].

466. Morse, W.J. 1922. Re: Request made in your letter to Mr. Oakley. Letter to Prof. C.V. Piper, Clifton Springs Sanitarium, Clifton Springs, New York, April 1. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: In accordance with the request made in your letter to Mr. Oakley for soybean products and recipes showing different ways in which soy bean flour and dry soy beans may be used, I am enclosing herewith a number of recipes which we have collected at various times. I have sent you four pounds of soy bean flour, four pounds of Easycook soy beans and two cans of green soy beans; one of the Hahto and one of the Easycook.

"If the party for whom you wish the information desires the names of concerns handling soy bean products, the following are the ones that are manufacturing them at the present time:

"Cereo Co., Tappan, New York

"Waukeshaw Food Products Co., Waukeshaw, Wisconsin

"Loomis Bros., Westfield, Massachusetts

"Very truly yours, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

467. Williamson, J.T. 1922. Re: Our cooperator in Foley, Alabama. Letter to Mr. W.J. Morse, Agronomist, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, April 7. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir:–I appreciate your offer of March 28 to send soybean varieties to one of our cooperators at Foley, Alabama. The name of this man is Elmer Kuhn.

"Mr. Kuhn used the Black Eyebrow soybean in 1921 in addition to the varieties mentioned in my letter of March 21st. Of course the results of this variety were rather poor.

"If you see fit to send seed of any variety other than the Hahto, I am sure he will appreciate them.

"Thanking you in advance for this favor, I am,

"Yours very truly, Field Agent."

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: Field Agent, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

468. Morse, W.J. 1922. Re: Requesting information on the forage and seed yields of soybean varieties grown in your state. Letter to Prof. E.F. Cauthen, Agricultural Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama, April 11. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Cauthen: We are endeavoring to obtain information as to the forage and seed yields of the varieties of soy beans grown in this country. Enclosed you will find a general form which I have prepared for the various varieties now grown in the United States. If it will not inconvenience you too much, I would greatly appreciate all the information you can give me as to the average yields of these varieties in your state. In addition, I would like very much your opinion as to the best forage and seed varieties now being grown in your state.

"Yours very truly, 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–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: Agronomist [USDA].

469. Morse, W.J. 1922. Re: Sending soybean varieties to Mr. Elmer Kuhn in Foley, Alabama. Letter to Mr. J.T. Williamson, Field Agent, Agricultural Experiment Station, Auburn, Alabama, April 11. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: Replying to your letter of April 7th, will say that we are taking pleasure in sending Mr. Elmer Kuhn, Foley, Ala., one pound of seed of the Hahto variety of soy beans, Inasmuch as the Black Eyebrow, an earlier variety gave rather poor results, I doubt if it would be advisable to send him any of the earlier varieties.

"Yours very truly, 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–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: Agronomist [USDA].

470. McKinnis, Guy P. 1922. Re: Request for opinion about soy bean varieties. Letter to W.J. Morse, USDA, Washington, DC, April 14. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir:–About a year ago a letter from you stated that you placed Virginia, Peking and Sable at the head of the forage bean list. We would like to know if your opinion is still the same and also what you advise for a seed crop. We are topheavy with Hollybrook and believe that some of us ought to go in for some other varieties and refuse to present black beans to the farmers for a logical bean for hay or forage, for which purposes we believe they excel yellow varieties.

"They are taking up Manchu with the claim that its high oil content will make it profitable for extracting purposes. I am on the fence regarding oil extraction. What information have you on it? Also advise me concerning varieties and sources of high class seed. We need the very best seed available for varieties that we can sell to advantage and we would be interested in getting started with a variety that has a future and that is not being produced in greater amounts than there is outlet for the seed. We rather like the Wilson Five and Pekin for ensilage and hay. The Black-Eyebrow seems to be a good early sort for hogging with 90-day corn and Mikado is satisfactory for foraging in the corn field after corn husking, which requires a late sort that holds in the pod well. Probably for seed yield and easy handling Hollys [Hollybrooks] or Mongols are as good as any but everyone will have them next year in Indiana and we need something that we can sell. Will appreciate any advice you will give and if there is any co-operative work we can do with you will take it up."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Parsons-McKinnis Co-operation, Camby, Indiana.

471. Morse, W.J. 1922. Re: Best varieties of soy beans for the Corn Belt. Letter to Guy P. McKinnins, Parsons-McKinnis Co-operation, Camby, Indiana, April 19. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Sir: I have your letter of April 14th relative to my opinion of the merits of varieties of soy beans for the Corn Belt. As was stated to you about a year ago, I still place the Virginia and Peking at the head of the forage list in the Central States. For varieties in the central and northern part of the Corn Belt, I have been recommending the Manchu and Black Eyebrow varieties. The Manchu is a high oil yielding strain giving about 19.5% oil.

"With regard to sources of Peking, Black Eyebrow and

Manchu, I refer you to the following:

"Black Eyebrow: Mr. Peter Labouisse, 149 Broadway, New York City (c/o B.L. Kennelly). Mr. E.E. Evans, West Branch, Michigan. Johnson Seed Farms, Stryker, Ohio. Mr. W.L. Stoltzfuss, Atglen, Pennsylvania.

"Manchu: Mr. E. Brooks, Salem, Indiana. Kelley Seed Co., San Jose, Illinois. Mr. P.L. Mark, Westerville, Ohio.

"Peking: Mr. Arvel Landes, Hammond, Illinois. Johnson Seed Farms, Stryker, Ohio.

"Wilson-Five: Johnson Seed Farms, Stryker, Ohio. Wallace Bros., Wallaceton, Virginia.

"With reference to the Peking and Sable varieties, will say that in our classification tests at Arlington the past year these varieties were identified."

"The Indiana Station has given varietal names to three of the Department's varieties which were obtained from Manchuria a few years ago. These varieties are the Wea, Dunfield and Pinpu. Other varieties which might be of interest to you are the Aksarben, Elton, Hoosier and Saskatoon. All of these are early or medium early sorts, and are specially good grain yielders. If you care to try out these varieties, we will be able to spare you perhaps one pound of seed of each."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

472. Wiancko, A.T. 1922. Re: Soybean varieties widely grown in Indiana. Letter to W.J. Morse, Agronomist, Bureau of Plant Industry, Washington, DC, April 19. 1 p. Typed, with signature on letterhead.

• ***Summary:*** After filling out a form sent by Morse, Wiancko notes: "Certain varieties on the list were not tested here. The figures represent averages of five years or more.

"The varieties most used in this state and best adapted for seed purposes are Ito San and Manchu for the northern part of the state, and Manchu and Hollybrook for the southern part. Hollybrook is particularly popular for planting in mixture with corn and not because of its grain yield record at the Station here. For hay production the Sable, Lexington, Haberlandt and Hollybrook are more or less used and recommended. We also suggest Medium Green and Sherwood. Where something early is needed, Ito San is used."

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–#9.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Chief in Soils & Crops, Purdue Univ. Agric. Exp. Station, Lafayette, Indiana.

473. Hackleman, J.C. 1922. Re: Soybeans grow well on poor soil in Illinois. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, April 25. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "We have just completed a series of farm advisers' conferences and I find that we have added a few counties to the list of applicants for soybean variety demonstrations."

"Johnson County, the third one on the list, is a county which is very slow to take up the soybean because their soil is one of the poorest in the state and their farmers have grown cowpeas for many years. The adviser was reluctant to go against what he thought was a popular belief but at the conference of advisers the other men who had had the demonstrations last year stated that they were in much the same position, namely: that cowpeas had changed things materially. If possible, therefore, I would like to have two demonstrations for Johnson County or 8 pounds each of the three varieties mentioned and in addition, one other variety."

Please include a hay type similar to the Wilson 5 [Wilson-Five] or Virginia. In northern Illinois, "a general purpose type such as the Peking, Manchu, or the Medium Yellow would be satisfactory."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

474. Morse, W.J. 1922. Re: Sending soybean varieties to Illinois. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, April 28. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "I have your letter of April 25th, enclosing a copy of the proposed demonstration with the soy bean varieties in different counties in Illinois. In all cases except one, that of the Mammoth Yellow, I will be able to supply the variety desired. We do not have any of the Mammoth Yellow and have not had any this season. In place of the Mammoth Yellow I am substituting the Tokio. Relative to adding another variety to the list submitted to you, I have added in each case the Easy Cook variety, a selection which I have experimented with 2 or 3 years, and it has given excellent results for forage and grazing purposes, and in addition is a most excellent edible bean, either green or dry. In Peoria

and Cook Counties I have added the Wea, which is an early Manchuria variety rather high in oil, and gives an excellent yield of grain." Morse will also send the Haberlandt variety.

Hackleman responds in a letter dated May 2: "I am certainly delighted to know that you can furnish us seed for practically all of our demonstrations. We are writing all the farm advisers concerned this morning giving them copy of your letter and also the approved list of varieties."

A table in his letter to Morse of May 10 shows that Hackleman intends to tests the following named soybean varieties in Illinois: From USDA–Black Eyebrow, Easy Cook, Manchu, Peking, Virginia, Wilson 5 [Wilson-Five]. From local sources: Ebony, Ito San, Mongol, Ohio 9035.

In his letter of June 30, Hackleman notes that he has soybean demonstration plots in about 16 Illinois counties and seven of the soil experimental fields [at the University].

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

475. Funchess, M.J. 1922. Re: Mr. Cauthen severed his connection with the Alabama Experiment Station about 2 months ago. Letter to Mr. W.J. Morse, Agronomist, Bureau of Plant Industry, Dep. of Agriculture, Washington, DC, May 17. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Sir:–Replying to your letter of April 11th, permit me to inform you that Mr. Cauthen severed his connection with the Alabama Experiment Station on March 15th last.

"I am giving you the data on soybeans as far as our 1920 records will permit. Last year our crop was practically ruined by drouth and I do not believe the figures would be of any value to you. It is for this reason that I have given you the 1920 record. You may recall that al of our records previous to 1920 were destroyed by fire. The number of days required for maturity as I interpret Mr. Cauthen's record are shown in the first column, though they appear to me to be possibly inaccurate. For those varieties where no data appear, we either did not grow the variety named of the records were inadequate to supply the data.

"Hoping this information will be of some service to you, I am,

"Yours very truly, 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–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: Agronomist, Experiment Station, Alabama Polytechnic Inst., Auburn, Alabama.

476. *USDA Bureau of Plant Industry, Inventory.* 1922. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from January 1 to March 31, 1919. Nos. 46951 to 47348. No. 58. 56 p. May 23.
• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ.

"47128-47129. From Harbin, Manchuria. Presented by Mr. Lewis S. Paten. Received February 17, 1919. Quoted notes by Mr. W.J. Morse.

"47128. 'Straw-yellow soy beans obtained from Peiliatze, Manchuria.'

"47129. 'Early black soy beans obtained from Peiliatze, Manchuria.'

"47130-47131. From Harbin, Manchuria. Presented by Mr. Charles H. Tuck. Received February 17, 1919. Quoted notes by Mr. W.J. Morse.

"47130. 'Early yellow soy beans grown in the vicinity of Harbin.'

"47131. Early black soy beans grown in the vicinity of Harbin." Address: Washington, DC.

477. Morse, W.J. 1922. Re: Traveling for soybeans. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, July 13. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** Responding to an invitation from Hackleman on June 30 to visit Illinois on his "soybean tours," Morse replies: "I will be very glad to spend a week or ten days with you. I am having rather a difficult time to arrange any sort of schedule of trips to the northern, central and western states. There are several meetings which I have been invited to attend, and the dates at which they are arranged simply won't go with any sort of schedule that I can fix out and visit the places that I want to. I was planning to leave Washington somewhere around the tenth of August and possibly go to Illinois, and also visit Wisconsin, Iowa, Minnesota, South Dakota, Nebraska, Kansas and Missouri, attempting to arrange it so that I would strike Missouri about the time they are having the Annual Soy bean Meeting at Columbia. I also want to take in Michigan and Wisconsin. I have two soy bean meetings in South Dakota which were arranged for over a year ago."

Hackleman asks Morse in a letter dated July 29: "When are we going to have the meeting to work on standardization of nomenclature? I believe you were chairman of the committee to work on the question of standardization of methods for seed certification."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

478. Oakley, R.A. 1922. Re: Mr. John Bostwick of Georgia. Letter (memorandum) to W.J. Morse, [USDA], Aug. 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Mr. John Bostwick, Manager of the Bostwick Seed and Truck Farm, Bostwick, Georgia, is much interested in Mung Beans and Otoo Tan [Otootan] soy beans. He called at the office today and asked that we include these in our New and Rare Field Seed Distribution. I told him that you were thoroughly familiar with the Mung bean and the Otoo Tan, and that I would ask you to write him giving him your opinion of them, and whether you think the time is ripe for the Department to take them up.

"Mr. Bostwick apparently expects to have seed for sale and this fact may influence his judgment somewhat. Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

479. Morse, W.J. 1922. Re: Meeting in Missouri to standardize soybean variety names. Letter to Prof. A.T. Wiancko, Chief in Soils and Crops, Indiana Experiment Station, Lafayette, Indiana, Aug. 14. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Wiancko: During 1921, Mr. W.E. Riegel, Tolono, Illinois, President of the National Soybean Growers' Association, appointed a committee, consisting of one prominent soybean grower and one station or agricultural man from each state, to make a study of soybean varieties now grown, and to try and clear up the great confusion which has resulted in the names of varieties, for, as you know, the same variety is frequently known under several different names. Your name has been handed to me as a member of this committee. At a meeting of the committee in Chicago, Illinois, Nov. 1921, the position of chairman was wished on me, and plans were discussed as to method of standardizing varietal names. It was decided to grow the varieties having more than one name at the meeting place of the next soybean conference, which is Columbia, Missouri, and that the members of the committee would meet at Columbia the day preceding the conference and study these varieties, check them up, and, if possible, assign a single name to each one in dispute. Accordingly, this spring I sent Prof. Helm, of the Missouri Experiment Station, a large collection of varieties, concerning which there is much confusion as to names.

"It is desired that a report be given at the general conference, and in this manner the aid of growers, seedsmen and state agricultural men can be utilized to assist us in carrying out the plan of standardizing varietal names.

"No doubt you have been notified that the regular conference is to be held at Columbia, Mo., Sept. 1st. Therefore, would it not be possible for you to be at Columbia, Mo., Aug. 31st, to meet with the rest of the committee on this variety question? In a recent letter, Prof. Helm writes, 'The committee should get together at least by 9 o'clock in the morning the day before the meeting'. If you can see your way clear to attend this meeting, I feel sure that we can do much good in straightening out this varietal name confusion."

Note: This is the earliest document seen (Oct. 2012) that mentions the "National Soybean Growers' Association." That association was formed (but without a clear name) in Sept. 1920 at the big meeting of soybean growers at Soyland in Camden, Indiana.

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–#8.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

480. Morse, W.J. 1922. Re: Meeting in Missouri to standardize soybean variety names. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Aug. 14. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** Note: The contents of this letter is identical to one by the same writer bearing the same date (Aug. 14) sent to Prof. A.T. Wiancko, Chief in Soils and Crops, Indiana Experiment Station, Lafayette, Indiana.

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

481. Morse, W.J. 1922. Re: Attaching a list of growers of soybeans. Letter to Prof. C.V. Piper, USDA, Aug. 23. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: I am attaching herewith

a list of growers of soybeans and agricultural workers, whom I thought would be interested in a book on soybeans, and no doubt would purchase a copy. The list was nearly made out when I learned that McGraw-Hill Co. had a list of agricultural workers. However, I do not think the list attached will cause any confusion.

"Yours very truly, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

482. Morse, W.J. 1922. Re: Itinerary in the Midwest. Letter to Prof. C.V. Piper, Bureau of Plant Industry, USDA, Washington, DC, Sept. 2. 4 p. Handwritten, with signature on hotel letterhead.

• ***Summary:*** Dear Prof. Piper: Just learned from Prof. Hackleman my itinerary for next week. It is as follows.

"Mon. Sept. 4. Paris, Illinois. c/o County Agent.

Tues. Sept. 5. Belleville, Ill. c/o County Agent.

Wed. Sept. 6. Girard, Ill. c/o County Agent.

Thurs. Sept. 7 to Fri. Sept. 8. Champaign, Ill. Inman Hotel.

Sat. Sept. 9 to Mon. Sept. 11. Ames, Iowa. Sheldon-Munn Hotel.

Tues. Sept. 12 to Wed. Sept. 13. Sturgeon Bay, Wisconsin. General Delivery. Thurs. Sept. 14 to Fri. Sept. 15. Wooster, Ohio. General Delivery.

"My trip has been a very interesting one from the point of view of utilization of soy beans. At the big meeting at Columbia, Missouri, two big oil concerns of Illinois sent representatives. One mill in Illinois has crushed considerable 1921 beans and has about 500 tons of meal for sale. Five mills in Illinois and three in Indiana are ready to crush this fall."

Note: Concerning The Inman Hotel: "Absolutely fireproof. European plan. All interurban and city cars stop at our door. Champaign's finest hotel. G.W. Byers–A. Danielson–Proprietors."

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. Folder–Morse, W.J.–#3 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: The Inman Hotel, Champaign, Illinois.

483. *Sandusky Register* (*Ohio*). 1922. Huron-Co. to have many at soybean day. Sept. 8. p. 9.

• ***Summary:*** "Huron-co farmers are planning to attend the annual soy bean day, held at the Wooster experiment station, on Friday, September 15, says county agent Phillips."

"J.B. Park, professor of farm crops of Ohio state university will speak on the culture and use of the soy bean on the farm. Professor W.J. Morse agronomist, of the U.S. department of agriculture, will speak upon the growth of the soy bean industry in the U.S. J.E. Anderson will discuss the commercial use of the soy bean and its by-product."

"Mr. E.F. Johnson of the Johnson Seed Farm, Stryker, Ohio, will take up the subject of sowing soy beans for seed."

484. Morse, W.J. 1922. Re: Testing soybean varieties at Arlington. Grading soybeans for the oil mills. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Oct. 2. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** Morse has about 100 acres of soybeans planted at Arlington, Virginia. "In this work I have many hundreds of selections and varieties of soybeans which require rather detailed notes. I might say that so far I have found some rather promising varieties and selections. It may interest you to know at least I have three Manchu selections which have bred true to the black hilum... One of these selections looks exceedingly promising, and was from a plant that I selected last year which gave 20.9 per cent oil."

"With regard to the grading of [soybean] seed for oil mills, that is, as to oil and moisture content, etc., I have not been able to find anyone that has done any work." Morse has been unable to find any grades in the Manchurian oil industry. "I am wondering if Mr. Bradley, of the Chicago Heights Co., is not right in going about his first year's work in buying beans just as beans." Morse is concerned that if grades are developed too quickly there might "be some dissatisfaction the first year among the seed growers."

Morse's "nights have been pretty well taken up correcting the galley proofs" of his soybean book [*The Soybean*], which arrived recently. Dr. Piper "assured me that you would receive a complimentary copy as soon as it is available for distribution."

Note 1. This is the earliest document seen (July 2016) that mentions the Chicago Heights Oil Co., started by Mr. I.C. Bradley.

Note 2. This is the earliest document seen (Feb. 2003) that mentions interest in grading soybeans in the USA.

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

485. Hackleman, J.C. 1922. Re: Soybean grades. Morse's new book on soybeans. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Oct. 7. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "I agree with you regarding the grade of seed for the mills. I think the best we can do is to buy on the basis of 'just beans' this year and possibly by next year we will have something more definite in mind. There is one other point however, that I believe would be worth considering. That is the question of the amount of split beans, dirt, etc., that will be available.

"I am certainly delighted to know that you have discussed with Dr. Piper the possibility of my getting a copy of your new book and that you are going to include me among the favored few to get an author's copy. As you well know, my nerve is good and I am going to ask for an autographed copy. I hope that you do not feel that I have lost all my reason and do not know when to stop asking for favors, but I certainly would appreciate getting the book and especially the signatures of the authors in it."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

486. W.H.L. 1922. The soybean–A crop with a future. Some plain facts regarding a remarkable plant of many uses. *Ohio Farmer* 150(15):354. Oct. 7.
• ***Summary:*** "The soybean has become definitely established as a commercial crop in the Middle West. It promises to rank with alfalfa as a hay crop; it will give clover a race as a soil-improving crop; it has already proven its value as a supplement to corn for both silage and hogging down purposes. As a cash crop it has great possibilities since the oil which it yields is in great demand both for food and for use in the arts. Either the raw bean or the resultant cake left after the oil is extracted or expressed has a high value as a protein supplement when combined with the proper mineral mixture.

"These are facts which were gleaned at the recent Soybean Field Day at the Ohio Experiment Station and which account for the remarkable rise in popularity of the soybean in the last few years. W.J. Morse, soybean specialist of the U.S. Department of Agriculture, told in his talk of the thousands of acres that were being devoted to this crop in Iowa, Illinois and Indiana. Growers in these states are establishing co-operative oil mills, Piatt County, Illinois, alone devoting 1,200 acres to soybean seed production and in addition has 50,000 acres of soybeans planted in corn.

"A large part of this development can be credited to Mr. Morse, thru his work of introducing and establishing soybeans in this country from their native home in Manchuria."

The first soybean was introduced by the USDA seed and plant introduction program in 1899 "and since that time between 1,500 and 2,000 introductions have been made by the U.S. Department of Agriculture, there being between 800 and 900 distinct varieties in this number. These varieties are given their initial test at the Arlington, Virginia, Experiment Farm maintained by the U.S. Department of Agriculture. If they prove of value co-operative tests are made in different sections of the country by the state experiment stations. If a variety proves adaptable to a section of the country it is disseminated following its trial by the experiment station, first thru tests with picked farmers and then to the farming public generally."

487. Woodworth, C.M. 1922. Re: Machine for harvesting and threshing soy beans. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, Oct. 19. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "On your last visit to Urbana you told about the machine for harvesting and threshing soy beans in the same operation–a combined harvester and thresher. At the time you thought it gave considerable promise.

"If you happen to have in your office, any description including diagrams and drawings of this machine or could tell me what manufacturing company is building them, so that I could write to them for further information, I shall greatly appreciate receiving the same.

"It seems to me that a machine of this kind would be a very valuable machine for our work here and provided it did a clean job of harvesting and threshing, it would save a great amount of work for the farmer who is growing his beans for seed."

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, 1899-1928. Box 11–Illinois. Folder #5–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Asst. Prof. of Plant Breeding, Agric. Exp. Station, Urbana, Illinois.

488. Morse, W.J. 1922. Re: Attaching three articles, one each on soybeans, velvet beans and cowpeas. Letter to Prof. C.V. Piper, USDA, Oct. 25. 4 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Prof. Piper: I am attaching herewith three articles, one each on soybeans, velvet beans and cowpeas. Also you will find a table giving the acreage of soybeans, velvet beans and cowpeas for seed production in the years

1917, 1918, 1919 and 1920. I went to considerable pains to look up in various sources the acreages of the three crops for several years. The results were rather disappointing, as in many cases the acreages for the same year were quite different. The table, which I give you, represents the points that I have brought out in the articles, but I feel that the soybean acreage is not large enough. I trust that the material submitted is what you desire for the Yearbook article."

"Yours very truly, Agronomist."

The paper titled "Soybeans" states: "The large recent increase in acreage of the soybean seems to indicate that it will become in the near future one of the leading farm crops in the United States. Although used many as a forage crop, and even for this purpose the acreage has increased greatly annually, the large increase has been in the acreage for seed production, especially in the corn belt states. In many sections the soybean has proved a more profitable crop than oats, the crop which it is replacing in many corn belt rotations. The increase in acreage in seed production in 1922 is estimated fully threefold that of 1921, being largely due to the possibilities of utilizing the seed for the production of oil and meal. The total area for seed production in the United States in 1920 was 190,000 acres. It is estimated that not more than 20 per cent of the soybeans are harvested for seed, the greater per cent being utilized for forage, pasture and ensilage. On this basis the total acreage of soybeans grown in 1920 would be 950,000 acres."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

489. Woodworth, C.M. 1922. The extent of natural cross-pollination in soybeans. *J. of the American Society of Agronomy* 14(7):278-83. Oct. [3 ref]

• ***Summary:*** "The is normally a self-fertilized plant. The flowers are extremely small, so small, in fact, that manipulation during artificial crossing is almost impossible without the aid of a binocular or a hand lens. There are ten stamens closely surrounding the pistil, and at the time when the stigma is receptive, the anthers burst open, covering the stigma with an abundance of pollen grains. As pollination occurs just before the flower opens, the chances of foreign pollen gaining entrance and effecting fertilization are very small

Nevertheless, some natural crossing–the production of natural hybrids–does occur. Piper & Morse (1910) reported that in bulk seed produced in 1907 there were some oddly colored seeds, "some of which produced plants whose progeny showed segregation in seed color, pubescence color, and flower color, thus proving the original seeds to be hybrids. They believe. however, that crossing in soybeans is far from common, and that 'the percentage of hybrids that occur is very small, perhaps one individual in two hundred.'"

Woodhouse and Taylor (1913) concluded from their experiments in Sabour, India, that "natural crosses do not occur on the plains of India to such an extent" as that noted by Piper and Morse in America. Woodworth (1921) found abundant evidence of segregation which clearly showed that natural crossing does occur in the soybean. An experiment was designed in 1916 to determine how often natural hybrids are produced among unbagged soybean plants, as follows: "Soybean flowers are either purple or white. Purple is dominant to white, and the two colors form an allelomorphic pair. Plants known to be homozygous for purple flowers were grown two feet apart in the row, and between every two of these, so that they alternated with them, white flowered plants were interpolated. As the branches of the two types intermingled, abundant opportunity was afforded for crossing between them."

Note: This is the earliest document seen (July 2016) that contains the word "homozygous" in connection with soybean breeding. Alternative forms of a given gene are called alleles, and they can be dominant or recessive. When an individual has two of the same allele, whether dominant or recessive, that individual is homozygous.

"Crossing might occur in any of four different ways: (1) white flowers might cross with white, or (2) purple with purple on the same or on different plants; or (3) pollen from white flowers might fertilize purple; and lastly, (4) pollen from purple might fertilize white. Only the last named type of cross was made use of in this experiment since it is the only one in which the crossing can be readily determined in the plants of the succeeding generation."

Altogether "205 plants were grown and not one showed evidence of hybridity." A second experiment was designed based on the fact that green cotyledon is recessive to yellow. "Altogether, 7,480 pods were produced by the 155 plants harvested. Three of these pods contained hybrid seeds, or .04 of 1 percent... Since this, however, is only one out of four ways in which crossing may occur, the actual proportion would be approximately one hybrid in 625 pods produced, or .16 of 1 percent. This figure is considerably lower than the estimate [of 0.5 of 1 percent] given by Piper and Morse (1910)."

"Practical significance:... If, for example, natural crossing occurs so seldom that bagging all plants is rendered unnecessary, then that fact is worth knowing. It is important that strains made pure by years of selection be kept pure. As soon as crossing occurs, deterioration in yield is a common result. Uniformity of product is also sacrificed, and market standards cannot be met, and the result is discrimination and reduced prices."

"Summary: 1. Natural hybrids are shown to occur in soybeans... 3. The percentage of cross-pollination may presumably differ according to the variety, the locality, and the season. 4. Hybrids may also arise by mutation. 5. It is important to the experimental plant breeder and to the farmer to know how much natural crossing may be expected under given conditions." Address: Asst. Chief in Plant Breeding, Illinois Agric. Exp. Station.

490. Morse, W.J. 1922. Re: Winter meeting of the Corn Belt Soybean Growers' Association. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Nov. 11. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have recently received a letter from Prof. C.E. Carter, President of the Corn Belt Soybean Growers' Association, notifying me that the Association will hold its winter meeting in Chicago, Dec. 4th, in the Assembly Hall of the Livestock Record Building, at 2 o'clock in the afternoon. It was suggested by Prof. Carter, that I write to each of the members of the committee on soybean nomenclature, in order to get as many as possible of them together preceding the meeting, so that I could make some sort of report on varieties to the general meeting.

"Mr. Ostrander, of Purdue University [Indiana] has written Mr. Carter regarding the purity of the Manchu variety... The Manchu has only one color of pubescence, namely, the tawny or brown. There have always been two colors of hilum in the Manchu, but this past season, I succeeded in obtaining a strain breeding true and having a pure black hilum. I am planning to develop a pure black hilum strain with this selection."

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

491. Hackleman, J.C. 1922. Re: Soybean mills in Illinois. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Nov. 18. 2 p. Typed, with signature on letterhead.
• ***Summary:*** Statistics for soybeans grown in Illinois, compiled by the farm adviser in each county, are significantly higher than those estimates reported by USDA's Bureau of Crops.

The soybean crushing plant at Monticello, Illinois, "is making progress but will not be ready to receive beans before the first of the year. A number of us went thru the plant very carefully. Those folks are very much in earnest and I believe will make their plant go across in fine shape. They are buying their first beans this week taking them in at $1.25 per bushel. These are 'contract' beans as they are short on storage room.

"Staley [A.E. Staley Mfg. Co., Decatur, Illinois], Chicago Heights [Oil Co., Chicago Heights, Illinois], and East St. Louis [East St. Louis Cotton Oil Co., East St. Louis, Illinois] are all out after beans but the farmers are not selling much yet. They will probably begin about January 1.

"I shall see you December 4. I have my reservation at the Atlantic. If you go there, insist on being in the *New Portion* which is fireproof."

Note 3. This is the earliest document seen (March 2008) that mentions a soybean crushing plant at Monticello, Illinois. By early 1923 we learn that it was a cooperative (Monticello Co-operative Soybean Products Co., later also called Piatt County Soybean Cooperative Co.).

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

492. Piper, Charles V.; Morse, William J. 1922. The velvet bean. *Farmers' Bulletin* (*USDA*) No. 1276. 27 p. Nov. [1 ref]
• ***Summary:*** "This bulletin is a revision and extension of Farmers' Bulletin 962, entitled 'Velvet Beans,' by S.M. Tracy and H.S. Coe, issued 1918" (p. 1 footnote).

Contents: Introduction. Description. History. Varieties. Distribution. Extent of culture. Soil preferences. Fertilizers. Inoculation. Time of planting. Methods of planting. Rate of seeding. Uses of velvet beans. Continuous cropping. Harvesting. Thrashing. Grinding. Feed: Composition, feeding value, feed for beef cattle, dairy cows, swine, horses. Insects.

Page 1: "Velvet beans have become a most important factor in developing the live-stock industry in the South and as a rotation crop which helps the succeeding crops." It is an annual legume that grows in the summer. "The Florida velvet bean was the only one grown for forage in the United States until about 1906,..."

Page 3: "History: While the Florida velvet bean has been grown for more than 40 years as an ornamental vine for porches and trellises, its value as a soil-improving crop or as a forage crop was not recognized until rather recently. As early as 1890 this plant was used to some extent for green manure in citrus orchards in Florida. From that time until the present the acreage has increased rapidly, and the crop now occupies an important place in southern farming systems.

"The Florida velvet bean was the only one grown for forage in the United States until about 1906, but during

recent years the Department of Agriculture has introduced about 20 other species, including the Chinese, Lyon, and Yokohama varieties, which have become more or less extensively cultivated.

"According to present information the first early-maturing variety of velvet beans was discovered in August, 1906, on a farm operated by Clyde Chapman, at Sumner, Georgia."

Pages 3-8: Varieties include: The Florida velvet bean. The Georgia velvet bean. The Alabama velvet bean. The Osceola velvet bean ("a hybrid between the Florida and Lyon varieties." "The seeds are slightly larger than those of the Lyon or Yokohama varieties and are usually marbled with brown"). Address: 1. Agrostologist in Charge; 2. Agronomist. Both: Office of Forage Crop Investigations, Bureau of Plant Industry.

493. Hackleman, J.C. 1922. Re: Farmers growing certified seed of the soybean variety Manchu in Illinois. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Dec. 21. 1 p. Typed, with signature on letterhead.
• ***Summary:*** Two Illinois farmers growing certified Manchu seed are: (1) Mr. John T. Smith, R.R. #5, Urbana, and (2) Mr. Frank Barton, Homer. Both fields were hand-picked.

"We will have considerable certified Manchu seed on our list this year, and if you will just refer people to the Illinois Crop Improvement Association, we will be glad to take care of it. The two men whose names I have given you have two of our purest lots of seed."

Note: This is the earliest document seen (July 2010) stating that certified soybean seed (Manchu variety) is actually being grown (or exists).

Note: This is the earliest document seen (July 2016) that mentions a state "Crop Improvement Association" in connection with soybeans (one of three documents).

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

494. William Morse (Photograph). 1922.
• ***Summary:*** This digital photo of Morse, seated, dated 1920s, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

495. Morse, W.J. 1923. Re: Letter from H.C. Chang regarding crops in Manchuria. Letter [memorandum] to Prof. C.V. Piper, Washington, DC, Jan. 13. 1 p. Typed, with

signature on letterhead.
• ***Summary:*** "Dear Dr. Piper: Relative to the attached letter from Dr. Taylor and Mr. H.C. Chang, will say that at the time of Mr. Chang's visit to the Department I had rather a pleasant visit with him regarding crops in Manchuria. At that time Mr. Chang did not care for any of our soybean varieties, but said that if we desired any varieties from Manchuria he would be glad to send us seed. In view of the last paragraph in his letter, I would be very glad indeed if Dr. Taylor would ask Mr. Chang to send us as many varieties of soybeans as he might be able to obtain. Four ounces would be ample of each sort. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

496. Morse, W.J. 1923. Re: Soybean varieties suited for the production of oil and meal in Illinois. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Jan. 24. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have your letter of January 18th with regard to growing certified Haberlandt seed in southern Illinois. I think your idea of growing this variety in that section an excellent one, as the Haberlandt according to my experience is a most excellent variety for yield of seed and for production of oil. It will fit in with the scheme that you are working out now in Illinois for the production of oil and meal. I should judge it would be to southern Illinois what the Manchu is to northern Illinois. I regret that we do not have seed of the pure Haberlandt in quantity at the present time.

"It is quite likely that you could obtain the amount you desire from Dr. R.Y. Winters, North Carolina Experiment Station, Raleigh, N.C. Dr. Winter has been working with the Haberlandt for several years, and it is being grown to quite an extent in North Carolina. He has one strain that he claims to be exceptionally high yielding, and I would suggest that you write to him to see if you could not obtain 1½ bushels of seed for your work in southern Illinois. It perhaps might be well to suggest to him that the seed would be used more or less experimentally, and that for two or three years southern Illinois might be a field for sending North Carolina seed.

"A few years ago Mr. Bruce L. Fain, Kane, Illinois, was producing Haberlandt seed. We purchased some Haberlandt from him once or twice and always obtained a very good quality of seed."

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

497. McKee, Roland. 1923. Re: List of seed to send to Mr. E.R. Lako, Albany, Georgia. Letter [memorandum] to W.J. Morse, [USDA], Feb. 2. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Following is a list of the seed that we would like to have sent to Mr. E.R. Lako, Postoffice Building, Albany, Georgia, for spring green manure plantings in pecan groves.

Cowpeas (with the amount of each variety to be sent, ranging from 15 lbs. for Brabham to ¼ lb for 3 varieties): Brabham, Early buff, early black, Catjang, Iron, Griot, New era.

Soybeans (6 lbs each): Otootan, Tokio, Biloxi, Barchet, Loredo [Laredo], Mammoth yellow.

Plus the following: Urd bean–¼ lb. Jack bean–¼ lb. Mung bean–3 lbs. Adjuki [azuki] bean–4 lbs. Rice bean–4 lb.

Bonavist–2 varieties of 5 pounds each. Velvet beans: Bush- 15 lbs. Georgia–15 lbs.

"Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

498. Morse, W.J. 1923. Growing soy beans as a cash crop: Will it pay to produce soy beans for oil and meal in the corn belt? *Wallaces' Farmer* 48(5):155, 161. Feb. 2.
• ***Summary:*** "The very large increase in acreage for [soybean] seed production the past two years–due principally to the high price of seed–has resulted in a surplus of seed for which a commercial outlet must be found. This has been particularly true in some corn belt states and in North Carolina."

"One oil mill in Illinois the past season crushed about 10,000 bushels of 1921 corn belt grown soy beans and has purchased about 30,000 bushels of the 1922 crop. Several other mills in Illinois and Indiana have prepared to crush large quantities of the 1922 crop. In Piatt county, Illinois, soy bean growers, after careful investigation, concluded that a home plant could be handled with economy and profit. A soy bean cooperative company was organized with a capital stock of $50,000, the stock being held almost entirely by growers in Piatt and adjacent counties. The solvent method

of extraction has been installed, the capacity being about 150,000 bushels yearly."

"The price of oil seeds is generally governed more or less by the price received for the oil, but with the soy bean, many are of the opinion that the cake or meal will be the governing factor in the purchase price of the beans... Cottonseed and linseed oil in reality determine oil prices in the edible and commercial fields, respectively... In paints, varnishes and linoleums, at the present linseed prices and supply, soy bean oil may be actually indispensable. Soy bean oil has nearly displaced linseed oil as a soft soap material, and with the use of hydrogenation process can serve in the manufacture of hard soaps, in which it now enters in equal quantities with linseed oil."

"The largest quantities of soy bean oil are consumed in the manufacture of soaps, lard and butter substitutes, and paints. Other trade uses are in the manufacture of rubber substitutes, linoleum, waterproof liquids, enamels, salad oil, printing ink, and waterproof goods, such as cloth for umbrellas, etc."

"The recent experiments with soy beans and soy bean meal at the Indiana and Ohio experiment stations seem to have established the fact that soy bean meal or soy beans with suitable mineral mixtures, were as effective as high-grade tankage or meat scraps in the feeding of hogs and poultry. The use of the meal as flour for human food has become an important factor in many European countries and to an increasing extent in the United States as a food of low starch content.

"In Asiatic countries, the cake or meal is recognized as a most valuable fertilizing material, and as such is used extensively for sugar plantations, rice fields and for mulberry trees. It has been used to some extent in the United States by manufacturers of fertilizers."

A photo shows an ordinary binder, pulled by two horses, being used in harvesting soy beans.

Note: This is the earliest document seen (June 2005) that uses the terms "solvent" or "extraction" in connection with a soybean crushing plant in the USA–in this case at the cooperative plant at Monticello, Piatt County, Illinois. Thus, it is the earliest document seen stating that oil is being extracted commercially from soybeans in the USA using this new process. Address: Agronomist, USDA, Washington, DC.

499. Hackleman, J.C. 1923. Re: Soybean prices and oil mills in Illinois. First impressions of *The Soybean,* by Piper & Morse. Letter to W.J. Morse, Forage Crop Investigations, USDA, Washington, DC, Feb. 23. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "I do not understand how the rumor spread that Indiana and Illinois have an overproduction of beans. We are practically sold out in this state of Manchus. Our supply of Midwests is going very rapidly, the Virginia is practically all gone and Wilsons are almost an unknown quantity. The Peking is selling at $2.50 a bushel and there will not be enough seed to go around. The only variety that I can think of, of which there will probably be more seed than we need, is the A.K. The oil companies have pushed their prices to $1.45 a bushel at the local station and are not getting enough beans to pay them to run.

"We are planning on a greater acreage of soybeans this year than last. A summary of the questionnaire which I sent the farm advisers, indicates that they expect the acreage for 1923 to double that of 1922. Personally, I doubt if that happens, but we will see a material increase."

"I received the copy of your book on soybeans just before I left for Michigan where I spent three days, for their farmers' week..."

"This book is certainly a masterpiece on the subject. While I knew that you and Dr. Piper had spent a great deal of time in its preparation, I had no idea that the book would be as complete as it is. It seems to me that you have very effectively assembled and compiled all the information on soybeans that is available at the present time.

"I am certainly delighted with my copy. The only objection I have is that it is not autographed. When you come out, I want you to put your name in it and hope that some time I can get a hold of Dr. Piper and ask him to do the same.

"I am enclosing another sample of seeds which have just come in from the Peoria County Farm Bureau." They seem to be a mixture of some type of Manchu with a green tinge, plus Haberlandt and varieties with a clear Hilum.

"By the way, you have never sent me the collection of the seed of different varieties of soybeans which you said you would send me. Of course you need not send me such common varieties as the Midwest, Manchu, Peking, Ebony, etc., but I should like to have fifteen or twenty of the varieties that are less commonly grown, but are nevertheless found frequently in our state."

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

500. 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 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

THE SOYBEAN

BY

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AND

WILLIAM J. MORSE, B. S. A.
AGRONOMIST, UNITED STATES DEPARTMENT OF AGRICULTURE

FIRST EDITION

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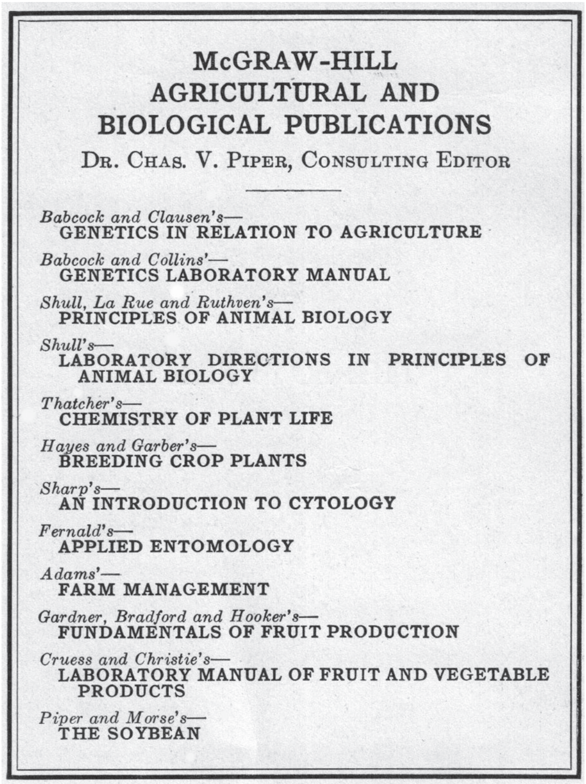

McGRAW-HILL
AGRICULTURAL AND
BIOLOGICAL PUBLICATIONS
DR. CHAS. V. PIPER, CONSULTING EDITOR

Babcock and Clausen's—
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Babcock and Collins'—
GENETICS LABORATORY MANUAL

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FUNDAMENTALS OF FRUIT PRODUCTION

Cruess and Christie's—
LABORATORY MANUAL OF FRUIT AND VEGETABLE PRODUCTS

Piper and Morse's—
THE SOYBEAN

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."

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.

501. Morse, W.J. 1923. Re: Soybean varieties grown at Arlington Experimental Farm. Manchu available in Illinois. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, March 1. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** Morse apologizes for the delay in getting the promised varieties to Hackleman. He did not forget. The man who is in charge of sending them has been sick for most of the past three months. "Our varieties of soybeans are kept at the Arlington Experimental Farm... I will endeavor to send you a full collection of the varieties in the near future."

"In your letter concerning the status of the soybean seed situation in Illinois, I note that your State is practically sold out on Manchus. Quite recently, Mr. C.H. Clark, of Ligonier, Indiana, called at the office, and, in talking with him, I learned that he had quite a quantity of good Manchu seed."

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

502. Morse, W.J. 1923. Re: Important soybean varieties grown in the United States. Letter (memorandum) to R.A. Oakley, Forage Crop Investigations, Washington, DC, March 2. 8 p. Typed, with signature on USDA letterhead.

• ***Summary:*** "Dear Mr. Oakley: With reference to the attached letter from Dr. Galloway, requesting memoranda touching important accomplishments in the matter of forage crop introductions, I am submitting herewith the following data on soybean varieties. In my talk with Dr. Galloway some time ago, he advised that he would like to have a list of varieties that are now out in trade, giving the S.P.I. number, date of introduction and source, and brief mention of the section to which the variety is specially adapted and its importance in that section. In the data submitted I have followed out this suggestion."

This one-page letter is followed by a seven-page typescript dated March 5, and titled "Varieties of soybean introductions through the Office of Foreign Seed and Plant Introduction that have become of economic importance in the U.S." The following varieties are discussed: Arlington, Aksarben, Austin, Auburn, Barchet, Biloxi, Black Eyebrow, Chernie, Chestnut, Chiquita, Columbia, Dunfield, Ebony, Elton, Easy Cook, Habaro, Haberlandt, Hoosier, Hahto, Laredo, Lexington, Manchu, Mandarin, Merko, Midwest, Morse, Peking, Pinpu, Shanghai, Southern Prolific, Tokio, Virginia, Wea, Wilson, Wilson-Five, Yokotenn, Wisconsin Black.

The entry for Arlington is typical: "S.P.I. # 22899; introduction from Paotingfu, China, 1908. An excellent forage variety grown to a slight extent in parts of Ohio, Indiana, and Missouri."

Note: This list is quite different from that which appeared in *The Soybean,* by Piper and Morse (1923, p. 162-72).

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. Folder–Morse, W.J.–#3 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

503. Ostrander, W.A. 1923. Re: Soybean prices in Indiana. Thoughts upon reading *The Soybean,* by Piper and Morse. Letter to W.J. Morse, Agronomist, Forage Crop Investigations, USDA, Washington, DC, March 2. 1 p. Typed, with signature on letterhead.

• ***Summary:*** On Feb. 17 Morse wrote Prof. Ostrander: "Quite recently it was called to my attention that farmers in Indiana and Illinois have an over-production of soybean seed as a result of the prospects of oil mills taking the seed, and that the farmers is unable to sell his crop at a price that will return him a profit."

Ostrander replies: "Dear Morse:... The present price of soybeans in Indiana is from $2.50 to $3.50 a bushel, so I think you see we do not have an over-production in this state this year. We are buying some seed in Illinois at $2 per bushel, so I guess they have enough. The oil mills did get beans early in the season for $1 to $1.25. None of our farmers feel they produced at a loss, and our acreage is going to be limited only by the amount of seed available.

"Just before I was taken sick, the publishers sent me a copy of your book and I want to thank you for it. It is a mighty good one and I got a lot of mighty good information out of it. Everybody around here has been reading it, and I expect 40 or 50 have come in to Indiana since the different people have seen my copy. Keep me informed regarding the status of the Manchu proposition; also anything new on mottling.

"Hoping that you will be out this way before long,..."

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–#10.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Assoc. in Soils and Crops Extension, Purdue Univ., Dep. of Agricultural Extension, Lafayette, Indiana.

504. Morse, W.J. 1923. Re: Soybean varieties. Letter to W.A. Ostrander, Indiana Experiment Station, Lafayette, Indiana, March 6. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "In regard to the Manchu, I expect to send you shortly samples of seed of improved strains with the black hilum, with which I have been working at Arlington Farm [Virginia] for the past two or three years. I am also going to send you packets of seed of the mottled Midwest and Ito San, concerning which plans were made for each member of the Nomenclature Committee to make a study of and report at the annual meeting in Chicago this year.

"Your comments on the soybean book are greatly appreciated by Dr. Piper and myself."

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–#10.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

505. Mark, P. Lewis. 1923. Soybeans have many differences. *Ohio Farmer* 151:313. March 10.

• ***Summary:*** A small table shows the protein and oil content of the following soy bean varieties: Manchu, Black Eyebrow, Hamilton, Ito San, and Mongol (now called Midwest). Black Eyebrow has the highest protein content (40.81%) and Hamilton has the highest oil content (19.70%).

"Considering in this connection that the Manchu, Hamilton and Black Eyebrow are among the heaviest yielders of seed in the Corn Belt it is easy to account for their deserved popularity. But some other varieties show a much wider range in the percentage of constituent elements than those given above. Piper and Morse in their new treatise on "The Soybean," just off the press, state that a range of from 12 to 24 percent fat and from 30 to 46 percent protein was shown in analyses of over 500 distinct sorts made by the U.S. Department of Agriculture."

Note: This is the earliest document seen (one of two documents, Aug. 2013) that mentions the soybean variety Hamilton. Address: Franklin County, Ohio.

506. Hackleman, J.C. 1923. Re: Soybean varieties for inoculation studies. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, March 22. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "I am sorry that there was some misunderstanding regarding our cooperative work with soybeans this year. We wanted the 100 pounds samples of the varieties to use for our preliminary inoculation studios in the green house. Then we proposed to follow these out into the field and study the inoculation there.

"The thing that I had in mind regarding the larger samples was that you furnish us perhaps thirty pounds of the Virginia, Wilson-Five, Peking, and Haberlandt. We would use the Virginia, Wilson-Five and Haberlandt in southern Illinois. We would furnish from here the 13-19, the Manchu, and Midwest, for the entire state. In central Illinois we would use the Peking."

"We are having a great deal of interest in counties that have never had soybean demonstrations and inasmuch as we

are going to conduct inoculation studies along with the plots, I believe we are going to get a great deal of information.

"Of course these variety demonstrations will all be supplemented with local varieties such as the Hamilton, the Ebony, the Hurrelbrink, etc."

Note: On Feb. 23 Hackleman wrote Morse that he would be conducting the soybean inoculation studies with Prof. O.H. Sears, Div. of Soil Biology, Dep. of Agronomy, Univ. of Illinois.

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, 1899-1928. Box 11–Illinois. Folder #6–Illinois Exp. Station.

Note: This is the earliest document seen (Aug. 2013) that mentions the soybean variety Hurrelbrink.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

507. Piper, Charles V.; Morse, William J. 1923. Mature or dry soybeans (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 221.

• ***Summary:*** "Many schools of cookery and domestic science and the United States Department of Agriculture have shown that the dry or mature soybeans can be used satisfactorily after the manner of navy or other beans. Though the flavor, which differs with the variety, is not very prominent, soybeans are very palatable. The lighter colored varieties, yellow and green, are best for food, as the dark ones usually have a stronger, less pleasant taste; however, some of the light brown varieties have a very agreeable flavor.

"Because of their high fat content and compact texture, most varieties of soybeans do not cook soft so readily as the navy or field beans. The method of cooking, however, may cause the beans to remain hard and tough. If cooked properly, soybeans do not require much longer soaking and cooking than the ordinary beans. One variety, the Easycook, has been found by the Department of Agriculture to cook fully as soft as the navy bean in less time after the preliminary soaking of 12 hours. Experiments with a large number of varieties have shown that the time required for cooking the beans tender varies to a considerable extent with the variety. The Haberlandt requires less time to cook tender than the Mammoth Yellow. When boiled, the beans can be used for baked beans, soups, croquettes, loaf, and many other dishes. In China the dried beans are soaked in water and roasted, this product being eaten after the manner of roasted peanuts."

Note: See also pages 259-66 for recipes (developed by the USDA) calling for mature and dried soybeans.

508. Piper, Charles V.; Morse, William J. 1923. Soybeans in Australia (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 49, 51.

• ***Summary:*** "Numerous experimental trials with the soybean have been made, in Victoria, Queensland and New South Wales. The crop has not given promising results in New South Wales but success resulted in Victoria and Queensland for both seed and forage."

A map (p. 51) shows that soybeans are grown mostly in the eastern one-third of Australia. See also p. 23.

509. Piper, Charles V.; Morse, William J. 1923. Introduction of the soybean to Europe (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 45-47.

• ***Summary:*** "The soybean has been grown experimentally at least in most of the European countries but in general the climatic conditions are not well suited to its culture. Some measure of success has been had however in south Europe, but the crop has never become of much importance.

"France: Paillieux (1880) has traced in detail the records of early attempts to introduce the culture of the soybean into France. Packets of soybean seeds from missionaries in China were received at the Jardin des Plantes, Paris, in 1739 and at frequent later dates beginning with 1834. The plants were very probably grown at the botanical garden since 1740, certainly so in 1779, and from 1834 to 1880 without interruption. In 1821, an unusually warm season, a Chinese variety had matured seed at Champ-Rond near Etampes. Beginning with 1855 the *Société d'Acclimatation* distributed numerous packets of seed, but did not succeed in establishing a permanent culture of the plant. In 1868 M. Chauvin cultivated several varieties at Cote d'Or, and the culture there has since continued. In 1874 the Society of horticulture of Etampes began experiments that continued until 1880. In 1879 a Chinese variety matured well at Marseilles. In 1880 Vilmorin-Andrieux & Company introduced into France one of the varieties tested by Haberlandt in Austria, which variety has proven well adapted to French conditions. This variety is presumably that now known in France as 'Yellow Etampes' which is the same as that known in the United States as 'Ito San.'

"The soybean is now rather widely grown in France but apparently is not an important crop. No definite statistics of its culture seem to have been published. Presumably it is grown more as a garden vegetable than as a field crop. Apparently only four varieties were cultivated in France before 1910 namely: Yellow Etampes (= Ito San); Early Black from Podolia (= Chernie); Brown (= Ogemaw); and Extra Early Black (= Wisconsin Black). All of these are short season varieties, indicating that the later sorts will not mature in France.

"Italy: The cultivation of the soybean in Italy dates from

about 1840. [Question: What is the source of this date?] At the present time it is grown sparingly in the compartments of Liguria, Emilia, Marches, and near Naples. In no part of Italy does it seem to be a crop of prime importance.

"Austria and Germany: A great impetus was given to the culture of the soybean in Europe by the experiments of Prof. Friedrich Haberlandt (1878) of Vienna, in 1875 and subsequent years. Haberlandt obtained seed of nineteen varieties at the Vienna exposition in 1873. These were as follows:" Five yellow-seeded, three black-seeded, three green-seeded, and two brown-red-seeded varieties from China. One yellow-seeded and three black-seeded varieties from Japan. One black-seeded variety from Trans-Caucasia. One green-seeded variety from Tunis.

"Of these only four varieties matured at Vienna in 1875, namely, two yellow-seeded, one black-seeded and one brown-red-seeded, all from China. The black-seed sort was so late that it matured but few seeds. Of the other varieties some did not even come into bloom, while the remainder produced blossoms or young pods too late in the fall to mature.

"In 1876 the two yellow and the brown varieties were tested by cooperators in Hungary, Bohemia, Steirmark [Steiermark, Austria], Bukowina [an area divided between Romania and the USSR after 1945], Moravia, and Silesia, favorable results being secured in each case.

"In 1877 seeds of all four varieties were distributed to 148 cooperators, mostly in Austria-Hungary, but some in Germany and Russian Poland, and one each in Switzerland and Holland. Most of the tests gave promising results.

"Haberlandt (1878) published the results of his investigations in much detail, and his results had great influence in stimulating further investigations. All of the varieties that Haberlandt was able to mature were short season varieties, which in general are far less productive than later sorts.

"England: According to Aiton (1812) the soybean was grown as early as 1790 at the Royal Botanic Gardens, Kew, but merely as a botanical curiosity. The soybean has apparently never been grown as a crop in England, where indeed only the earliest varieties would be expected to mature.

"Investigations on the adaptability of the soybean have been carried on by Dr. J.L. North of the Royal Botanic Gardens during recent years. Early varieties were introduced from numerous sources. With careful selections two or three quite promising early strains have been obtained which mature fully and give good yields of seed under English conditions."

510. Piper, Charles V.; Morse, William J. 1923. Soybean varieties grown in Europe and the identifications of those grown by Haberlandt (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 47-49.

• ***Summary:*** "Seeds of soybeans were secured by the U.S. Department of Agriculture from various European sources, including five packets from Dr. E. Von Tschermak of Vienna, said to be the progeny of those used by Haberlandt in his experiments. These were tested one or more years at Arlington Farm, Virginia, and their identities established as follows:

"Samarow: Seed obtained from Dammann & Co., Naples, Italy, No. 224411, and identical with No. 17260, which last was introduced by Thorburn & Co. [of New York] from Italy. Also No. 01597 from Von Tschermak, Vienna, said to be one of Haberlandt's varieties, but this is probably an error as Haberlandt mentions no green-seeded sort that matured in his experiments.

"Etampes: Seed from Vilmorin-Andrieux & Co., Paris, France, No. 21818, proved identical with Ito-San. Also advertised by other Europeans, usually as Yellow Etampes.

"Wisconsin Black: Seed was received from Vilmorin-Andrieux & Co. as 'Early Black from Podolia,' No. 21757 and No. 21756; from Haage & Schmidt, Erfurt, Germany, as No. 22321; from Dammann & Co., as 'Black,' of Haberlandt's experiments; and No. 5039 from Vilmorin-Andrieux as 'Extra Early Black Seeded.' This last is the original importation of the variety later named Wisconsin Black, S.P.I. No. 25468, which is now commercially handled by a few seedsmen.

"'Yellow Riesen': Seed obtained from Haage & Schmidt, No. 22318. The variety is very similar to Mammoth, but somewhat later. No. 22317, 'Yellow,' from the same source, has indistinguishable seeds, but did not germinate.

"Buckshot: No. 22322, obtained from Haage & Schmidt, is indistinguishable from the Buckshot variety, S.P.I. No. 17251. It was received as 'Early Black from Podolia,' but is not the same as the variety received under the name from another source. Seeds of this variety were also mixed in the brown seed from the Botanical Garden of Bremen, Germany, and grown as No. 25212A.

"'Yellow': This variety was received from Dammann & Co., No. 22414, and Vilmorin-Andrieux & Co., No. 21754, the two being identical and different from any others yet received. It is a small, early variety, maturing at Arlington in ninety days. No. 17276, without name, from Havre, France, is a very similar but distinct variety, matched exactly by No. 01594 from Von Tschermak, Vienna, said to be the progeny of one of the yellows used in Haberlandt's experiments.

"'Brown': Seed under this name was obtained from Dammann & Co., No. 22413, Haage & Schmidt, No. 22319, and Vilmorin-Andrieux & Co., No. 21755. These seeds are indistinguishable, but only No. 21755 grew. The original seed of this is much smaller than Ogemaw, but in 1909 both the seeds and plants could not be distinguished from Ogemaw from Michigan. No. 25212, from the Botanical

Garden, Bremen, Germany, also with brown seeds, was likewise indistinguishable from Ogemaw in 1909, though the original seeds were different both from No. 21755 and from Ogemaw. Finally two lots of seed, Nos. 01595 and 01598, from Von Tschermak, Vienna, said to be the brown of Haberlandt's experiments, also proved to be Ogemaw.

"Butterball: The variety secured from Dammann & Co., No. 22415, as 'Giant Yellow,' could not be distinguished from S.P.I. No. 17274, Butterball.

"There are no authentic records of a few of the earliest S.P.I. importations from Europe, so that nothing definite can be said as to their identity. Among these are No. 1492 (brown-seeded), No. 1493 (black seeded), and No. 2156, Yellow Etampes, all from France. From these data it would appear that in 1909 at least ten varieties of soybeans were more or less grown in Europe.

"The four varieties used by Haberlandt in his trials include with scarcely a doubt Wisconsin Black, Ogemaw, and No. 17276, 'Yellow.' What the other yellow seeded sort may have been is doubtful. It could scarcely have been Etampes or Ito San, as that variety could hardly be expected to mature in Vienna."

Note: Prof. Haberlandt's work is also discussed in this book on pages 157 (heat units) and 218 (use of the soybean as a food for humans and animals).

511. Piper, Charles V.; Morse, William J. 1923. Soybeans in Africa (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 49-51, 53-54.

• ***Summary:*** "Africa: Although the soybean was successfully cultivated as a rotation crop with corn in the upland, midland and coast districts of Natal and throughout the Gambia, Sierra Leone, Nigeria and Gold Coast Colony, it was not until about 1910 when everything pointed to a further advance in the price of all oil-seeds that special efforts were made to secure the adoption of the soybean as a South African staple. Previous to this time the prices for soybean seed offered little prospect of a remunerative crop except to the advantages as a rotation crop.

"The first trials of soybeans at Cedara, Natal, in 1903 gave a maximum yield of 920 lb to the acre. It was found that imported seed for planting purposes gave very poor results whereas local grown seed resulted in satisfactory results. In West Africa the first experiments gave from 6 to 8 bu to the acre, the low yields being due to the low viability of the seed. The continued poor germination of imported seed in various parts of Africa led to experiments which have resulted in the establishing of strains giving very satisfactory results. Results from the extensive experiments point to the fact that the soybean is adaptable to a wide range of elevation and temperature. In general, the climate most suitable for corn seemed to furnish the required conditions for soybeans, although certain sorts gave most excellent results in the tropical conditions in the Gold Coast country. One of the greatest difficulties encountered in the culture of soybeans has been the finding of a satisfactory method of harvesting.

"Extensive investigations have been made with all of the Governmental Experimental farms in Africa in cooperation with English firms handling oil and oil-seeds. It was found that beans grown in South Africa yield 20 to 22 per cent oil, as against 15 to 16.5 for the same varieties grown in Manchuria.

"Egypt: Tests with the soybean have shown that it succeeds as a summer crop. Seed was sown the latter part of June, and the crop harvested at the end of September. When cut for hay nearly 6 tons to the acre were obtained. It was found that cattle, sheep and goats ate the fodder, but that donkeys and mules would not do so. The following yields of seed in pounds per acre were obtained: Manchurian [Manchuria?], 1,257; Medium Yellow, 1,596; Elton, 1,061; Morse, 1,486.

"Mauritius: Trials with soybeans have not given very satisfactory results. If sown as early as May or June, the plants suffer from the effect of cyclones and torrential rains, whereas, if sown later in the year, they are liable to attack by the 'haricot fly' and to destruction by birds and small mammals."

512. Piper, Charles V.; Morse, William J. 1923. Soybeans in Latin America (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 50, 53.

• ***Summary:*** "Argentina: Extensive experiments have been conducted with soybeans during recent years in Argentina, and the results have been such that many planters plan to grow the crop on a commercial scale in preference to linseed as a restorative crop in rotation with wheat. Tonnelier (1912) reports on the results of the work as to varieties, culture and analyses.

"British Guiana: Soybeans have been cultivated experimentally in several districts in British Guiana. The varieties under test, however, did not give very successful results."

513. Piper, Charles V.; Morse, William J. 1923. Vernacular names of the soybean (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 35-36.

• ***Summary:*** Name–Locality.

An-ing–Naga Hills, Assam.
Bhat–United Provinces, India.
Bhatmas–United Provinces, India.
Bhatnas or Bhatwas–Nepal.
Bhatwan–Ceylon.
Bhatwas–United Provinces, India; Nepal.
Bhetmas–Bengal, India.
Bhut–Punjab, India.

Botumash, Bhativas or Bhatmais–Buthia, India.
Buncae–Ceylon.
Cadelee–Amboina.
Chlai–Bengal, India.
Coffee Bean–United States.
Dau nanh–Annam; Cochin China; Tonkin.
Dau tuong–Tonkin, French Indo-China.
Daidzu–Japan; Tonkin.
Disomhorac–Santhal, India.
Gari-kalai–Bengal, India.
Hoam teu–Cochin China.
Japan pea–United States.
Kajuna–Nepal.
Kajang koro–Celebes.
Katjang boelec–Java; Sunda.
Katjang-djepoen–Java; Sunda.
Khujoon–N. W. [North-West] Provinces, India.
Kije–Naga Hills, Assam.
Lasi–Kachin, Burma.
Lasi Shapre turu–Bhamo, Burma.
Lasi N'Loi–Myitkyina, Burma.
Lasi N'Hti–Myitkyina, Burma.
Mame–Japan.
Patani–India.
Patani-jokra–Assam.
Pe-kyat-pyin–Burma.
Pe-nga-pi–Burma.
Pois oléagineux de Chine–France.
Ram kurthi–Bengal, India.
Ryambai-ktung–Khasi Hills, Burma.
Salyang (Selliyang)–Sikkim.
San-dek-sieng–Cambodia, French Indo-China.
Sandek an gen sar–Cambodia.
Silliangdun–Sikkim.
Soia–France; Italy.
Soja–France; United States.
Sojaboon–Holland.
Sojabohn–Germany.
Sou–China.
Soy–United States.
Soya–United States; England.
Stock pea–United States [Note!].
Sudza–Naga Hills, Assam.
Ta teou–China.
Teou–Tonkin.
Tzuda–Naga Hills, Assam.
Yeou–China.

Geographical notes: Assam: A state in northeast India bordering to the north on Bhutan and Arunachal Pradesh.

Bengal: A former province in northeast British India, now a region encompassing West Bengal (in India), and Bangladesh; the capital is Calcutta.

United Provinces (in full United Provinces of Agra and Oudh) are now called Uttar Pradesh, a state in north India bordering to the north on Nepal.

514. Piper, Charles V.; Morse, William J. 1923. Soybeans in Canada (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 50.
• ***Summary:*** "Canada: Soybeans are grown in very small quantities in Canada and then usually as a forage crop. Experiments have been carried on by the Ontario Agricultural College for several years. About 20 varieties have been tried, but most require too long a season to mature. The very early maturing varieties and selections from these have been quite thoroughly tested in cooperative experiments as reported by Zavitz (1916). The Early Yellow (Ito San) variety has given an average of 15 bu to the acre for the past 15 years. The average yields of twelve varieties grown in competition for the past 5 years at the Ontario Agricultural College are: O.A.C. No. 111, 15.8 bu; Buckshot, 15.8 bu; Habaro, 15.7 bu; Chernie, 15.5 bu; Brown, 15.3 bu; Quebec No. 92, 14.8 bu; Early Yellow (Ito San), 14.2 bu; Quebec No. 537, 13.6 bu; O.A.C. No. 81, 13.4 bu; Ito San, 13.3 bu; and Medium Green (Guelph) 6.2 bu."

515. Piper, Charles V.; Morse, William J. 1923. Soybeans in the Philippines (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 50-51.
• ***Summary:*** "Philippines: The soybean is not a native crop in the Philippines. Varieties imported from the United States, China and Japan, Java and India have been tried out at various times at the different experiment stations in Luzon. Variety trials at Singalong and Batangas gave returns of forage and seed that were unsatisfactory. At Alabang and Lamao, the plants grew normally in every way, but were one-third smaller than plants of the same variety in Virginia. Layosa (1918) and Norona (1919) have done considerable successful breeding work with strains of this crop. At the present time the soybean is not recommended for general culture in the Philippines."

516. Piper, Charles V.; Morse, William J. 1923. Soybean coffee (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 227-28. [1 ref]
• ***Summary:*** "When properly roasted and prepared, the dried beans of any variety of soybeans make an excellent coffee substitute. As such the soybean has been used to a slight extent for many years in Europe, especially Switzerland, and in the United States. It is recorded that during the period of the Civil War the soybean was used rather extensively in the southern states as a coffee substitute. For a considerable while seedsmen sold the Ito San variety under the names Coffee Berry and Coffee Bean. In Japan and southern Russia soybean coffee is prepared and put up in small packages for the market. This product is ground very fine and has much

the appearance of coffee essence.

"Prepared as coffee, the soybean gives a liquid of the same color and odor as coffee and somewhat the flavor of a cereal beverage. Those fond of cereal drinks pronounce the soybean beverage equal to the best of the preparations on the market. According to Li Yu Ying and Grandvoinnet (1911-1912) the soybean dried and roasted, such as is used in Switzerland, has the following composition: Water, 5.27; cellulose, 4.97; carbohydrates, 34.76; fat, 18.01; total materials soluble in water, 49.07."

Note 1. This is the earliest document seen (Aug. 2016) which states that soybeans were used as a coffee substitute during the Civil War in the United States. The source of this information is not given–and that is very surprising, since Piper and Morse are so careful about citing their sources in this book. Why did they omit this citation? Perhaps they had heard the story several times but were unable to find an early document to prove it.

Our 30-year search for documentation to verify the above statement has been unsuccessful. Soybeans had been cultivated in 9 southern states by 1865, however none of those states grew a significant acreage of soybeans in 1909–when soybean acreage statistics were first recorded. Therefore its hard to know where to start looking.

Note 2. This is the earliest English-language document seen (Nov. 2012) that uses the term "soybean coffee" to refer to soy coffee.

Note 3. This is the earliest English-language document seen (Aug. 2013) that contains the term "soybean beverage" which is used to refer to soy coffee.

517. Piper, Charles V.; Morse, William J. 1923. Table dishes of soybeans and soybean products (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 259-79.

• ***Summary:*** This chapter contains the largest collection of soyfood recipes published in the Western world at this time. They are organized into four categories, based on the type of soyfood being used. "All are highly nutritious, and many of them of peculiar and delightful flavor and palatability.

"Mature or Dried Beans.–Experiments by the Office of Home Economics, U.S. Department of Agriculture and by the Home Economics department of many colleges have shown the mature or dry soybeans can be used in many palatable ways. The ordinary varieties of soybeans as the Mammoth, Midwest, Ito San, etc., require a longer period of soaking and cooking than navy beans. The Easycook and Hahto varieties need no more preparation than the ordinary bean as they cook up very readily. Time may be saved by using a pressure cooker for they soften very readily when thus treated. In general it is well to soak the beans and then cook them until soft. The time required will vary with the dryness of the bean and also with the variety. After soaking for 20 to 24 hours the beans should be cooked until they are well softened which may require as much as 2 hours or more."

Recipes are given for: Boiled soybeans (starting with 2 cups dried soybeans, soaked in water for about 12 hours). Baked soybeans, No. 1 (with "2 cups boiled soybeans"), 2 (with "1 lb. of beans"), and 3 (with "1 quart of soybeans"). Soybean soup (with "1 cup dry soybeans"). Soybean vegetable soup. Cream of soybean soup Soybean croquettes, No. 1 and 2 (with "1 cup soybean pulp"). Soybean loaf, No. 1 and 2. Soybean chili con carne. Soybean roast (with "1 cup mashed boiled soybeans"). Soybean timbales (with "1 cup bean pulp"). Mexican frijoles. Soybean souffle. Soybean pudding. Soybean and fruit pudding. Soybeans and macaroni. Soybean salad (with "1 cup chopped boiled soybeans"). Soybean and cottage cheese salad. Soybean filling for sandwiches. Soybeans and rice. Soybean pastry. Soybean cookies (with "½ cup soybean pulp"). Soybean crust. Soybean muffins.

Note 1. This is the earliest English-language document seen (June 2013) that uses the term "soybean pulp" to refer to cooked whole soybeans that have been sieved or ground.

"Soybean flour. -... As soybean flour contains considerable fat, not much shortening is required." Recipes: Soybean biscuits, No. 1 and 2. Soybean muffins, No. 1, 2, 3, 4, and 5. Soybean griddle cakes, No. 1, and 2. Soybean coconut pudding. Soybean spice cake. Soybean mush. Soybean croquettes (mush). Soybean loaf (mush). Soybean omelet. Soybean fruit cake. Soybean gems. Soybean spoon bread. Soybean wafers. Soybean jam pudding. Soybean ginger cookies. Soybean gingerbread. Soybean filled cookies. Soybean yeast raised coffee cake. Soybean soft ginger cake. Soybean nut bread. Soybean and rye bread. Soybean cup cakes. Soybean pancakes. Soybean flour and celery soup.

"Tofu.–Attempts have been made during the past 5 years to introduce tofu to the American people, but without much success. In cities having a large oriental population fresh tofu or bean curd may be had at the Chinese stores. The following recipes prepared by the Soy Products Co., and Chicago Bean Bread Co., indicate the wide adaptability of tofu, or soy cake as it is termed by one company, to all kinds of cooking, and at the same time may suggest other practical ways in which this valuable food may be prepared. Recipes: Chicken soy cake (tofu). Soy cake (tofu) with tomatoes. Soy cake (tofu) with tomatoes and cheese. Mushrooms with soy cake (tofu). Potatoes with soy cake (tofu). Soy cake stuffed peppers. Cabbage or cauliflower soy cake (tofu). Eggs a la Caracas with soy cake (tofu). Soy cake (tofu) with tuna fish. Soy chicken salad. Soy cake (tofu) salad dressing. Salted tofu (p. 276, 278). Tofu for soup. Tofu and fish. Tofu with cheese. Creamed tofu in ramekins. Tofu and vegetable stew. Tofu and bacon. Pickled tofu. Tofu cakes. Curried tofu. Tofu in pineapple jelly.

"Soybean sprouts.–Soybean sprouts are especially valuable as a green vegetable and on account of their high

nutritive value. The sprouts are easily prepared, have no waste, are quickly prepared, not more than 4 or 5 minutes in any given way. Boiling water should be poured over the sprouts before using for soups, stews, fried or boiled and creamed." Recipes include: Fried sprouts. Creamed sprouts. French sprout salad. Spanish salad. Potato salad. Potato salad. Sardine salad. Fruit salad. Chicken salad. Fish salad.

518. Piper, Charles V.; Morse, William J. 1923. Immature or green soybeans (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 221-22.
• ***Summary:*** "When soybeans are from three-fourths to full grown, the bean makes a most palatable and nutritious green vegetable (Fig. 58). The yellow, brown, and green sorted seeds are all excellent for this purpose, being shelled and cooked like lima or other green or immature beans. The pods are rather tough and not desirable to eat. The beans are rather difficult to remove but after cooking in the pods for about 5 minutes shell out very easily. These beans may also be canned the same as green peas or lima beans and make an excellent green vegetable. One large canning company has successfully canned green soybeans on a commercial scale. As they are much cheaper than lima beans and equal in quality, this promises to become an important industry.

"The [percentage] composition of the soybean when about full grown [but still green] is as follows: Moisture, 70.24; protein, 10.53; fat, 5.68; starch, 2.00; sugar, 2.59; fibre, 1.98; ash, 1.92.

"In preparing for the table, cook the beans until tender, changing the water once. Season with salt, pepper, and butter or combine with a white sauce made from one cup of milk, two tablespoons of flour, and one tablespoon of butter."

A black-and-white photo (fig. 58) shows green vegetable soybeans in their open pods on a white plate. The caption reads: "Seeds and pods of the Hahto variety of soybeans, the seeds being especially valuable as a green vegetable."

519. Piper, Charles V.; Morse, William J. 1923. Vegetable casein (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 233-34.
• ***Summary:*** "Vegetable casein can be prepared from soybean milk by precipitating the legumin from the milk, purifying by several washings and precipitations and finally by drying. The soybean casein obtained in this manner is a yellowish powder closely resembling animal casein prepared in the same manner. It is the general opinion that vegetable casein has a coefficient of digestibility much less than that of animal casein. According to the investigations of Labbé (1911 ["Le soja et ses usages"]), however, vegetable albumin is quite as readily assimilated as animal albumin. While vegetable casein has some differences from animal casein, about the same differences exist between the caseins of different animals.

"According to Beltzer (1911 [*see Scientific American Supplement,* 19 Aug. 1911, p. 115]), the manufacture of vegetable casein from the soybean has become an established industry in Cochin China. The extraction of the casein for industrial purposes is obtained from the meal, after the extraction of the oil from the bean."

"The casein obtained from the soybean can be employed in the same ways as animal milk. This vegetable casein is utilized for food and for industrial purposes. The various uses of soybean casein are: Medium for paints, dressing for textiles, size [sizing] for paper, Galalith, waterproofing for textiles, etc. As a food it is used as 'Soy-casein,' a flour like Nestle's, with which sauces, bread, jam, milk, fermented milk, cheese, and concentrated biscuits may be made."

Note 1. See also the separate section in this book titled "Soybean flour" (p. 222-25).

Note 2. This is the earliest English-language document seen (Dec. 2015) that uses the term "soybean casein" or the term "Soy-casein" to refer to a soy protein products.

520. Piper, Charles V.; Morse, William J. 1923. Utilization of soybean oil in soap manufacture (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 200.
• ***Summary:*** "Soybean oil was first used in Europe and America in its crude state principally in the manufacture of soft soaps. As a soft soap material it has practically displaced linseed oil, and with the use of the hydrogenation process can serve in the manufacture of hard soaps in which it now enters in equal quantities with cottonseed oil. The soap industry has been the largest single consumer of crude soybean oil. The quantity used increased from 1,182,000 lb. in 1912 to 124,058,000 in 1917, in which year it was practically on a par with cottonseed oil as a soap-making material and represented 24 per cent of the total vegetable oils used in that industry."

A table shows the consumption of vegetable oils by the soap industry in the United States from 1912 to 1917, inclusive. In 1912 the 3 main oils (in million lb) were: cottonseed oil (132.3), coconut oil (78.8), and palm-kernel oil (20.8). In 1917 (after World War I started) the 3 main oils (in million lb) were: coconut oil (168.6), cottonseed oil (126.4), and soybean oil (124.1).

"Soybean oil has been found especially suitable for the soap maker's purpose on account of its low content of free fatty acids and unsaponifiable matter. In the latter respect it has proved superior to any other oils or fats of commerce, whether of vegetable or animal origin. When properly refined, soybean oil 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, cottonseed oil, coconut oil, etc. It is subsequently distilled for explosives such as

dynamite, cordite, blasting gelatine, and for purposes in the arts."

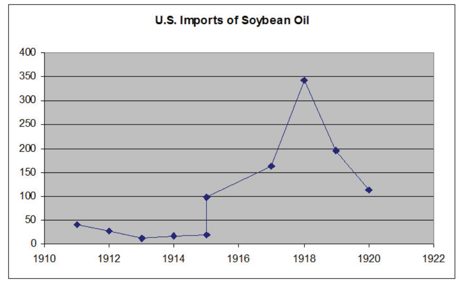
521. Piper, Charles V.; Morse, William J. 1923. Quantity and value of soybeans, soybean cake, and soybean oil imported into the United States, 1910 to 1920, inclusive (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 22.
• ***Summary:*** A table (p. 22) shows imports of soybeans began in 1914, when 1.929 million lb (worth $49,507) were imported. These imports increased to a peak of 5.334 million lb (worth $132,572) in 1917, falling to 3.136 million lb (worth $180,759) in 1920.

Imports of soybean cake began in 1911, when 2.115 million lb (worth $59,626) were imported. These imports increased to 29.473 million lb (worth $645,267) in 1920.

Imports of soybean oil began in 1910, when an unspecified amount (worth $1.099 million) was imported. These imports rose to 41.105 million lb (worth $2.555 million) in 1911, reached a peak of 343.758 million lb (worth $39.309 million) in 1918, then dropped to 112.549 million lb (worth $13.767 million) in 1920.

522. Piper, Charles V.; Morse, William J. 1923. Miso (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 247-50.
• ***Summary:*** "In extent of use miso is said to surpass all other preparations from the soybean in the Orient. It forms an indispensable part of the daily menu of the rural population and wage earners but it is used somewhat less extensively among the people living in cities. It is the general custom of the people in rural districts to prepare miso for their own use. It has been estimated that the daily consumption of miso per person in rural districts of Japan is about 40 grams.

"The preparation of miso depends primarily upon the action of a fermenting agent known as *kojii* [sic, koji], containing certain forms of fungi, of which *Aspergillus*



oryzae is the principal one. The *kojii* also contains diastatic and inverting ferments which change the carbohydrates of the raw material into maltose, glucose, etc., and a proteolytic ferment which acts upon the nitrogenous bodies, converting them into simpler and more soluble materials."

Describes the method of preparing miso in Japan, and two of the most important kinds of Japanese miso. The soybeans "are usually steamed for about 25 hours first with strong heat and later very gently." "White miso, which contains but little salt, is fermented with rice koji for 3 or 4 days only, and may be preserved for about 10 days. Red miso is red in color and contains a relatively large amount of salt. It is fermented usually with barley koji for 1½ to 2 years, and may be kept for several years." A table (from Kellner 1889) compares the composition of these two types of miso.

Photos show: (1) Five Japanese men making miso in a commercial shop; shows the steamer and a large miso fermentation vat. (2) Four men working at the "mill used for crushing the soybeans, yeast [koji] and salt mixture in the manufacture of miso. (3) Two Japanese men shoveling "early cured miso" out of a large vat and packing it into small wooden tubs, each ringed by 5 bamboo hoops.

Note: This is the earliest document seen (June 2004) in which Piper or Morse describe miso.

523. Piper, Charles V.; Morse, William J. 1923. Natto (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 244-45. [1 ref]
• ***Summary:*** "Natto, a sort of vegetable cheese prepared from soybeans, has long been used by the Buddhists and is now used extensively by the Japanese. Although it is made throughout Japan, the method of manufacture varies somewhat with the locality, the different kinds being associated with the place of manufacture such as Tokyo natto, Kyoto natto, etc.

"In preparing natto, the soybeans are boiled in water for about five hours to render them exceedingly soft. The material while still hot, is wrapped in small portions (about a handful) in rice straw and the bundles tied at both ends (Fig. 70) are placed in a cellar or room (Fig. 71) heated by hot water or charcoal. The room is then closed for about 24 hours, the temperature ranging from 35 to 40ºC., this allowing the

TABLE XIII.—QUANTITY AND VALUE OF SOYBEANS, SOYBEAN CAKE, AND SOYBEAN OIL IMPORTED INTO THE UNITED STATES, 1910 TO 1920, INCLUSIVE[1]

Year	Soybeans		Soybean cake		Soybean oil	
	Quantity, lb.	Value	Quantity, lb.	Value	Quantity, lb.	Value
1910	....	....	....	....	Not stated	$ 1,019,842
1911	....	....	2,115,422[2]	$ 59,626	41,105,920	2,555,707
1912	....	....	2,416,052[2]	64,350	28,019,560	1,576,968
1913	....	....	7,004,803	93,002	12,340,185	635,882
1914	1,929,435	$ 49,507	3,163,260	38,255	16,360,452	830,790
1915	3,837,865	87,306	5,975,592	64,307	19,206,521	899,819
1916	3,003,065	78,963	10,468,001	103,081	98,119,695	5,128,200
1917	5,344,334	132,572	11,760,935	136,064	162,734,010	11,410,606
1918	1,433,349	111,818	78,370	1,261	343,758,948	39,309,261
1919	4,368,780	201,496	16,988,787	483,221	195,808,421	24,019,226
1920	3,136,850	180,759	29,473,132	645,267	112,549,075	13,767,917

cooked beans to ferment in the warm, moist atmosphere.

"Another method is to put the cooked beans in a box with cut straw placed over and closed with a lid. The box is then placed in a stove for 24 hours at a temperature of 35 to 40ºC. The fermented product is a thick viscid mass having a peculiar but not offensive odor. The amount of natto produced is about double the quantity of beans used.

"Although the moderate heat of the cellar or rooms acts for only 24 hours, there is evidently a considerable bacterial fermentation. Yabe (1897) [sic, 1894 or 1895] made a rather extensive study of the microorganisms and chemical composition of natto. This investigator found one species of bacillus and three of micrococcus present...

"In addition to being a highly nutritious food, it is quite probable that Natto is more easily digested than the soybean, as it is very soft and contains more peptone. The average composition of natto is as follows: Water, 61.84%; albumen, 19.26; fat, 8.17; carbohydrates, 6.09; cellulose, 2.80; ash, 1.84.

"Natto is used commonly as a side dish and also as a material for confections. It is usually eaten with drops of soy sauce.

A table (p. 245, based on Yabe 1894) compares the nitrogenous substances in soybeans and natto made from those same soybeans. Unfortunately the table was reproduced incorrectly so that most of the values are wrong. For the correct values see Yabe 1894, "On the vegetable cheese, natto."

Photos show (p. 243): (1) About ten Japanese women and men sitting on bundles of straw in a room, "packing a handful of boiled soybeans into fresh rice straw wrappers in preparation of natto." (2) Two Japanese men in a brick-walled natto fermenting room. One is looking in through the small, low entrance door. Each holds a bundle of the straw wrappers.

Note: This is the earliest document seen (Jan. 2012) in which Piper or Morse describe natto.

524. Piper, Charles V.; Morse, William J. 1923. Hamananatto (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 245. [1 ref]

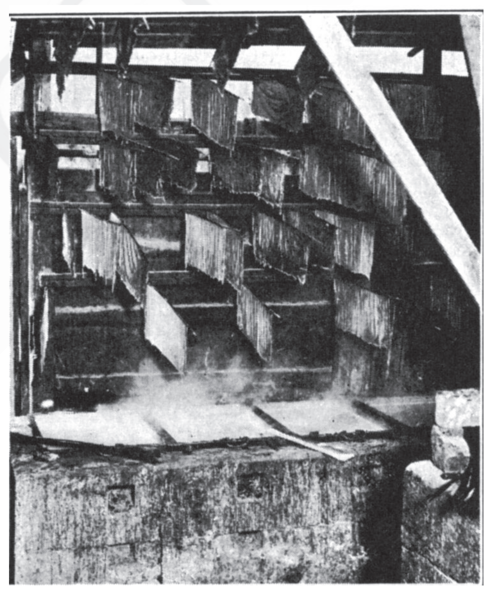
• ***Summary:*** "Hamananatto, a kind of vegetable cheese prepared from soybeans, is manufactured principally in the central provinces of Japan. Although prepared much like miso and natto, it has a somewhat different flavor and texture from either of these. It has an agreeable salty taste and a peculiar odor somewhat resembling that of the fresh crust of brown bread. The soybeans composing it form no compact mass and are of a brown color with a thin layer of a salty taste and a somewhat sticky consistency.

"In preparing Hamananatto the soybeans are thoroughly washed, boiled to softness, spread on straw mats and mixed with wheat flour (6 liters of flour to 10 liters of soybeans). Molds soon develop, after which the mixture is exposed to direct sunlight for 3 days, probably to kill the fungi, and then is put in flat tubs. After about 12 days some salt and ginger are added. The entire mass is then kept in tubs under pressure for about 30 days.

"Sawa [1902, citation not in bibliography] in his investigations found that at least three different kinds of bacteria are present in this product. According to this investigator [Sawa] Hamananatto has the following composition [sic, composition of dry matter only]: Albuminoid nitrogen 3.57%. Fat 3.44%. Fiber 6.87%. Total carbohydrates, excluding cellulose 8.40%. Total ash, including salt added 18.54%. Moisture of fresh sample 44.73%."

Note: This is the earliest document seen (Nov. 2011) in which Piper or Morse describe Hamananatto [Hamanatto].

525. Piper, Charles V.; Morse, William J. 1923. Yuba (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 246-47.



• ***Summary:*** "When soybean milk is boiled, a film forms on the surface. This film, known as yuba, has been prepared since ancient times in China and Japan, and is a very popular foodstuff. It is very brittle and is sold in sticks, sheets, or small flakes. In cooking, yuba is used as a wrapper, cut into ribbons, or small pieces and either fried or used in soups.

"In the preparation of yuba, soybean milk of the best quality is boiled for about one hour in a copper pan over a slow fire. A small quantity of auramine [a bright yellow ketonimine dye] is added which tends to produce a thick film. The film is removed from the milk by passing a stick underneath the surface, the film thus hanging on in two-fold (Fig. 72). It is dried slowly on a galvanized net over charcoal fire, resulting in a thin yellowish sheet.

"The best quality of yuba is glossy and of a cream-

yellow color. The first film is the best and the quality of the succeeding films gradually becomes inferior.

"The milk obtained from 3 lb. of beans is said to produce about thirty sheets of yuba. The [rather thick, semisolid] residue of the milk after the films are removed is still rich in nutrients, and is used mostly for food. It may also be used as animal feed.

"Yuba is valued chiefly on account of its high content of protein. It consists mainly of albuminoids and fat. The composition of yuba is shown in the following table" [Sources: Oshima / Nagao]: Water 18.31 / 22.85. Protein 49.65 / 51.60. Fat 18.00 / 15.62. Carbohydrates 11.82 / 7.31. Ash 2.22 / 2.82. Note: The source of the information from Nagao is not cited.

A photo (p. 246) shows "the boiling of soybean milk in copper pans over a mild fire in the manufacture of yuba." About 25 sheets of yuba are hanging in two-fold over sticks several feet or more above the pans.

Note 1. This is the earliest known photo of yuba being made commercially. It may well have been taken by Frank N. Meyer during one of his early trips as a USDA agricultural explorer to Japan or China.

Note 2. This is the earliest known practical and useful description of how yuba is made on a commercial scale.

Note 3. This is the earliest document seen (Oct. 2012) in which Piper or Morse describe yuba.

526. Piper, Charles V.; Morse, William J. 1923. Tofu or soybean curd (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 234-44, 273-78. [6 ref]

• ***Summary:*** Contents: Introduction. Method of manufacture. Coagulating agents. Manufacturing yields. Composition of soybean curd. Digestibility of soybean curd. 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.

Tofu, "a sort of white cheese or curd,... is called "Teou fu' by the Chinese, 'Tofu' by the Japanese, and 'Dan Phu' by the Annamites [in today's Vietnam]. It is said to have been originated by the Chinese philosopher, Whai Nan Tze, before the Christian Era, and was undoubtedly introduced into Japan from China by the Buddhists."

"The coagulating agents most generally employed throughout the Orient are the concentrated mother liquid obtained from the manufacture of salt from sea water, burned powdered gypsum, and magnesium chloride... The junior author (Morse) has obtained successful results with rennet and 1 per cent. solutions of acetic, tartaric, and lactic acids. Sour milk has also given satisfactory results as well as the water [whey] drawn from the bean curd after coagulation. By the use of pure salts or rennet the bitter taste which is generally found in the curd made by Oriental methods is avoided."

Yields: In commercial tofu production, 1 pound of beans is said to yield about 3.57 lb of tofu (i.e., the yield is 3.57). Champion (1885) got a yield of 1.53 and Paillieux (1880) got a yield of 1.50. Morse conducted many tests to determine the yield of curd from 19 different soybean varieties. His yields ranged from 0.686 to 0.282–extremely low.

Different types of Chinese tofu: (1) Dry bean curd or *tofu khan:* bean curd squares are dipped in burnt millet-sugar sauce until rich brown in color. "Fine salt also has been rubbed on them. This form of cheese can be kept for several days and is generally eaten in soups."

Note 1. This is the earliest English-language document seen (April 2013) uses the term "bean curd squares" to refer to Chinese-style pressed tofu. And this is the earliest English-language document seen (April 2013) that uses the term "soybean curd" to refer to tofu, or that uses the term "Teou fu" (or "Teou-fu"), or the term "Dan Phu" (or "Dan-Phu") to refer to Chinese-style tofu.

(2) "Thousand folds (*chien chang tofu*)*:* This product is prepared by placing very thin layers of the bean curds on cloths, on top of one another, and subjecting them to considerable pressure and allowing them to dry for a short time. The layers of bean curd are then removed and rolled together like a jamroll. It is said to be eaten cut into strips, like noodles, in soups. When allowed to mold for several days it is fried in sesame oil and has a meat like flavor."

Note 2. This is the earliest English-language document seen (Nov. 2014) that contains the term "Thousand folds" or the terms "meat like" or "meat like flavor" used to refer to a meat alternative.

(3) "Fried bean curd (*tza tofu*)*:* The fresh bean curd is cut into small squares and fried in deep fat. After a few minutes the bean curd pieces float on the surface and they are taken out. This product is often fastened on bamboo fibers (Fig. 65) and may be kept for several days. They may also be eaten with syrup as fritters." (4) "Fragrant dry bean curd (*hsiang khan*) [*wu-hsiang toufu kan*]*:* This form is made like the ordinary bean curd but great pressure is applied to drive out as much water as possible. The squares (Fig. 66) are first soaked in a weak brine or bean sauce to which powdered spices and burnt millet-sugar have been added and then are thoroughly dried out. The curd becomes very hard and can be kept indefinitely. It is said to be eaten sliced in soups and in various vegetable dishes."

(5) "Frozen tofu (*kori tofu*)*:* Frozen bean curd is an excellent example of the application of the freezing process for the drying or concentration of a food. Fresh bean curd contains rather a high per cent. of water and is therefore a very unstable product. The fresh bean curd is cut into small pieces and exposed to severe cold weather. By freezing, the vegetable proteid shrinks and forms a porous cake permeated with ice crystals. This frozen cake can be readily thawed

out and dried. It forms a product much resembling gluten bread in appearance. If the tofu is not frozen, it is difficult to dry and the resulting material is dense and horn-like...” (6) “Chinese preparation:... Tofu is quite generally preserved in loaves (100 to 150 grams) which are cooked in a decoction of turmeric roots. It is also preserved with salt. Often the curd is cut into small pieces and preserved in rice brandy [to make fermented tofu]. When smoked, the curd also keeps very well and can be wrapped in tinfoil for the market. Smoked curd is prepared by cooking the curd in a sauce diluted with water (80 per cent. and 20 per cent. soy sauce) and after cooking the curd is smoked in the same manner as meat.”

Various American- and European-style recipes: “When cut into small pieces and cooked with an egg, it furnishes an excellent omelet. It also may be used as the principal ingredient in baked stuffed peppers. The fresh tofu makes an excellent salad or sandwich filling if the curd is chopped finely and chopped olives, pepper, salt, and mayonnaise dressing are added. When cut into small pieces and cooked in tomato sauce or similar sauces, a very good meat substitute is obtained. Cooked with meat broth, the curd takes the flavor of the meat. It is readily seen that the fresh bean curd can be utilized in many ways and when the people of the western world become better acquainted with this simple method of manufacture, it will no doubt, become more generally utilized.”

Nineteen tofu recipes are given on pages 273-78.

Photos show: (1) “Large blocks of freshly made bean curd ‘Tofu’ ready to be cut up into squares and sold for breakfast.” (2) “A large bamboo tray full of various kinds of bean curd. In the little wooden tubs on the ground the watery sorts of curd are kept immersed in saline water.” (3) “Squares of fresh bean curd fried in oil and put on a string of bamboo fiber. Called tza tofu (fried bean curd) and said to supply a ‘snack’ in between meals for hard working Chinese laborers.” (4) “A semi-dry bean curd of the consistency of smoked sausage, called ‘Hsiang khan’ (fragrant dry) which is eaten sliced in soups, and with vegetable dishes.” Two squares, each bearing a stamped mark, are shown next to an open pocket knife for size comparison. (5) “A semi-dry fresh bean curd, called ‘Lao to fu’ (old bean curd) said to be used by the poorer classes of Chinese for breakfast.” One square (with a cloth-like texture on the surface) on a small plate, and a broken half square are shown. (6) A room in which fermented tofu is being made. “A dark room of even temperature where wooden frames, full of squares of bean curd are piled, one on the other, the lowest resting on a layer of somewhat damp rice straw.” One tray is open, showing the rows of tofu cubes, each covered with a white mycelium. (7) “Large earthen jars, full of squares of bean-curd, which are covered over with spiced brine and soy-sauce. After several months’ curing a new product has been formed, called ‘Foo-yu’–Bean cheese [fermented tofu], which can be kept for many years and becomes better with age.”

Note 3. This is the earliest English-language document seen (Oct. 2011) that uses the term “Foo-yu” to refer to fermented tofu.

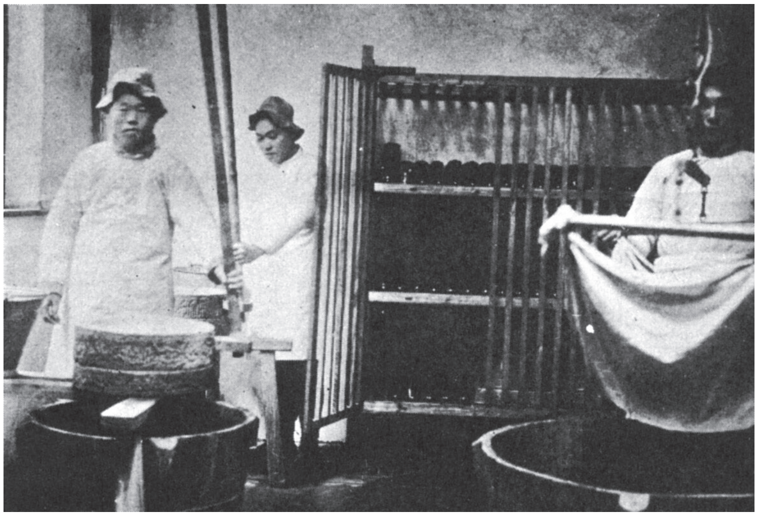
Note 4. Each of these 7 photos was taken (probably in China) by Frank N. Meyer, Agricultural Explorer, USDA.

Tables show: (1) Yields of bean curd obtained by William Morse from different varieties of soybeans. Variety #37062 gave the highest yield of tofu. 50 grams of soybeans yielded 34.3 gm of tofu and 30.5 gm of “Cake” [okara]. Note 4. This yield of 0.69 is very low; it should be at least 2.5. Variety #38462 gave the lowest yield, 0.28. (2) Composition of tofu and tofu products, compiled from various sources: Five samples of fresh tofu (6.0% protein on average), one frozen tofu (48.65% protein and 28.65% fat), and one fried tofu (21.96% protein and 18.72% fat).

527. 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).

- Soybeans.
  - Plants.
    - Green manure.
    - Forage.
      - Hay.
      - Ensilage.
      - Soiling.
    - Pasture.
  - Seeds.
    - Meal.
      - Human food.
        - Breakfast foods.
        - Diabetic foods.
        - Flour.
          - Bread.
          - Cakes.
          - Muffins.
          - Biscuit.
        - Infant foods.
        - Macaroni.
        - Crackers.
        - Milk.
      - Stock feed.
      - Fertilizer.
    - Oil.
      - Glycerin.
      - Explosives.
      - Enamels.
      - Varnish.
      - Food products.
        - Butter substitute.
        - Lard substitutes.
        - Edible oils.
        - Salad oils.
      - Waterproof goods.
      - Linoleum.
      - Paints.
      - Soap stock.
        - Soft soaps.
        - Hard soaps.
      - Celluloid.
      - Rubber substitute.
      - Printing inks.
      - Lighting.
      - Lubricating.
    - Food products.
      - Dried beans.
        - Soy sauce.
        - Boiled beans.
        - Baked beans.
        - Soups.
        - Coffee substitute.
        - Roasted beans.
        - Vegetable milk.
          - Cheese
            - Fresh.
            - Dried.
            - Smoked.
            - Fermented.
          - Condensed milk.
          - Fresh milk.
          - Confections.
          - Casein.
        - Breakfast foods.
      - Green beans.
        - Green vegetables.
        - Canned.
        - Salads.



(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).

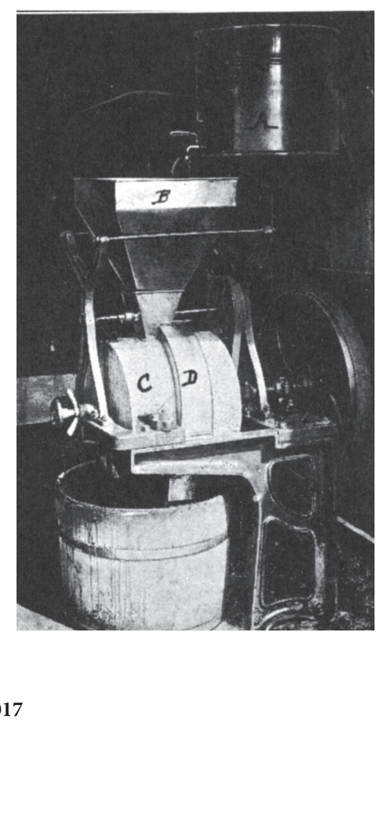
(21) A man standing in a plat of soybeans without inoculation (in the foreground) and an adjacent plat which had been inoculated, in the background (p. 67). (22) A man seated on a cultivator pulled by two horses doing the last cultivation on a field of soybeans (p. 79). (23) Soybeans and sorghums grown 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 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.

528. Piper, Charles V.; Morse, William J. 1923. Soybean sprouts (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 226-27, 278-79.

• ***Summary:*** "Sprouts grown from soybean seed are used extensively by the Chinese as a green vegetable in a great variety of dishes. Bean sprouts furnish a fresh vegetable dish during the whole year, especially in the winter when green vegetables are scarce. The yellow- or green-seeded varieties are most generally used for growing sprouts.

"In preparing the sprouts the beans are thoroughly washed and then poured into a large vessel (usually an earthen jar) which is about 3 ft. high and 1½ ft. in diameter. At the bottom of the vessel small holes are made for draining excess water from the beans. A bamboo mat or cloth is placed at the bottom of the vessel to prevent the beans from running out of the holes. After the beans have been poured in, the vessel is covered with a straw cover to keep out the light. The beans must be moistened at least three times each day during the summer and twice a day during the winter. In the winter it is advisable to add warm water and keep the vessel in a warm place. The beans are usually kept in the vessel from 3 to 5 days in the summer and about 15 days in the winter. At the end of the time the sprouts are fully grown (1½ to 2 in. long) and ready to be used or taken to market for sale (Fig. 59).

"Bean sprouts are considered a great relish and are eaten as a common vegetable throughout the whole year. The sprouts are sometimes boiled with salt, bean oil, or rape seed oil. They are also boiled and eaten with rice and millet. Salads of various sorts may also be prepared with the sprouts as the chief ingredient. The sprouts, in fact, may be utilized in almost any way that green vegetables are used and require only a very short cooking.

"The Mung bean (*Phaseolus aureus*) is perhaps used more generally then the soybean for sprouts."

A table (p. 227, from Li and Grandvoinnet 1911) shows the composition of sprouts from the soybean and mung bean. Soybean sprouts contain more nitrogenous materials (protein; 14.73% vs. 3.41%) and more fat (5.95% vs. 0.28%).

A photo shows a basket to the left containing sprouted,

small, yellow soybeans, while one on the right holds sprouted mung beans (Meyer; p. 226). Eight recipes for "soybean sprouts" are given on pages 278-79.

Note: This is the earliest English-language document seen (Jan. 2013) that uses the term "soybean sprouts" to refer to these sprouts.

529. Piper, Charles V.; Morse, William J. 1923. Soybean flour (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 222-25, 266-73.

• ***Summary:*** "Soybean flour, though not as yet a common commodity, has been used for many years in America and Europe in invalid dietetics. This flour which is made by grinding either the whole beans or the press cake remaining after the oil has been removed from the bean, is becoming an important article of food in America and European countries as it is of high food value and can be used as one of the ingredients of many palatable and nutritious dishes.

"Utilization and products.–"Extensive investigations have been conducted by the United States Department of Agriculture and Domestic Science Schools relative to the utilization of soybean flour. It has been found that this flour can be successfully used as a constituent for bread, muffins, biscuits, crackers, macaroni, and in pastry. In these various food products about one-fourth soy flour and three-fourths wheat flour have been found to be the proper proportion. In some of the pastry products, however, as much as one-half soy flour can be used. It will be found that in several dishes, as soybean mush, soy flour can be used entirely.

"In the United States soybean flour in on the market, being put up like ordinary cereal flours; also in special packages for invalids. In England, manufacturers have placed on the market a so-called 'soya flour' which is 25 per cent. soybean flour and 75 per cent. wheat flour. This soya flour is being used by bakers in making a soy bread which is very palatable and is extensively used by the English bakers. A similar flour is said to have been manufactured in Holland for 25 years. Soya biscuits and crackers are also manufactured from this flour and constitute articles of export from England.

"German millers have been experimenting to some extent with soy flour in making brown bread by mixing with rye flour... Soybean flour enters largely as a constituent in many of the so-called diabetic breads, biscuits, and crackers manufactured as food specialties. It also is utilized in the manufacture of breakfast foods and can be used in the preparation of vegetable milk and bean curd.

"Composition and value for invalids.–The soybean contains at the most but a slight trace of starch, and extensive experiments in American and Europe indicate that value of the bean and its products as the basis of foods for persons requiring a low starch diet."

A table (p. 224, from the USDA Bureau of Chemistry) compares the composition of two types of soybean flour (made from whole soybeans, or from soybean cake), wheat flour, corn meal, rye flour, Graham flour, and whole wheat flour. The two types of soybean flour contain by far the most protein (39.56% and 47.30% respectively), followed by Graham flour (12.60%) and whole wheat flour (12.00%). The two soybean flours also contain the least carbohydrates (26.63% and 33.85%).

Also summarizes research on: (1): The value of soybean flour for feeding infants and young children; (2) The nutritive value and digestibility of soybean flour.

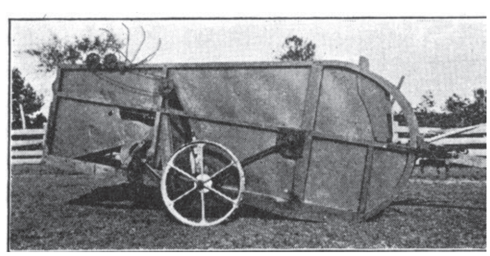
Thirty-one recipes for soy flour are given on pages 266-73.

530. Piper, Charles V.; Morse, William J. 1923. Harvesting and storage of soybeans (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 85-101. Chap. VI. [1 ref]

• ***Summary:*** Contents: Introduction. Harvesting soybeans for hay: Time of cutting (Mammoth Yellow), curing soybean hay (cut the plants, allow to lie in the swath until the leaves are thoroughly wilted, rake into windrows, place the hay in small cocks or bunches for curing, curing in the shocks, curing frames {three- or four-sided pyramids} or poles), shrinkage in curing (Table 20 showing varieties, 1915-1917, from Arlington Farm, Virginia: Austin, Arlington, Barchet, Black Eyebrow, Chiquita, Mammoth, Midwest, Tokio, Virginia, Wilson), yields of soybean hay (typically 1-3 tons/acre, occasionally 4 tons).

Harvesting for silage ("The crop may be harvested with a side-delivery reaper or a twine binder. The latter implement is, perhaps, the best and most satisfactory as the beans can be handled in bundles easily and without waste.").

Harvesting for seed: Time of harvesting, method of harvesting, methods of curing and handling, thrashing, special bean harvesters. Seed yields. Proportion of straw to seed. Storing soybean seed. Separation of cracked from whole soybean seed. Viability of soybean seed. Pedigreed, inspected, registered and certified seed: Indiana, Wisconsin, Virginia (Varieties: Black Eyebrow, Wilson, Virginia, Hollybrook, Mammoth Yellow, Tokio, Mammoth Brown, Haberlandt). Ohio (Varieties: Manchu, Midwest, Ito San, Elton, Hamilton, Medium Green, Peking, Wilson, Virginia). Michigan ("The Michigan Crop Improvement Association inspects three varieties of soybeans: Manchu, Black Eyebrow, and Ito San.").



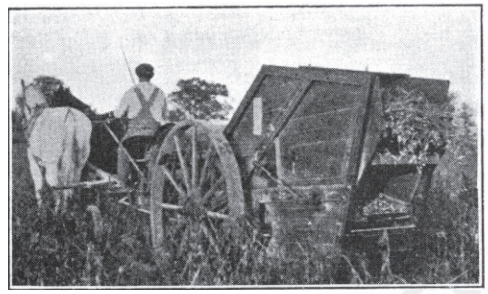
The introduction states: “Soybeans present no especially difficult problems in harvesting by machinery. Several special types of machines have been devised for harvesting and thrashing soybean seeds, which reduce greatly the cost of production.”

“Time of harvesting.–The soybean is strictly determinate as to growth–that is, the plants reach a definite size, according to variety and environment, and then mature and die. Nearly all varieties shatter their seeds somewhat, if allowed to stand after reaching maturity... When special harvesters are used to gather the seed, the plants must reach full maturity to obtain the best results (Fig. 27)... In the Oriental countries the plants are pulled or cut usually just before the pods are mature so as to prevent loss of seed by shattering” (p. 88-91).

Table 30 (p. 89) shows tons of soybean hay to the acre at different experiment stations in the USA for different varieties: Aksarben, Biloxi, Black Eyebrow, Chestnut, Chiquita, Elton, Early Brown, Ebony, Habaro, Haberlandt, Hamilton, Ito San, Mammoth, Manchu, Mandarin, Mikado, Medium Green, Midwest, Morse, Peking, Tokio, Tarheel Black, Virginia, Wilson, Wisconsin Black.

Method of harvesting.–”When the cutting is done with a mowing machine, it is well to have a side-delivery attachment (Fig. 28) in order that the horses will not need to trample on the swath of cut beans... The self-rake reaper (Fig. 29) has given very satisfactory results, as the cut plants are placed in bunches out of the way of the machine and team. The self-binder can be used to good advantage with the taller growing varieties of beans if the plants are not too coarse. This method of harvesting is rapidly coming into favor in many sections... The bean harvester which is used to a slight extent in the northern states is mounted on wheels like a riding cultivator. It has knives that can be adjusted to run just beneath the surface of the ground, cutting the plant where it is soft. This machine will cut two rows at a time and place both in a windrow for curing and convenient for handling” (p. 91-92).

“Thrashing.–The ordinary grain separator (Fig. 31) can be adjusted to thrash soybeans successfully, but as equipped for small grains, a large percentage of cracked beans will result. The chief cause of split beans is the high speed of the cylinder which should be reduced at least one-half, but the speed of the fan and other parts of the separator should be maintained. This may be accomplished by doubling the size of the cylinder pulleys. In some cases a special set of thin concaves is used, while in other instances the concaves are removed. Good judgment on the part of the thrasherman will enable him to adjust the ordinary separator so that the beans may be thrashed with practically no splitting... Special pea and bean separators of different sizes are now on the market. These types of machines do clean hulling and split practically none of the beans... Soybeans, if thoroughly dry, can easily be thrashed with a flail... In some sections of



eastern North Carolina, a thrashing table is employed” (p. 91-93).

“Special bean harvesters.–The harvesting of seed from the mature standing vines by means of patented bean harvesters, of which there are several types (Fig. 32, 33) is rapidly gaining popularity in sections where the soybean is grown rather extensively for seed. The commonest type is a two-wheeled, box-like machine as is drawn by two horses (Fig. 34). As the machine passes over the row of plants, four sets of rapidly revolving arms or long teeth on a large revolving cylinder like the cylinder of a separator shatter the beans from the pods into the body of the harvester. As the machine moves up the row, the seed is constantly raked by a man to the rear of the box. As the seed box becomes filled, the seed is removed and the pods and broken stems are screened out. To secure the best results the rows should be ridged, though recently patented machines are suitable either for ridged or level rows. One of the types of machines also has a cleaning arrangement. Under favorable conditions, two men with a team [of horses] can harvest one acre in about two hours by this method. Although there is some loss of beans, it is more than compensated by the saving of time and labor” (p. 94-95).

Photos show: (Fig. 26) Soybean hay piled high on frames (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 being pulled by a team of horses and led by a man (p. 90). (29) A man next to a self-rake reaper used in cutting soybeans for seed (p. 91). (30) A man next to soybeans cut for seed with a binder and bundles placed in shocks for curing (p. 92). (31) “An ordinary gasoline thrashing outfit may be used in thrashing 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 man using a special bean

harvester by which plants are cut, thrashed, and cleaned (p. 94). (34) A special bean harvester (called the "Little Giant Bean Harvester" made by Hardy & Newsom, La Grange, North Carolina) used to gather soybean seed from the standing mature plants, and which can be adjusted to level or ridged cultivation (p. 95). (35) Method of storing soybean seed awaiting shipment in Manchuria. The beans in sacks are stacked under Chinese mats (p. 98).

Note 1. Some of the "special bean harvesters" (p. 94-95) appear to be crude, early versions of the combine (combined harvester-thresher), though the word "combine" is not used.

Photos show: (Fig. 32) A special bean harvester used in gathering the soybean seed from the standing mature plants and also cleaning it (p. 94).

(Fig. 33) A special bean harvester by which the plants are cut, thrashed, and cleaned (p. 94).

(Fig. 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).

These were the first such machines designed specifically for soybeans. Soybeans were first harvested using a combine (designed for wheat) in 1924. But, surprisingly, some 50 years would pass before combines would again be designed specifically for soybeans.

Note 2. The tractor is not mentioned anywhere in this chapter or in this book.

531. Piper, Charles V.; Morse, William J. 1923. Seed yields. Proportion of straw to seed (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 95-97. Chap. VI. [1 ref]

• ***Summary:*** "In regard to the seed yield of the soybean, there is considerable variation in the figures given by authorities in different countries. In Manchuria experts estimate the yield from 1,100 to 1,600 lb. to the acre, commercial authorities from 1,600 to 1,800 lb., and Japanese agricultural experts from 400 to 2,000 lb. In the best bean-producing districts the average yield is said to be more than 1,800 lb. to the acre. The average yield of soybeans to the acre in Japan for the decade 1904-1913 is 15.7 bu. The highest average yield, 21.6 bu. is recorded on the west or Japan Sea coast, while the lowest average yield, that of the Soochoo Islands, is 8.48 bu.

"In South Africa at the Government Experiment farms as high as 2,000 lb. per acre were recorded, while in many instances the yield was well over 1,000 lb. to the acre.

"When grown alone for seed, the best varieties under proper culture in the United States yield from 30 to 40 bu. of seed to the acre. A maximum yield of 50 bu. to the acre has been reported from North Carolina."

Table 31 (p. 96) shows soybean seed yields (in bushels to the acre) of the more important varieties grown in the United States as reported by investigators at various Experiment Stations. "It will be seen that the yields vary greatly with the same variety at different stations. This in most cases may be attributed to the adaptability of the variety to certain localities for seed production. In general the figures given represent the average yield for a number of years, and indicate the best seed-producing sorts."

The varieties shown in Table 31 are: Aksarben, Black Eyebrow, Biloxi, Chiquita, Ebony, Elton, Habaro, Haberlandt, Hamilton, Ito San, Mammoth, Manchu, Midwest, Mikado, Medium Green, Morse, Mandarin, Peking, Tokio, Tarheel Black, Wilson, Virginia. The states are: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Kansas, Kentucky, Maryland, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Virginia, Washington, West Virginia, Wisconsin.

In the section titled "Proportion of straw to seed," Table 32 (p. 97) gives the relative yields of straw to seed for different varieties of soybeans at the Ohio Experiment Station (5-year average). For each variety the average 5-year yield of seed (bushels) and straw (pounds) is given. The varieties are: Sable, Taha, Cloud, Yosho, Hamilton, Mikado, Amherst, Auburn, Midwest, Ito San, Ebony, Medium Green, Habaro, Ohio 9001, Ohio 9016, Elton. The four varieties with the top 5-year average seed yields are: Ohio 9016 (29.22 bushels/acre). Elton (26.51). Midwest (24.06). Ohio 9001 (24.00).

532. Piper, Charles V.; Morse, William J. 1923. Viability of soybean seed (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 99. Chap. VI. [1 ref]

• ***Summary:*** "The seeds of the soybean do not retain their viability well, and it is not advised to sow seed 2 years old without previous testing.

Table 33 (p. 99) gives the viability of soybean seed for different varieties, including the seed color, and percentage viability after 9 months, 17 months, 25 months, 38 months, and 48 months (4 years). The varieties (listed in descending order of viability after 4 years) are: Chernie (black, 94.0% viability after 9 months, 90.0% after 17 months, 76.5% after 25 months, 66.0% after 38 months, 46.5% after 48 months / 4 years), Tarheel (black, 43.5%), Baird (brown, 24.5%), Fairchild (black, 20.0%), Jet (black, 19.5%), Habaro (straw yellow, 6.5%), Shingto (olive yellow, 5.0). Cloud (black, 4.5%). Ebony (black, 4.0%). Tashing (green, 3.0%). Ito San (straw yellow, 2.5%). Guelph (green, 1.5%). Mammoth (straw yellow, 0.5%). Haberlandt (straw yellow, 0.0%). Meyer (black and brown, 0.0%).

The percentage viability of a the best straw yellow variety (Habaro) is as follows: After 9 months: 95.5%. After 17 months: 94.5%. After 25 months: 78.5%. After 38 months: 48.0%. And after 48 months (4 years): 6.5%.

Note: Black soybeans tend to retain their viability the

longest.

533. Piper, Charles V.; Morse, William J. 1923. Structure of soybean seeds (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 187-193. Chap. X. [3 ref]

• ***Summary:*** Contents: Introduction. The structure of the soybean seed: The seed coat (incl. hilum, chalaza, micropyle, hypocotyl), microscopic structure of the seed coat, microscopic structure of the hilum, the embryo, microscopic structure of the cotyledons, identification of soybean meal, differences in structure of the seed varieties.

"The seed coat is smooth, often shiny, rather firm in texture, and closely enveloping the embryo. The *hilum* or seed scar is linear-elliptical in shape and nearly flat (Fig. 50). At one end is a small linear groove marking the *chalaza,* or point where the seed coat was joined to the body of the ovule. At the other end of the hilum is the *micropyle,* a minute orifice in the seed coat, through which the primary root of the young seedling emerges in germination. In many varieties of soybean the outlines of the *hypocotyl* may be seen through the seed coat" or testa.

"The cellular [microscopic] structure of the seed coat or *spermoderm...* consists of four layers of cells."

Illustrations (line drawings) show: (Fig. 50) Soybean seed (yellow variety from Japan and another variety) showing the hilum, chalaza, micropyle, and an outline of hypocotyl seed through the testa (p. 187, after Kondo 1913). (51) Cross-section of the testa of a yellow soybean. Horizontal section, showing the cuticle, light-line, palisade cells, hour-glass or column cells, spongy parenchyma, and aleurone layer (p. 188). (52) Cross-section of the hilum of a yellow soybean from China, showing outer palisade layer, inner palisade layer, asteroid parenchyma, spongy parenchyma, fibro-vascular bundle, fibro-vascular bundle of the testa, aleurone layer, and hour-glass cells (p. 189).

(Fig. 53) Embryo of a yellow soybean from Japan. Whole embryo from ventral side. Half of embryo from the inner side. The 2 leaves of the plumule, with cotyledons and hypocotyl (sprout; p. 189). (54) Soybean. Cells of the cotyledon filled with fat, protein, and starch (p. 189). (55) Cellular structure found in soybean flour and meal. Palisade and hour-glass cells in sections and surface views from above and below. Aleurone cells within seed-coat. Same with compressed parenchyma in section. Surface view of epidermal cells near the hilum. Parenchyma near the hilum. Tracheids from hilum furrow. Epidermis and underlying cells from flat and round sides of cotyledon. Epidermis and palisade cells in transverse section of cotyledon. Epidermis and mesophyll cells from rounded face of cotyledon. Oil drop. Crystal. Aleurone grains (p. 190).

Table 83 (p. 192) shows the "Variations in the cooking qualities of seed of different varieties of soybeans." For each of the 18 varieties (9 with names and 9 with numbers) is given: Weight of 100 beans (dry, in gm). Weight of 100 beans after soaking (gm). Amount of water taken up by 100 beans (gm). Texture of beans after cooking. The named varieties are: Tokio, Chiquita, Midwest, Manchu, Haberlandt, Ito San, Mammoth, Easycook, Hahto. One hundred seeds of each variety were used. The seeds were weighed dry then after soaking for 17 hours were weighed again. Each sample was cooked for 2 hours. The varieties with the largest seeds are Hahto and 37264: 100 dry beans weigh 35.95 gm. These two varieties also weighed the most after soaking: 92.80 gm and 86.70 gm, respectively. The 3 varieties with the softest texture ("Very soft") after cooking were Easycook, Hahto, and 37305.

"Studies on the structure of the seed of several of these varieties by Dr. Albert Mann, of the United States Department of Agriculture, showed that there was an appreciable difference in the structure of the Easy cook and other varieties. The most important difference was the much greater permeability of the skin or integument of the Easycook variety. This permeability is due to a very great looseness in the cells comprising the various layers of the integument; particularly so of the outer or palisade layer. The walls of all the cells of the integument are more delicate and, therefore, more permeable than those of the Mammoth Yellow, which does not cook up easily. The palisade cells on account of their external position doubtless play the most conspicuous part in this particular."

"In general, those varieties absorbing a large amount of water cooked rather easily, but in a very few instances varieties absorbing small amounts of water cooked quite easily. It was found that in addition to difference in structure, the varieties as the Easycook, Hahto and Tokio contained more starch, which was scattered more or less through the cotyledons."

Note: This is the earliest English-language document seen (Oct. 2004) that uses the word "chalaza" in connection with soybeans. An illustration (p. 187) shows that the chalaza, located at one end of the hilum on a soybean seed, is a small linear groove which marks the point where the seed coat was joined to the body of the ovule.

534. Piper, Charles V.; Morse, William J. 1923. Soybean varieties (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 144-86. Chap. IX.

• ***Summary:*** Contents: Introduction. Japanese classification of varieties. Classifications of varieties in Manchuria: Yellow (*Pai-mei* or white eyebrow, *Chin-huän* or round golden bean, and *Hei-chi* or black navel), green (*Ching tou*), black (*Wu tou*). Botanical classifications: *Soja elliptica* Martens (*S. elliptica nigra, S. elliptica castanea* [brown], *S. elliptica virescens, S. elliptica lutescens*), *Soja sphœrica* (*S. sphœrica nigra, S. sphœrica minor, S. sphœrica virescens, S. sphœrica lutescens, S. sphœrica minima*), *Soja compressa*

(*s. compressa nigra, S. compressa parvula, S. compressa virescens, S. compressa zebrina*). Varietal characteristics: Habit of growth, foliage, pubescence, flowers, pods, size and weight of seeds, color of seeds, frost resistance, period to maturity, disease resistance, classifications by lengths of life period, desirable characteristics in varieties, descriptions of important varieties, key for identification of varieties (Yellow group, green group, brown group, black group, bicolored group), breeding and improvement (pollination, mutations, natural hybridization, artificial hybridization), genetic behavior (flower color, pubescence, color of pods, color of seeds, color of cotyledons, oil content).

The section titled "Classification by lengths of life period" [maturity] states: "Based on the data from variety tests at the Arlington Experimental Farm, the varieties may be classified into seven groups according to their life periods:

"Very early–Maturing in 81 to 90 days.

"Early–Maturing in 91 to 100 days.

"Medium early–Maturing in 101 to 110 days.

"Medium–Maturing in 111 to 120 days.

"Medium late–Maturing in 121 to 130 days.

"Late–Maturing in 131 to 150 days.

"Very late–Maturing in more than 150 days."

Note 1. This is the earliest document seen (Aug. 2011) in which soybean varieties are classified into groups based on their maturity (number of days to mature) or "life periods."

The following 43 varieties (not including synonyms) are described in the section titled "Descriptions of important varieties" (p. 162-70): A.K., Aksarben, Barchet, Biloxi, Black Eyebrow, Chestnut, Chiquita, Columbia, Early Brown, Easycook, Ebony (same as Black Beauty), Elton, Guelph (same as Medium Early Green, Medium Green), Hoosier, Haberlandt, Hamilton, Habaro, Hahto, Hollybrook, Ito San (same as Medium Early Yellow), Laredo, Lexington, Mammoth Yellow, Mammoth Brown, Manchu, Mandarin, Merko, Minsoy, Midwest (same as Medium Yellow and Mongol; appears identical with Roosevelt, Banner, and Northern Hollybrook), Mikado, Morse, Ogemaw, Otootan, Peking (same as Sable), Pinpu, Tarheel Black, Tokio, Virginia, Wilson, Wilson-Five, Wisconsin Black, Wea, Yokotenn [Yokoten].

Note 2. This is the earliest document seen (Oct. 2013) that mentions the soybean variety Hamilton (one of two documents).

535. Piper, Charles V.; Morse, William J. 1923. Early introduction of the soybean into the United States (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 39-41.

• ***Summary:*** "There are fortunately fairly complete records for the early history of the soybean in the United States. The facts emphasize the difficulties with which a new crop wins its way to recognition.

"The earliest records.–The first mention of the soybean in American literature is by Mease (1804), who writes 'The soybean bears the climate of Pennsylvania very well. The bean ought therefore to be cultivated.'

"Thomas Nuttall (1829) grew a variety with red flowers and chocolate brown seeds in the botanic garden at Cambridge, Massachusetts, and from his observations wrote a brief account concerning it. He writes:

"'Its principal recommendation at present is only as a luxury, affording the well-known sauce, soy, which at this time is only prepared in China and Japan.'

"In the same journal two years later, November 23, 1831, is an account of the successful culture of the plant at Milton, Massachusetts, the seed having been obtained from Nuttall.

"No further mention of the plant in America literature appears until 1853, when a brief account appeared under the name 'Japan pea' by Ernst [of Ohio] (1853), as follows:

"'The Japan pea, in which so much interest has been manifested in this country for a year or two past, from its hardihood to resist drought and frost, together with its enormous yield, appears to be highly worthy of the attention of agriculturists.'"

"The Perry Expedition to Japan.–The Perry expedition in the year 1854 brought back two varieties of 'soja bean' from Japan, one 'white' seeded, the other 'red' seeded. These, together with the Japan pea, were distributed by the Commissioner of Patents in 1854, (Browne 1854) and, thereafter frequent references to the plant occur in agricultural literature under such names as Japan pea, Japan bean, and Japanese fodder plant. Most of these articles speak of the plant as the Japan pea, none of them as the soy or soja bean. It is apparent from the early accounts that there were at least two Japan peas, one early enough to mature in Connecticut (Patent Office Report, 1854, p. 194), the other very late (American Agriculturist, 1857, vol. 16, p. 10). Judging from all the accounts, we suspect that the early Japan pea may be the Ito San variety, which, however, has red flowers, while the late variety may be the Mammoth. The Ito San is still occasionally called the Japan pea, while the introduction and source of the Mammoth has never been definitely determined. From these early accounts the Mammoth may well be the 'white-seeded' soja bean obtained by the Perry expedition. The 'red-seeded soja bean' was, probably, the adsuki bean (*Phaseolus angularis*)*,* as no red-seeded soybean is known.

Later Introductions.–Prof. G. H. Cook, of New Brunswick, New Jersey, obtained seed of the soybean at the Bavarian Agricultural Station [in Germany] in 1878. In the same year Mr. James Neilson obtained seeds of several varieties at Vienna, Austria. Both of these gentlemen planted the seeds and gathered crops of the different varieties in 1879. These varieties were without doubt some of those grown and distributed through Europe by Professor Haberlandt of Vienna.

"A yellow-seeded soybean was grown at the North Carolina Agricultural Experiment Station in 1882 and reported on in some detail. The source of the variety is not given, but by implication it is the same as the variety stated to be grown by a number of persons in the State, and is probably the Mammoth.

"Two varieties, one black seeded, the other with white seeds, were grown at the Massachusetts Agricultural Experiment Station in 1888.

"In 1890 Prof. C. C. Georgeson (1890) secured three lots of soybeans from Japan which were grown at the Kansas Agricultural Experiment Station in 1890 and subsequently.

"Prof. W. P. Brooks, (1890) of Amherst, Massachusetts, brought with him from Japan in 1889 a number of soybean varieties, including the Medium Green or Guelph, and the Ito San. It is quite certain that other importations of soybeans from Asia were made by others, but no definite records have been found.

"Since 1890 most of the agricultural experiment stations have experimented with soybeans and many bulletins have been published dealing wholly or partly with the crop."

536. Piper, Charles V.; Morse, William J. 1923. Pedigreed, inspected, registered, and certified seed (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 99-101. Chap. VI.

• ***Summary:*** "Several states have formed seed improvement associations, the object of which is to specialize in the production and marketing of high yielding, adapted pure seed. Seed stock which is descended from an individual plant or group of plants of which a performance record has been kept is termed 'Pedigreed Seed.' 'Registered Seed' is pedigreed seed that has successfully passed both the field and final inspections conducted by the State Crop Improvement Association under the supervision of the State Agricultural College. Seed of varieties or strains of crops which in tests conducted by the State Agricultural College have demonstrated their adaptability, purity, and yielding qualities and have passed *both* field and final inspections is termed 'Certified Seed.'" Thus, certified seed is seed of those varieties suited for ordinary crop production.

Details on inspections, seed certification, and crop improvement associations are given for the following states: Indiana, Wisconsin, Virginia, Ohio, and Michigan.

In Virginia the following varieties are inspected and recommended: Black Eyebrow, Wilson, Virginia, Hollybrook, Mammoth Yellow, Tokio, Mammoth Brown, and Haberlandt.

In Ohio the following varieties are inspected and recommended: Manchu, Midwest, Ito San, Elton, Hamilton, Medium Green, Peking, Wilson, Virginia.

The Michigan Crop Improvement Association inspects only three soybean varieties: Manchu, Black Eyebrow, and Ito San.

Note: This is the earliest English-language document seen (July 2010) that contains the term "registered seed" or the term "certified seed."

537. Piper, Charles V.; Morse, William J. 1923. Composition of the soybean: Carbohydrates (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 109-12. [14 ref]

• ***Summary:*** "Many investigators have studied the nitrogen-free extract of the soybean from various points of view. In many cases, the published analytical data are somewhat conflicting. The soybean has a variety of carbohydrates, altogether amounting to from 22 to 29 per cent., depending on the variety and maturity of the bean. The most complete quantitative separation of the carbohydrates existing in the soybean has been made by Street and Bailey (1951).

"Considerable differences of opinion have existed among investigators with regard to the presence of starch in soybeans." Some found none, whereas others found small amounts. "Japanese chemists have not identified starch in the native soybean. Undoubtedly the discrepancies relative to starch content have been due to the maturity of the beans or rather the method in which they are allowed to mature." Harz (1885) found that mature soybeans generally contain little or no starch.

"Thoroughly mature seed of sixteen varieties of soybeans grown quite generally throughout the United States were submitted by the authors to Dr. Albert Mann of the United States Department of Agriculture for investigation as to starch content. Dr. Mann reported that in all cases where starch reaction was obtained, it appeared upon the inner (approximate) surfaces of the two cotyledons. It was intensest at the middle part of the line of separation and extended immediately under or behind the epidermal layer of these two surfaces. In the majority of cases only a trace of starch extended back into the thicker portion of the cotyledons, that is, midway the inner and outer surfaces. One variety, the Hahto, showed a distribution of starch throughout most of the cotyledon, although the color reaction was nowhere intense. No starch was found in the seed coats of any of the varieties and only a mere trace in the embryos. It will be noted in the following table that those varieties with black or brown seed coats (with the exception of the Black Eyebrow variety) are practically starch free while a general tendency toward relatively high starch content is exhibited by the yellow-seeded sorts."

Table 45, titled "Starch content of commercial varieties of soybeans in the United States" (p. 111), has three columns: Variety, seed color, and amount of starch, as follows: Peking, black, no starch. Virginia, brown, no starch. Wilson, black, no starch or merest trace. Biloxi, brown, trace. Early Brown, brown, small amount. Hollybrook, straw yellow, small amount. Guelph, green, small amount. Midwest, straw yellow, thin area covering 3/4 of inner surface. Ito San, straw

yellow, similar to Midwest but the areas heavier in starch. Manchu, straw yellow, strong starch areas in inner surface of each cotyledon. Mammoth, straw yellow, decided starch band on inner surface of each cotyledon. Black Eyebrow, black and olive, pronounced starch band on inner surface of each cotyledon. Hahto, olive yellow, starch grains more or less through the cotyledons. Chiquita, straw yellow, very strong starch band on inner side of each cotyledon. Haberlandt, straw yellow, very strong starch bands on inner side of each cotyledon. Tokio, olive yellow, strongest starch reaction of all varieties tested. Easy Cook [Easycook], straw yellow, decided starch bands on inner surface of each cotyledon; more or less starch to outer side of cotyledons also; starch more or less distributed through the tissue of the bean.

538. 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... 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.

539. Piper, Charles V.; Morse, William J. 1923. Solvent method of oil extraction (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 197.
• ***Summary:*** "The solvent method of extraction, involving the use of benzine or gasoline, is used by many of the large oil mills in European countries, especially England. The beans are first crushed finely and then treated directly by the fat solvent. The oil is taken out of the fat solvent by evaporating the latter, which is distilled and used over again. The residue is well dried and as a bean meal rather than cake is obtained, can be used without further treatment as fertilizer and also as a feedstuff where no prejudice exists against the use of chemically-treated beans. The chemical process can not be utilized when an edible oil is desired, as the solvent gives the oil an odor which can not be entirely removed.

"It is contended that by the solvent process more oil of a better quality is extracted from the beans and the resultant meal is better suited for flour or fertilizer, as it contains less oil. When the extraction process is used about 95% of the oil is obtained, the meal containing only about 1.5% oil and 43 to 45% protein. One of the solvent process mills recently erected in Manchuria has a maximum capacity of 80 tons of beans every 24 hours. However, only 50 tons of beans are crushed daily, producing about 7 tons of oil and 40 tons of meal, the 3 tons which were lost consisting of moisture, dust, and trash."

540. Piper, Charles V.; Morse, William J. 1923. American oil mills (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 197-98.
• ***Summary:*** "American Oil Mills.–The oil mills in the United States employ two methods of oil extraction–the hydraulic and expeller processes. Extensive tests with domestic grown beans indicate that 1 ton of beans will yield by the expeller process an average of 32 gal (about 7.5 lb/gal) of oil and 1,600 lb of cake, the difference (about 130 lb) representing the loss due to cleaning and the evaporation of moisture driven off after the beans have been crushed and heated. The cost of producing oil and cake by either process is said to be less with the soybean than with cottonseed. The cotton oil mills can easily handle soybeans with little or

no change in their present equipment. As soybeans may be stored with less danger of deterioration than cottonseed, it is practicable to press the beans after the regular cottonseed crushing season is over."

541. Piper, Charles V.; Morse, William J. 1923. Soybean cake or meal (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 204-17. Chap. XII.

• ***Summary:*** Contents: Introduction, feeding value, composition, use for feeding for dairy cows, cattle, swine, sheep, poultry, digestibility, injurious effects, fertilizer.

Introduction: "The cake or meal remaining after the oil is extracted is a most valuable product and has the widest usefulness. The yellow-seeded varieties produce a bright yellow meal, while that from the brown and black varieties is of a darker shade. The cake or meal from which the oil has been extracted by means of the solvent process is of the brighter color than that from which the oil was removed by heating and pressure. Soybean cake or meal when fresh has a sweet, nutty flavor, and not at all unpleasant to taste. As a feed, soybean meal is highly concentrated and nutritious and is relished by all kinds of livestock. In the Orient it is used to a very considerable extent for fertilizing purposes. The use of the meal as flour for human food has become important in several European countries during the last few years.

"Feeding value: In Manchuria, soybean cake or meal, mixed with bean and kaoliang (sorghum) stalks, is used as a feed for horses and mules, but only when very hard work is done. It is also recognized in Japan as a valuable feed for work animals and as a fattening feed for animals not employed in farm work."

"The use of the meal in America thus far has been confined almost entirely to the Pacific Coast states. It is considered a valuable feed not only by dairymen, but also by poultrymen. The meal has been used to some extent by kennel owners who have found it to be a highly satisfactory dog feed."

"Soybean meal as fertilizer: The utilization of soybean meal as a fertilizer has been confined almost entirely to Asiatic countries. For centuries bean cake has been sent to the sugar plantations of southern China, and its use gradually spread to the plantations in Java and other tropical islands. The high fertilizing value of the cake has long been recognized by the Japanese, who import large quantities annually for use in the rice fields and as an alternative manure for mulberry trees. In Manchuria large amounts of cake are used annually on poor soils for both field and garden crops.

"Although large quantities of soybean cake have been imported into the United States and Europe during the last few years, there is no mention of its use in the manufacture of commercial fertilizers. With the production in the United States of bean meal and oil from domestic-grown beans, fertilizer manufacturers became interested in the possibilities of the meal and purchased considerable quantities for this purpose.

"Like cottonseed meal, soybean meal contains considerable amounts of phosphoric acid and potash, a large proportion of which is 'available,' but it is principally valued in fertilizers as a source of nitrogen. From the fertilizer standpoint, soybean meal is richer in plant food constituents than is cottonseed meal, and if the price is determined on the same basis as that used in calculating the fertilizing value of cottonseed meal, the soybean meal is a more valuable substance. Its composition with reference to fertilizing constituents and a comparison with cottonseed meal are shown in the following table."

"While soybean meal, as shown in the above table, has a high value as a fertilizing material, a more economical use is to feed the meal to livestock and apply the resulting manure to the soil. Feeding experiments indicate that much of the fertilizing value of feeds is recovered in the manure."

542. Piper, Charles V.; Morse, William J. 1923. Enemies of the soybean: Rodents (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 288-288a.

• ***Summary:*** "Rabbits are most troublesome as they are very fond of the soybean, and have been known to destroy considerable areas. In the Great Plains area failures with soybeans have been chiefly due to rabbits. The greatest damage is done while the plants are young and tender. Observations have been noted in various sections where rabbits showed particular preference to certain varieties of soybeans. In South Carolina where a number of varieties were under test, the Barchet, Riceland, Tokio and Chiquita varieties were kept eaten down during the entire season while several other varieties were damaged but slightly, and a few varieties remained untouched. At the Moro Station, Oregon, the Black Eyebrow, Ito San and Guelph varieties were more or less damaged by rabbits, while the Manchu was not injured. In a variety test using the Barchet, Tarheel Black, Laredo, Hahto, Biloxi, Peking, Chiquita, Otootan, Virginia and Tokio at Shafter, California, the Barchet was the only variety damaged, the Jack rabbits keeping this variety eaten down during the season. The Hahto variety in some sections of the Southern States appears to be preferred to other varieties commonly grown. Where rabbits are abundant soybean culture is practically impossible unless the field can be enclosed with rabbit-proof fencing. Small experimental plantings may be protected by a 25-inch woven wire fence. The dusting of the plants on the outer rows of soybean fields with lime, or spraying with some arsenical poison has prevented serious damage from rabbits

"In some of the Northern States woodchucks have caused considerable injury to small plantings of the soybean."

543. 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."

544. Piper, Charles V.; Morse, William J. 1923. Tables (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p.
• ***Summary:*** Tables: (1) Acreage, production and yield of soybean seeds in the United States. Gives statistics for each for 1918, 1919, and 1920 for 14 states, other, and total. The states are listed in descending order of soybean acreage in 1921, as follows: North Carolina, Virginia, Alabama, Illinois, Ohio, Kentucky, Missouri, Tennessee, Wisconsin, Indiana, Georgia, Pennsylvania, S. Carolina, Mississippi.

(2) Estimates of soybean production of Manchuria for various years (in million tons): 1906 = 0.6. 1907 = 0.6 to 0.9. 1908 = 1.150. 1909 = 1.150. 1910 = 1.4. 1913 = 1.2 1921 = 4.52.

TABLE I.—ACREAGE, PRODUCTION AND YIELD TO THE ACRE OF SOYBEAN SEED IN THE UNITED STATES[1]

State	Acreage			Production			Yield to Acre		
	1920, acres	1919, acres	1918, acres	1920, bu.	1919, bu.	1918, bu.	1920, bu.	1919, bu.	1918, bu.
N. Carolina	91,000	96,000	85,000	1,638,000	1,373,000	1,700,000	18.0	14.3	20.0
Virginia	30,000	30,000	28,000	570,000	555,000	630,000	19.0	18.5	22.5
Alabama	23,000	7,000	11,000	228,000	59,000	110,000	9.9	9.4	10.0
Illinois	8,000	6,000	5,000	92,000	60,000	65,000	11.5	10.0	13.0
Ohio	8,000	6,000	2,000	64,000	42,000	14,000	8.0	7.0	7.0
Kentucky	8,000	7,000	7,000	120,000	105,000	84,000	15.0	15.0	12.0
Missouri	7,000	7,000	5,000	133,000	98,000	40,000	19.0	14.0	8.0
Tennessee	5,000	5,000	2,000	50,000	40,000	10,000	10.0	8.0	5.0
Wisconsin	4,000	2,000	1,000	28,000	15,000	8,000	7.0	7.5	8.0
Indiana	3,000	3,000	1,000	42,000	36,000	15,000	14.0	12.0	15.0
Georgia	2,000	2,000	1,000	22,000	20,000	11,000	11.0	10.0	11.0
Pennsylvania	....	2,000	2,000	....	36,000	34,000	....	18.0	17.0
S. Carolina	....	1,000	1,000	....	6,000	6,000	....	6.0	6.0
Mississippi	1,000	1,000	8,000	15,000	15,000	120,000	15.0	15.0	15.0
Other	....	....	10,000	....	177,000	....	....	17.7	
United States	190,000	175,000	169,000	3,002,000	2,460,000	3,024,000	15.8	14.1	17.9

(3) Cost of production of soybeans per acre in Manchuria, 1910. (4) Monthly capacity of steam oil mills at Newchwang, Manchuria, 1917. (5) Export of soybeans, bean cake, and bean oil from the principal ports of South Manchuria, 1909 to 1913, inclusive. (6) Five-year averages (1897-1919, inclusive) of acreage, production, and yield per acre of soybeans in Japan. (7) Amount and value of soybeans imported by Japan. (8) Importations of soybean cake and bean oil into Japan. (9) Quantity and value of exports of soybeans and soybean oil from Japan to foreign countries, 1913 and 1914.

(10) Quantity and value of exports of miso (bean cheese) and shoyu sauce, 1903 to 1907, inclusive. (11) Quantity and value of imports of soybeans, bean cake, and bean oil by European countries, 1912 to 1914, inclusive. (12) Comparative prices per ton of cottonseed and soybeans in European markets, 1911 to 1914, inclusive. (13) Quantity and value of soybeans, soybean cake, and soybean oil imported into the United States, 1910 to 1920, inclusive. (14) Quantity of imports of soybeans in the world's trade, 1920-1919 inclusive. (15) Quantity of imports of soybean oil in the world's trade, 1910-1919 inclusive. (16) Quantity of exports of soybean oil in the world's trade, 1910-1919 inclusive. (17) Quantity of exports of soybeans in the world's trade 1910-1919 inclusive. (18) Acre yields of seed and hay of soybeans at different dates of planting at Arlington Farm, Virginia. (19) Yields of soybeans variously spaced.

(20) Acre yields of soybean hay and seed when planted at different rates. (21) Germination of soybeans at different depths of planting at Arlington Farm, Virginia. (22) Influence of nodules on the composition of seed. Michigan Experiment

Station. (23) Effect of various nitrogenous fertilizers on the yield of soybeans. Massachusetts Experiment Station. (24) Effects of different phosphatic fertilizers with and without lime. Rhode Island Experiment Station. (25) The influence of different potash salts on yields of soybeans. Massachusetts Experiment Station. (26) Effects of different kinds of lime on the yield of soybeans. Massachusetts Experiment Station. (27) Effect of fertilizers on soybeans. Delaware Experiment Station. (28) Composition of hay of Mammoth soybean at different stages of development. Arlington Farm, Virginia. (29) Comparison of the loss in moisture in 10-lb. samples of green forage of ten varieties of soybeans when air dried. Arlington Farm, Virginia.

(30) Tons of soybean hay to the acre at different experiment stations in the United States. (31) Bushels of soybean seed to the acre at different experiment stations in the United States. (32) Relative yields of straw to seed in different varieties of soybeans. Ohio Experiment Station. (33) Viability of soybean seed. (34) Proportions of stems, leaves, and pods. (35) Nutritive constituents contained in each part of the soybean plant. After Lechartier. (36) Composition of the different parts of the soybean plant at different stages of growth, at Arlington Farm, Virginia. (37) Total weights of mineral materials in 1,000 kilos of dry forage. After Lechartier. (38) Mineral Materials in 1,000 kilos of dry forage. After Joulie. (39) Percentages of nitrogen, phosphoric acid and potash contained in different parts of the soybean plant at different stages of growth, at Arlington Farm, Virginia.

(40) Composition of soybean seed compared with that of other legumes. (41) Composition of common American varieties of soybeans. (42) Percentage composition of the different parts of soybean seed. After Lechartier. (43) Percentage composition and comparison of the amino acids of the protein of the soybean and of cow's milk. (44) Percentage composition of the nitrogen-free extracts of the soybean. (45) Starch content of commercial varieties of soybeans in the United States. (46) Maximum, minimum, and average of the more important constants of soybean oil from 48 varieties, compared with those of other well-known oils. (47) Comparison of the more important constants of soybean oil by different observers. (48) Constants for soybean oil. (49) Composition of the ash of the soybean seed. After Pellet.

(50) Mineral content of the soybean seed compared with those of cowpea, navy bean, and peanut. (51) Oil content of soybeans gathered at various stages of maturity. (52) Oil content of soybeans as affected by partial defoliation. (53) Oil content of soybeans as affected by partial removal of very young seed pods. (54) Oil content of soybeans of large and small size seed from the same plant. (55) Oil content of soybeans planted at intervals of two weeks in 1911, at Arlington Farm, Virginia. (56) Varietal differences in the oil content of soybeans grown at Arlington Experiment Farm, Virginia, in 1907, 1908 and 1910. (57) Oil content of soybeans grown under different environmental conditions. (58) Oil and protein content of soybean varieties grown under different environmental conditions. (59) Fertilizing constituents of soybeans contained in crop and roots on one acre. Connecticut (Storrs) Experiment Station.

(60) Yields of hay of different legumes and content of fertilizing ingredients. Michigan Experiment Station. (61) Fertilizing constituents of soybeans cut at different stages of growth. Arlington Farm, Virginia. (62) Data and results of soiling experiments with milch cows. Iowa Experiment Station. (63) Soybean soiling experiment with milch cows, Pennsylvania Experiment Station. (64) Analyses of soybean, soybean and corn, and corn silages. (65) Digestibilities of soybean and other silages. (66) Digestible nutrients in 100 lb. of air-dry substance. (67) Digestible nutrients in 100 lb. of soybean straw and in other roughages. (68) Fertilizing constituents of soybean straw compared with those of wheat, oats, barley, and rye. (69) Number of seeds per bushel and weight in grams of 100 seeds of the most important varieties.

(70) Results of planting a single variety of soybean at different dates. Vienna, Austria, 1877. (71) Results of planting different varieties of soybeans at different dates at Knoxville, Tennessee. (72) Life period of soybean varieties grown at the Arlington Experimental Farm, Virginia, for eight seasons. (73) Life periods of American varieties of soybeans grown at Sabour, India, 1911 (from Woodhouse and Taylor, 1913). (74) Life period of soybean varieties planted at intervals of two weeks in 1911 at the Arlington Experimental Farm, Virginia. (75) Behavior of flower color in natural hybrids. (76) Behavior of pubescence colors in natural hybrids. (77) Behavior of amount and colors of pubescence in an artificial hybrid. (78) Behavior of the color of pods in natural hybrids. (79) Behavior of seed colors in natural hybrids.

(80) Soybean crosses in the study of seed color. (81) Behavior of cotyledons in natural hybrid selections. (82) Behavior of cotyledons in soybean crosses. (83) Variations in the cooking qualities of seed of different varieties of soybeans. (84) Consumption of vegetable oils by the soap industry in the United States. (85) Consumption of vegetable oils in the production of lard substitutes and oleomargarine in the United States (incl. coconut oil, cottonseed oil, peanut oil, soybean oil, and corn oil). (86) Composition of soybean cake, meal, and other important oil feeds. (87) Two 17-week comparisons of soybean meal with other supplements for fattening pigs. (88) Growth and nitrogen elimination of chicks fed varying amounts of meat scrap or soybean meal or both, in addition to a corn ration. (Indiana Experiment Station). (89) Comparison of the digestibility of soybean meal and other oil meals.

(90) Digestion coefficients of soybean meal obtained with sheep. Massachusetts Experiment Station. (91) Fertilizing constituents of soybeans, soybean meal, and

cottonseed meal. (92) Analyses and calories of soybeans compared with those of other legumes and foods. (93) Composition of soybean flour in comparison with wheat flour, corn meal, rye flour, graham flour, and whole wheat flour. (94) Composition of the sprouts from the soybean and mung bean. (95) Composition of soybean milk compared with cow's milk. (96) Yields of bean curd obtained from different varieties of soybeans. (97) Compositions of tofu and tofu products. (98) Nitrogenous substances in natto. (99) Composition of hamananatto. After Sawa.

(100) Composition of yuba. (101) Composition of red and white miso. (102) Composition of shoyu or soy sauce. (103) Composition of soybeans of the same variety dried, soaked, and roasted.

545. Piper, Charles V.; Morse, William J. 1923. Fermented vegetable milk (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 233.

• ***Summary:*** In the section on "Soybean or vegetable milk" (p. 228+), a subsection titled "Fermented vegetable milk" states (p. 233): "As fermented milks are being used to a greater extent in therapeutics, it is possible to replace successfully cow's milk with vegetable milk. The same ferments [starter cultures] used with animal milk can be used with vegetable milk. If the carbohydrates are not sufficient in the vegetable milk, the addition of lactose will furnish the desired proportion. The advantages of using fermented vegetable milk are that it is economical and not so easily contaminated with injurious bacteria or ferments" [microorganisms].

546. Piper, Charles V.; Morse, William J. 1923. Soybean or vegetable milk (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 228-33.

• ***Summary:*** Contents: Introduction. Preparation of soybean milk. Composition of soybean milk. Residue from manufacture of vegetable milk [okara]. Utilization of vegetable milk. Condensed vegetable milk, Vegetable milk powder. Fermented vegetable milk.

The section titled "Residue from manufacture of vegetable milk" states: "After separating the milk from the solid material, the residue is still very rich in nutritive substances. According to Bloch (1907) and Li Yu Ying (1911-12) this material contains no trace of starch. Bloch (1907) gives the following composition of this vegetable milk residue: Water, 88.75, nitrogen, 0.248; ash, 0.36, fat, 0.04; and other substances, 10.85 per cent.

Note: This is the earliest English-language document seen (June 2013) that uses the term "vegetable milk residue" to refer to okara.

"Utilization of Soybean Milk: Vegetable milk has rather a strong characteristic taste and odor, somewhat suggesting

malt. These may be masked by the addition of a small quantity of coumarin or vanillin. Vegetable milk may be used the same way as cow's milk. In China this milk is drunk by the Chinese in the early morning with some sugar added. It is also eaten as a thin broth with salted pickles. Vegetable milk is extensively used throughout China for infant feeding. In many of the cities and towns of China, factories are engaged solely in the manufacture of vegetable milk. This milk which is bottled is delivered (Fig. 62) each morning to regular customers.

"Investigations in America and Europe with vegetable milk indicate that it may be successfully used in place of cow's milk in numerous preparations. The milk has been used with good results in bread, cakes, in creaming vegetables, in custards, in chocolate or cocoa, and in milk chocolate. In special therapeutic cases, vegetable milk has been used successfully in place of animal milk and is said to rank closely to mother's milk in infant feeding. If allowed to remain in a warm place, the milk becomes sour, like animal milk, and in that form may be employed just as is sour milk or buttermilk. Various ferments may be also used to bring about this condition.

"The milk made from the soybean also serves as a check on the very prevalent summer diarrhea common to children. Sinclair (1916) experimented on babies, who had various ailments, and found that soybean milk brought improvement in the great majority of cases, curing diarrhea and intestinal disturbances. It was also found that the milk was easily digested and easily excreted."

547. Piper, Charles V.; Morse, William J. 1923. Soybean bran (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 225-26.

• ***Summary:*** "According to Bowers (1919) the bran of the soybean can be separated by milling more easily and more completely than can the bran of wheat. The bran makes up about 8 per cent. of the soybean and is composed chiefly of crude fiber and nitrogen free extract. The crude fiber amounts to about 37 per cent. and the nitrogen free extract to about 43 per cent.

"Experiments with the bran show that the nitrogen free

extract, including the hemicelluloses and the waxes, is about 84 per cent. digestible, which is much less than that of the whole bean. This is judged to be on account of the large amount of waxes in the nitrogen-free extract of the bran. A diet consisting of well cooked soybean bran appeared to have no ill effects. No noticeable amount of gas indicating fermentation, as is the case with navy bean bran, was noticed with the soybean bran.

"The calcium oxide content of the bran was found to be 0.8 per cent. and the phosphorous pentoxide content, 0.27 per cent. No salicylic acid was found in the bran, and no hydrogen cyanide or cyanates in the samples tested. There was no trace of tannin in the bran and only a slight trace of alkaloids."

Note: This is the earliest English-language document seen (June 2013) that uses the term "soybean bran" to refer to soy bran.

548. Piper, Charles V.; Morse, William J. 1923. Varieties: Japanese classification of varieties (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 144-46.

• ***Summary:*** "In Japan varieties of soybeans are distinguished largely according to the color, shape and size of seed, period of maturity; also according to use, as those which serve principally in making shoyu, tofu, miso, and those used for ordinary purposes.

"(A) The white (pale yellow) called in Japanese *Shiro-mame* or *Hakudaidzu,* includes the following important varieties:

"Goguwatsu-mame (five-months kind) also called *Tofu-mame,* because it is used chiefly in making tofu, is an early ripening sort with very small seeds.

"Wase-mame is another small-seeded early-ripening variety used in making tofu, and is also termed *Tofu-mame.*

"Nakate-mame (middle late bean) matures between the early and late varieties and has round seeds somewhat larger than the above early sorts.

"Okute-mame, Maru-mame, and *Teppo-mame,* or *Aka-mame* are late maturing varieties with round seeds which become harder and longer than the early ones. The *Teppo-mame* is used largely in making shoyu, while *Maru-mame* is valuable as horse feed.

"(B) The black varieties, Japanese *Kuro-mame* or *Kodu-daidzu,* are for the most part eaten boiled, with sugar, as a relish to rice. *Kuro-mame* is a middle-late variety with round or ellipsoid seeds and is somewhat similar to *Kuro-teppo-mame* which has large round seeds. There is also a late maturing sort with flat ellipsoid seeds known under several names.

"(C) The brown-seeded varieties, Japanese *Katsu-daidsu,* are much less grown than the white and black sorts, and are used like the latter. Varieties with reddish-brown, round seeds are called *Aka-mame,* while three light-brown sorts of small importance are termed *Cha-mame* (tea beans).

"(D) Greenish or bluish-green varieties, Japanese *Aô-mame* or *Seidaidzu* are mostly boiled with sugar like the brown and black varieties. Similar to the brown sorts, they are much less widely grown than the black and white varieties. The Japanese distinguish the following sub-varieties:

"1. *Sei-hito.* Epidermis green with yellow germ.

"2. *Nikuri-sei.* Epidermis green with green germ. Both of these sorts range from round-ellipsoidal to a bullet roundness and are of medium size.

"3. *Kage-mame.* Epidermis pale green, round with yellow germ.

"(E) The speckled or bicolored varieties. Japanese *Fuiri-mame* or *Han-daidzu,* is a group of small importance and their cultivation is confined to a small area in a few provinces. The following sub-varieties are recognized:

"1. *Kuro-kura-kake-mame.* Seed greenish, flat, ellipsoid with a black spot on the scar.

"2. *Aka-kura-kake-mame.* Seed yellowish green, flat, long with a brown spot on the scar.

"3. *Fuiri-mame* or *Udzura-mame.* Seed yellowish-green, spotted with many dark flecks. This is a rare variety grown only in a few localities."

549. 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

TABLE VI.—FIVE-YEAR AVERAGES OF ACREAGE, PRODUCTION AND YIELD PER ACRE OF SOYBEANS IN JAPAN[1]

Five-year periods	Acreage, acres	Production, bu.	Yield per acre, bu.
1897–1901	1,129,000	17,112,000	15.16
1902–1906	1,124,000	17,137,000	15.26
1907–1911	1,183,000	18,268,000	15.42
1912–1916	1,153,000	17,584,000	15.25
1917–1919	1,072,000	18,163,000	16.46

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 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

TABLE VII.—AMOUNT AND VALUE OF SOYBEANS IMPORTED BY JAPAN

Year	Quantity, tons	Value
1903[1]	146,971	$3,184,540
1904[1]	144,231	3,558,133
1905[1]	193,479	4,915,128
1906[1]	176,040	4,504,086
1907[1]	177,365	4,792,161
1911[2]	162,703	
1912[2]	103,416	
1913[2]	90,651	
1914[2]	139,222	

TABLE VIII.—IMPORTATIONS OF SOYBEAN CAKE AND BEAN OIL INTO JAPAN

Year	Soybean cake			Soybean oil
	Quantity, tons	Value	Percentage of import of bean cake against the total import of other fertilizers	Quantity, tons
1903[3]	216,198	$3,807,685	57.8	
1904[3]	70,595	1,629,100	32.3	
1905[3]	225,180	4,525,043	40.5	
1906[3]	289,459	6,458,330		
1907[3]	367,210	8,715,489	44.8	
1911[4]	357,362	....	....	9,340
1912[4]	357,752	....	....	10,889
1913[4]	492,985	....	....	3,964
1914[4]	447,080	....	....	4,107

TABLE IX.—QUANTITY AND VALUE OF EXPORTS OF SOYBEANS AND SOYBEAN OIL FROM JAPAN TO FOREIGN COUNTRIES, 1913 AND 1914[1]

Country of destination	Soybeans		Soybean oil			
	1914		1913		1914	
	Quantity, lb.	Value	Quantity, lb.	Value	Quantity, lb.	Value
China	62,820	$ 1,372	220,155	$11,328	184,104	$ 10,198
United Kingdom	589	21	214,491	11,570	1,019,854	48,687
France	....	....	73,890	3,907		
Germany	....	....	66	2	10,979	588
Belgium	....	....	69,057	3,405	333,735	16,573
United States	421,011	10,125	658,393	34,386	365,478	19,393
Hawaii	203,560	5,296				
British America	246,175	4,540	56,218	3,234	69,652	3,196
Australia	18,070	475	587,413	30,101	120,240	748
Other countries	20,967	504	....	....	274,080	18,542
Total	973,192	22,333	1,879,683	97,933	2,378,122	117,925

TABLE X.—QUANTITY AND VALUE OF EXPORTS OF MISO (BEAN CHEESE) AND SHOYU SAUCE, 1903 TO 1907 INCLUSIVE[2]

Year	Miso (bean cheese)		Shoyu sauce	
	Quantity, lb.	Value,	Quantity, lb.	Value
1903	2,204,521.00	$ 34,647	5,922,357	$204,959
1904	4,884,691.68	88,880	7,892,802	276,837
1905	7,503,650.00	132,652	12,506,892	440,076
1906	5,923,855.00	111,020	12,425,367	476,176
1907	6,863,953.00	135,833	13,210,743	541,425

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..

550. Morse, W.J. 1923. Re: Loose use of the term soybean meal. Letter [memorandum] to Prof. C.V. Piper, Washington, DC, April 5. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Dr. Piper: With reference to the attached letter from Dr. F.B. Morrison [author of the famous book *Feeds and Feeding. A Handbook for the Student and Stockman*], concerning the loose use of the term soybean meal, will say that in looking over the chapter I think it will be a very easy matter to remedy the situation in the next edition of the book. I will have no trouble in knowing just what was used in the experiments, that is whether it was ground beans or soybean oil meal. I am inclined to think that the term soybean oil meal as given by Dr. Morrison would be the correct one to use for the meal from which the oil has been extracted and where simply the ground beans were used, possibly, the term soybean meal with the word ground in parenthesis. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

551. Ostrander, W.A. 1923. Re: Companies crushing soybeans in the Corn Belt states. Letter to W.J. Morse, Agronomist, Forage Crop Investigations, USDA, Washington, DC, April 14. 1 p. Typed, with signature on letterhead.

• ***Summary:*** On April 14 Morse wrote Prof. Ostrander requesting information on the "present status of the soybean oil and oil meal industry in the Corn Belt States." He asked specifically "to what extent the Oil mills in Illinois entered upon the crushing of domestic grown soybeans the past season."

Ostrander replies: "Dear Sir: The Staley Manufacturing Co. at Decatur, Illinois, and the Chicago Heights people crushed all the beans they could get. Chicago Heights paid up to $1.40... They would have crushed more if they could have gotten the beans. We have brought in a large amount of seed from Illinois this year and our acreage is going up, so I would not want to guess where it is right now. All available seed will be planted. Mills are starting to offer not less than the price of No. 2 wheat for beans and more if the market warrants. The seasonal epidemic of men seeking information about it is on, and if every egg hatched we would have enough mills in the state to keep every farmer busy. The soybean is gaining the attention of the larger people. I have a letter from one of the largest cottonseed concerns in the country. They were mighty glad to find that soybeans were coming into use and that they might be able to get some."

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–#10.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Assoc. in Soils and Crops Extension, Purdue Univ., Dep. of Agricultural Extension, Lafayette, Indiana.

552. Hackleman, J.C. 1923. Re: Processing of soybeans by oil mills in Illinois. Greatly increased interest in soybeans in Illinois. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, April 23. 2 p. Typed, with signature on letterhead.

• ***Summary:*** On April 14 Morse wrote Hackleman asking "to what extent the oils mills in Illinois entered upon the crushing of domestic grown soybeans the past season."

Hackleman replies: "Soybean oil mills have not had enough beans this year to supply the demand. I was in Staley's plant last week and they are shut down so far as soybean oil is concerned. They told us that they secured several carloads of beans in the state, but the seed demand soon became so great that prices were soon beyond the commercial market and they have not attempted to operate the factory recently. The same thing is true of the Chicago Heights plant. The Monticello plant is just about ready to open.

"They have been moving very cautiously with their plant, watching the Peru plant and following their suggestions–profiting by their mistakes. These people have several thousand of bushels of beans stored, ready for use as soon as the factory is ready to operate.

"The East St. Louis Company I believe, did not succeed in finding enough beans to start on soys. They felt it unwise to do anything on this crop unless they could get several thousands of bushels and that seemed impossible.

"We are seeing a very heavy demand for soybeans seed now–beans that were welling at $1.00 per bushel in October are now bringing from $2.50 to $3.25 per bushel. Present prospects are that we will have a considerably greater acreage of beans than we had last year. If the chinch bug menace becomes more serious, even the present indicated increase is likely to be materially enlarged, provided seed can be found in the United States.

"I was talking with Mr. Sommer of Pekin, who told me that in the last three days he had orders for two hundred bushels of soybean seed, all of which was requested in small lots, from two or three to five or ten bushels. Note: O.J. Sommer, a seed dealer, was also president of the Illinois Crop Improvement Association in 1923.

"This of course means a great interest in the crop. We are planning on putting out more soybean demonstrations this year than we have ever had–not because we feel that the crop is not appreciated, but to acquaint people with the better varieties. Incidentally we are getting demonstrations started in six or eight counties where soybeans have practically remained an unknown quantity."

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

553. Hackleman, J.C. 1923. Re: Thanks for sending soybean varieties and excellent cooperation. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, April 27. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "I am indeed delighted to get your letter of the 23rd and to note that you are sending us the additional soybeans. We could make use of thirty of the Tarheel Black and twenty-five pounds of the Hahto if you want to send them. The Haberlandt I think we have in sufficient quantity here. We have no Mammoth Browns."

"We appreciate the kind remarks you have made regarding our work in Illinois and assure you that this would have been impossible had it not been for the excellent cooperation from the Department of Agriculture, thru you. We are deeply appreciative of this fine spirit of cooperation and want you, Professor Piper, and others to know that we realize the value and importance of the unselfish help that you people have given us."

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

554. *Orange Judd Farmer.* 1923. Chinch bugs no longer a "bug-a-boo." Macoupin County farmers recommend soy beans in corn for the trouble. 71(9):267. May 1.

• ***Summary:*** "Chinch bugs are not the 'bug-a-boo' that they once were to farmers in Macoupin County, Illinois. Even though the trouble still has to be guarded against, the development of interest in growing soy beans along with corn in that section of the state has lessened their losses considerably in the last two years or so."

Chinch bugs do not like moisture. "Soy beans tend to shade the ground, holding moisture. This fact, combined with the distastefulness of the plants themselves, seems to be enough to keep out bug troubles." Several farmers around Macoupin have been growing soy beans to keep out chinch bugs since 1921. They include M.E. Fullington (1921), Frank Chism (has grown soy beans in his corn for 5 years), J.S. Davis, F.M. Kirkland, H.J. Schultz, H.W. Day (soy beans are very drouth resistant), J.P. Denby, J.P. Enslow, and C.C. Coots (finds the varieties Ohio 9935, Morse, and Hurrelbrink work best as a resistant against chinch bugs; they have heavy foliage). Coots adds that, "above all, soy beans are the greatest feed, either to hog down or feed threshed."

The Morse variety "was named after the 'soy bean man of America,' who is the government expert on this crop. He has written a book on soy beans just printed, which is the most complete work on beans we have ever seen." Address: Illinois.

555. Hackleman, J.C. 1923. Re: Farmers in southern Illinois still think cowpeas are better than soybeans. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, May 2. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Our farm advisers in extreme southern Illinois are not 100% sold on soybeans. Perhaps I had better say their farmers are not. That is a great cowpea country as you know and their farmers insist that the cowpea is better. Therefore we always have to compare our soybeans ad cowpeas in the same plot." Whipporwill [also spelled "Whippoorwill"] and New Era are considered the best cowpea varieties.

Hackleman notes that he telegrammed Morse on April

30: "Send thirty pounds each Tarheel, Hahto, Mammoth Browns, as per your letter twenty-third..." Plus two cowpea varieties.

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

556. Morse, W.J. 1923. Re: Request for 2 pounds of pure Mikado seed. Letter to L.W. Parsons [Parsons-McKinnis Co-operation], Plainfield, Indiana, May 6. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Parsons: I would like to obtain if possible from you 2 pounds of pure Mikado seed for our variety plot test at Arlington Farm, Virginia. I am including all of the varieties in our field plot test, to obtain cooperative results and data on the yield of hay and seed. I desire to have the pure varieties, and, therefore, am writing you to see if you are not able to find enough to send me 2 pounds of your seed. I am enclosing herewith our franked tag, which may be used in forwarding the seed for your 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–General Correspondence, 1905-29. Box 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

557. McKinnis, Guy P. 1923. Re: Opinions and request for opinions about soybean varieties and harvesters. Letter to W.J. Morse, USDA, Washington, DC, May 12. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Sir:–We like to exchange letters with you at least once each year as you always give us some suggestions that help in our business. Have had a very good trade on soybeans this year and expect to sell our remaining stock of about 100 bu. Cert. Midwest and same uncertified. Could sell many more Wilsons and Sables if we had them. We have been advocating Sable for hay, Wilson for ensilage and Mikado for late hogging, foraging after corn is husked and for shredding with corn and the demand for Midwests for all these purposes has taken the supply in the past. We believe that there is some likelyhood [sic, likelihood] of this condition changing, overproduction of Midwest and a better demand for special purpose beans. We desire your opinion on all these matters and if there are better varieties than we have we wish to know. Wilson is hardly stiff stemmed enough. Who is doing field selection work with soybeans? We used some re-selected Wilson last year and they were inferior to old stock, earlier and shattered badly. We are adding Manchu to our line this year as we have considerable call for them. And note that Haberlandt is coming into general use south of us. Are they more desirable as a late bean than Mikado? We are informed that Lexington and Arlington are good forage beans. We are always looking for better seed and practices and are putting in beet and bean planters and cultivators.

"Particularly interested in harvesters and would like to know what machines you have observed and can recommend. Have plans for a power field harvester and thresher and expect to make a trial machine and apply for patents. Note in the Farm Implement News that a similar machine has been patented. Where could information concerning what has been done along that line be obtained and do you happen to know good people who render the service we may need in securing a patent that would not enfringe [sic, infringe] on others? We have bulletins from S. Carolina describing the machines in use there but they seem to be rather crude. Our idea is to plant, cultivate and harvest in four 22-inch rows and we believe the time is not far distant when beans can be produced as cheaply per acre as the small grain crops. We will have a fall meeting here and if you can send us samples of soybeans that are promising we will be glad to test them in our demonstrations. We are working with Purdue but as you probably know they confine themselves to about two yellow varieties Midwest and just recently they have replaced Ito San with Manchu. They are taking some interest in a new selection called Dunkirk [sic, Dunfield]. What do you know about Dunkirk? Will be glad to have an answer to the many questions and will cooperate with you if the opportunity arises."

"Wish a copy of your Soybean book. Check enclosed."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-McKinnis Corporation. Address: Indianapolis, Route O, Indiana.

558. Piper, C.V. 1923. Re: Mr. Sanford of North Carolina. Letter (memorandum) to Mr. W.J. Morse, Agronomist, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, May 12. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Attached is the card of Mr. F.L. Sanford, who now has charge of the whole area of drained land at Lake Mattamuskeet, North Carolina, some 63,000 acres, I believe. This thing has been a sort of a failure so far, but Sanford wants to make it a success... I would like to have you write Mr. Sanford regarding the soybean proposition, with the idea of his erecting a mill and

purchasing all the soybeans produced in the area."

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. Folder–Morse, W.J.–#3 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist in Charge, Bureau of Plant Industry, Washington, DC.

559. Morse, W.J. 1923. Re: New soybean selection called Dunkirk. Letter to W.A. Ostrander, Indiana Experiment Station, Lafayette, Indiana, May 25. 1 p. Typed, without signature (carbon copy). [1 ref]

• ***Summary:*** "Very recently I had a letter from Mr. Guy P. McKinnis, of the Parsons-McKinnis Co-operation, advising me that the Indiana Station had a new soybean selection called Dunkirk. He asked me regarding this variety and I had to confess my ignorance in regard to it. I will be very glad if you can give me some information concerning this variety and I would also like to obtain a small sample of seed that I might include in our variety tests this season at Arlington" [Virginia].

Note: Morse is probably referring to the newly-named Dunfield soybean variety, which was given this name in late 1922. Dunfield was an introduction (in 1913 from Jilin, China), not a selection.

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–#10.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

560. Morse, W.J. 1923. Re: Opinions concerning best varieties of soy beans, and harvesters. Letter to Guy P. McKinnins, Parsons-McKinnis Co-operation, Route O, Indianapolis, Indiana, May 25. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Sir: I have your letter of May 12 with reference to the soybean situation in your state. I am very glad indeed to learn that you have had such a good trade in seed beans this year. For the past three or four years many of the growers in the corn-belt states have had the idea that there would be an overproduction of soybean seed. In the fall after harvest although the seed was abundant and there seemed to be an overproduction, yet the following spring the seed has been disposed of quickly and there has been considerable demand for seed from those states which seem likely to have an overproduction. In view of the greatly increased acreage annually for forage, pasturage, and ensilage purposes, it hardly seems to me that there will be an overproduction, and if there should be a greater supply of seed than could be handled for seed purposes the oil mills will be in a position to take the seed at a price, I think, that will be profitable to the farmer.

"Relative to selection work with the soybeans, the Department is doing a very considerable amount of work at the experiment station in Virginia. We have just planned out around 1,000 selections which we made last year. The selection work involved high yield and protein content, high seed and forage field, habit, seed color, and disease resistance.

"Concerning the Manchu variety, will say that the seed of this variety has been in very great demand throughout the northern states. It is the leading variety in Iowa, central and northern Illinois, Indiana, Michigan, and Ohio.

"The Haberlandt is one of the favorite varieties in Kentucky. It is a week to ten days later than the Mikado and by many is considered a more desirable variety.

"The Lexington and Arlington varieties are both good forage sorts, the Arlington being a black-seeded sort while the Lexington is a small olive-yellow-seeded variety. I know that the Arlington will give a much heavier yield of forage than the Lexington, but I do not believe it will outyield it in seed. If you care for any of the varieties such as the Lexington, Arlington, or Haberlandt, I will be very glad indeed to send you trial packages.

"With reference to the harvesters that are being used in different parts of the country, will say that most harvesters are now used in southern Virginia and in North Carolina. There are several different types used in these states, some of which do very good work. I understand that in your state two men have invented a two-row harvester. I suggest that you write to Prof. W.A. Ostrander, Indiana Experiment Station, Lafayette, Indiana, who can put you in touch with these men. Last season I had an opportunity of seeing a four-row harvester at work in Virginia. This harvester was manufactured by the planter and as yet has not been put on the market.

"Relative to your fall meeting, I am sending you four-pound samples of varieties that may be of value for demonstration.

"Concerning the selection called Dunkirk, I must say that I have no data as yet. I will write Prof. Ostrander regarding this variety and obtain from him a history of it and possibly a sample of seed.

"As to the soybean book which was recently published, I refer you to the McGraw-Hill Book Co., 370 Seventh Ave., New York, N.Y."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-

McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

561. Hackleman, J.C. 1923. Re: Soybean variety demonstration in 27 counties. Morse's upcoming visit. Letter to W.J. Morse, Bureau of Plant Industry, USDA, Washington, DC, July 9. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Professor Morse:... We have 27 county soy bean variety demonstrations this year, and I should like very much for you to spend some time with us in this State... Perhaps, September would be better, since the Corn Belt Soy Bean Meeting has been advanced to September 11th."

Hackleman and the people at the new soy bean mill at Monticello hope that Morse can visit Piatt County for a meeting. "They propose to invite the leading soy bean growers from Piatt, Champaign, Macon and DeWitt counties–make it an invitational affair–and they expect to put on a real entertainment for us. Last year they put on one of the finest 'feeds' I ever had the pleasure of attending. They had about eight or ten from the College here out to their meeting, and I think it was voted a 'howling success'. Mr. Watson, the farm adviser, has asked us to set the date and outline the program.

"They are primarily interested in getting information regarding harvesting and handling the soy bean seed crop. I thought of having Professor Lehmann, who is chairman of a special committee on this subject, appointed by the American Society of Agricultural Engineers, to give us a report of his findings; to have you give us your observations on the machine that are in operation in the east; and then to have someone give us a rather detailed statement of the experiences of corn belt farmers who are harvesting beans with special harvesters. I think these talks, if supplemented with a large number of pictures, would be very interesting indeed."

Morse replies on July 12: "It would surely be a great pleasure to be in Piatt County for the meeting, I am very anxious indeed to look over that mill and hear the results that they have obtained. It may interest you to know that the International Vegetable Oil Co. is erecting a new solvent process mill at Norfolk [Virginia], and I understand this mill will be in operation for soybean about the middle of November."

Note: As of Sept. 2005, we can find no subsequent records that mention the International Vegetable Oil Co. However, in 1924, the Eastern Cotton Oil Co. began solvent extraction of soybeans at Norfolk, Virginia.

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

562. Piper, C.V. 1923. Re: Write Mr. Littleton about use of soybeans for hay. Letter [memorandum] to W.J. Morse, [USDA], July 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Please write to Mr. Littleton advising him in regard to soybeans for hay, particularly varieties that he can use and dates of planting so that he can cut his hay crop after September 15. He is also interested in soybeans for hog pasture, and you might indicate dates of seeding and varieties he can use for having his pasture ready at different times. Very truly yours,..."

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: Agrostologist in Charge [Bureau of Plant Industry, USDA, Washington, DC].

563. Piper, C.V. 1923. Re: Hackleman's upcoming presentation on "The Soybean and its Future" in Chicago. Letter to Prof. J.C. Hackleman, Agric. Exp. Station, Urbana, Illinois, July 13. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Hackleman: I have yours of the 9th instant and am delighted that you will present the subject of The Soybean and Its Future at the forage conference in Chicago in November. I am asking Mr. Morse to write up a series of suggestions in connection with the topic that may be of value to you. What I would really like to have covered is a sort of prophecy based on its progress of the last few years and what we may expect the importance of the soybean to be in the near future."

"Copy to Mr. W.J. Morse." 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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agrostologist in Charge, Bureau of Plant Industry, Washington, DC.

564. Hackleman, J.C. 1923. Re: Long-term research on soy beans in Illinois. Letter to Prof. C.V. Piper, Agrostologist in Charge, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, July 17. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Professor Piper: When I came to Illinois four years ago we formulated a program for the crops work

which we thought would require from three to five years."

This program had three main parts: "(1) corn disease work and the establishment of field practices which would assist in its control; (2) the encouragement of the soy bean industry and the introduction of better adapted varieties; and (3) the more general utilization of sweet clover as a pasture and green manuring crop." There were also several minor projects.

"It appears to us that during this general depression in our agricultural sections and especially with the grain farmers we should go still farther in the urging of forage crops, not being content to stop with sweet clover and soy beans." They now propose to begin an alfalfa campaign, and are looking for other forage crops to include in both their demonstrations and investigations.

"During the past four years we have co-operated with Mr. Morse, of your division, with the finest kind of results, and I am sure that had it not been for his co-operation we would not have gotten as far as we have with the soy bean in Illinois–and we are selfish enough to believe that he could not have gotten the same results without our assistance. In other words, I feel that this co-operation was absolutely necessary. I am sure that if you will discuss this with Mr. Morse he will give you a still better idea of the type and extent of the work we are doing with the soy bean.

"I am wondering, therefore, if it is not possible for us to arrange for starting some forage crop work next year or possibly this fall, patterned somewhat after the co-operative work that we have done with Mr. Morse.

"We are enclosing copy of the project that we have used this year, in order that you may have some idea as to the manner in which we are handling these demonstrations.

"We are already getting reports from our soy bean work this year, and it promises some excellent data.

"Will you be kind enough to write me at your convenience your opinions as to such co-operative work and whether or not you think it worth while for us to figure on such a co-operative plan?"

The 4-page project report that Hackleman encloses is titled: "University of Illinois College of Agriculture–Department of Agronomy. United States Department of Agriculture–Bureau of Plant Industry. _______ County Farm Bureau Cooperating.

Title of project: Soybean varieties. Location: Twenty-seven counties in Illinois. Object (four objects). Previous work. Organization. Method of procedure. Form titled "Field notes of soybean variety demonstrations."

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: In Charge, Farm Crops Extension, Agric. Exp. Station, Urbana, Illinois.

565. Hackleman, J.C. 1923. Re: Speakers and program for meeting at Monticello, Illinois. Letter to W.J. Morse, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, July 17. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "My dear Mr. Morse: We have about decided that the best time for you to visit Illinois will be the first week in September." They would travel the first four days (Sunday to Wed.), then conclude the week "with a meeting in Monticello the afternoon and evening of the 5th, and on the South Farm, here at the University, all day September 6th, thus making September 6th Illinois Soy Bean Day. Friday and Saturday have not yet been arranged for..." Then they will drive to Wisconsin, visiting two or more soy bean plots as they go north.

The people at the Monticello plant are "anxious that this meeting be a most valuable one, from the standpoint of the future of the soy bean in Illinois. They are going to discuss almost solely the handling of the seed crop. The following are the suggested speakers for this meeting:

"W.J. Morse–'Soy Bean Harvesters in the United States.'

"E.W. Lehmann–'Summary of a Questionnaire Sent 5,000 Soy Bean Growers in the Corn Belt.

"Carl Walker–'My Experience with a Soy Bean Harvester.'

"We were wondering if it would be possible for you to get Mr. Clapp, who, I believe, has built a special soy bean harvester, to come with you on your western trip, taking in the soy bean work in Illinois and going on to Wisconsin... At this same meeting they will have at least one administrative officer, preferably a member of the board of directors, or one of the chief men in the Research Department of the International Harvester Company, the John Deere Mfg. Company, the Avery Mfg. Company, and perhaps other manufacturing companies who might be interested in this problem."

"Professor Piper tells me you are going to furnish me some suggestions for a talk that he wants me to make before the American Society of Agronomy, in Chicago, in November. I will be glad to have all the help you can give me."

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Crops Extension, Agric. Exp. Station, Urbana, Illinois.

566. Morse, W.J. 1923. Re: Odds and ends. Letter to A. Lydenberg, Div. of Forage Crops, Bureau of Plant Industry, USDA, Washington, DC, Sept. 8. 1 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** "Dear Lydenberg: Please have McKee attend to the enclosed letter from Mr. Ares. Am having sent from the Monticello soybeans mill 10 lbs. of soybean meal. Wish you would turn over to Mr. Buchanan, Office of Exhibits, 2nd floor, 5th wing of our building about 8 lbs. of this meal, the two pounds I desire to keep in the office.

"If the cake or meal comes from the Chicago Heights firm you can turn all of the cake and meal over to Mr. Buchanan.

"Have had rather a strenuous time since leaving Washington [DC]. Two soybean meetings a day and occasionally three.

"Address mail after Monday to Ames, Iowa, c/o Sheldon-Munn Hotel. Yours sincerely,..."

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: The Inman Hotel, Champaign, Illinois.

567. McKee, Roland. 1923. Re: Send soy bean varieties to Mr. K.C. Strobeck, Macedon, New York. Letter [memorandum] to W.J. Morse, [USDA], Oct. 17. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. K.C. Strobeck of Macedon, New York, whom I met at the National Dairy Show would like to get small quantities of 6 or 7 varieties of soy beans that will mature in about 115 days or a little less. I suggested to him the trying of such varieties as Manchu, Midwest, etc. The County Agent in the district is Mr. E. Wagner, Sodus, N.Y. I also me Mr. Wagner and he is interested in the soy bean trials that will be carried out with Mr. Strobeck."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

568. Morse, W.J. 1923. Re: Suggestions for a talk to the American Society of Agronomy in Chicago in November. Letter to J.C. Hackleman, Illinois Agric. Exp. Station, Urbana, Illinois, Nov. 5. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have taken the matter up with Prof. Piper in regard to what he would like to have done, and he said he desired to have you give some idea of the importance the soybean is likely to attain in the Corn Belt during the next few years at least, and the progress it has been making in the Corn Belt in the last three or four years. I think one of the important items would be the statistics that you obtained the past summer. No doubt you could obtain from the statistician from whom you obtained these figures other figures from some of the Corn Belt States.

"It perhaps would be well to give a little history of the soybean in the Corn Belt States for the last ten years, that is reviewing history briefly, pointing out the great strides the crop has made, and, if possible, give the part it plays in the different rotation systems and the manners in which the crop is utilized. Then, also the progress of the oil and meal industries throughout the Corn Belt States.

"With regard to the progress of soybeans in the other parts of the Country, I might add that with the exception of North Carolina the progress, or rather increase in acreage, has been very much greater in the Corn Belt States than anywhere else. Of course, the acreage in North Carolina has been rather slow, but it has been for some time the leading soybean state in the Country. The increase in acreage throughout the Southern States has been rather slow, but during the past two years the various Southern States have been doing more or less work with the soybean, but it will take years to reach the place the Corn Belt States, especially your state, has attained with soybeans at the present time. In North Carolina they do use some quantities of soybeans for oil and meal, but not to any great extent.

"Undoubtedly throughout the Country the soybean will always be primarily a forage crop, the largest acreage being used for pasture, hay and silage. As to the oil and oil mill industry, I doubt seriously that during the next few years there will be a place for the community oil mill, as there are too many old established oil mills now that are in position to handle whatever surplus seed we may have.

"I think from your knowledge of the situation throughout the Corn Belt that you will be able to give a very good prophecy as to the future of the soybean."

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, 1899-1928. Box 11–Illinois. Folder #7–Illinois Exp. Station.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

569. Morse, W.J. 1923. Re: The National Soybean Growers' Association. Letter (memorandum) to R.A. Oakley, Forage Crop Investigations, Bureau of Plant Industry, USDA,

Washington, DC, Dec. 14. 1 p. Typed, with signature on USDA letterhead.
• ***Summary:*** "Dear Mr. Oakley: At the recent meeting of the National Soybean Growers' Association, held at Chicago, Illinois, Dec. 6th, the members present elected me to the office of President. In connection with this I might say that I was not concerned in the election of officers, and was not aware of the honor conferred on me until after the meeting was over... I do not know just the attitude of the Bureau or Department in such matters, and wish to bring to your attention the following information concerning the Association to avoid any misunderstandings concerning the situation.

"The National Soybean Growers' Association is really not an Association in the sense of the word, as the Cotton Growers' Asso. [Association], Fruit Growers' Asso., etc. A few years ago several of these soybean growers and Experiment Station men interested in soybeans had a small gathering at the International Stock Show, and started to have a meeting that summer in the interest of soybeans. They elected officers and decided upon a place for a field meeting. This has been their procedure ever since, merely electing some men to take charge of the work during the year, holding a field meeting either at one of the State Experiment Stations, or at some large grower's, and also holding a meeting at Chicago during the International Stock Show. At these meetings soybean growers from various parts of the country, especially from the Corn Belt and Northern States, gathered and discussed the soybean problem, and this is also done at the Chicago meeting held in December every year. The organization, if it be such, has no constitution, collection of dues, and the officers receive no pay, it being really a social gathering for discussing soybean problems by enthusiastic growers in the country. In conclusion, I might say that the work of the officers has merely to do with the charge of the program at the field and station meetings."

Note: Morse decided to write Mr. Oakley as his superior on this matter rather than Dr. Piper.

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. Folder–Morse, W.J.–#3 F.C.I.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

570. Kellogg, John Harvey. 1923. The soy bean (Document part). In: J.H. Kellogg. 1923. The New Dietetics: A Guide to Scientific Feeding in Health and Disease. Revised ed. Battle Creek, Michigan: The Modern Medicine Publishing Co. 1021 p. See p. 315-21. 24 cm.
• ***Summary:*** This section is quite similar to that in the 1921 first edition of this book, but on different pages. Changes appear on the following pages: 316 (addition of a paragraph stating that the soy bean is a highly valuable food for persons suffering from diabetes), 318 (deletion of the statement that the writer "has for twenty-five years made use of milk prepared from the almond and other nuts."), 320-21 (addition of a table, supplied by William Morse of the USDA, giving the composition of soy beans sprouts and mung bean sprouts). Address: Battle Creek, Michigan.

571. Kempski, Karl E. 1923. Die Sojabohne: Geschichte, Kultur und Verwendung unter besonderer Beruecksichtigung der Verhaeltnisse in Niederlaendisch-Indien [The soybean: 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 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.

572. Life period of soybean varieties grown at the Arlington Experimental Farm, Virginia, for eight seasons (Important event). 1923.

• ***Summary:*** A table with this title appears on page 158 in: Piper, Charles V.; Morse, William J. 1923. *The Soybean.* The eight years are 1905 to 1913. The varieties were planted each year about the first of June. "In period of maturity nearly all of the varieties behave consistently from season to season as indicated in the following table." The following varieties were grown in 1905. The life period (in days, for 1905) of each is given in parentheses after the varietal name: No. 17251, Buckshot (103 days). No. 17252, Flat King (128). No 17253, Nuttall (114). No 17254, Ebony (122). No 17255, Kingston (114). No 17256, Brownie (121). No 17257, Eda (112). No 17258, Ogemaw (88). No 17260, Samarow (103). No 17261, Guelph (112). No 17262, Yosho (103). No 17263, Austin (119). No 17264, Tokyo (149). No 17267, Hope (149). No 17268, Ito San (113). No 17269, Midwest (121). No 17271, Haberlandt (119). No 17273, Butterball (96). No 17275, Amherst (114). No 17277, Manhattan (96). No 17278, Hollybrook (133). No 17280, Mammoth (147).

The following two varieties were first grown in 1907: No 17861, Jet (117 days). No 18227, Chernie (117 days).

573. Morse, W.J. 1924. Re: Arlington Farm 1924 land assignment. Letter to Mr. R.A. Oakley, USDA, Washington, DC, Feb. 13. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Dr. Oakley: With regard to the attached memorandum concerning the Arlington Farm 1924 land assignment, I have talked over the matter of seed increase with Mr. Connor and we selected four varieties of soybeans, the Laredo, Wilson-Five, Peking and Hahto, and one variety of cowpeas, the Victor. The total amount of land for this increase work will be about 50 acres. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

574. Morse, W.J. 1924. Re: Arlington Farm land assignments. Letter [memorandum] to Prof. C.V. Piper, Washington, DC, Feb. 13. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Prof. Piper: With regard to the attached memorandum relative to Arlington Farm, 1924, land assignments, I have taken up the matter with the different members of the office who have worked at Arlington, and am attaching herewith a memorandum, giving the object of the experiment and land desired. Yours very truly,..." The attached memorandum has the subtitle: "Clover Investigations–Dr. A.J. Pieters."

Plants discussed: Kobe lespedeza, clover nursery, red clover strains. Sorghums and Sudan grass investigations–H.N. Vinall.

"Soybeans, cowpeas and miscellaneous legumes–W.J. Morse. The land that has been previously devoted to the above investigations occupies a place in the rotation established by the farm a few years ago. We desire to have the same amount of land as in previous years. During the past season, 1923, in our increase plot of Early Buff, on section A-North, we had a considerable amount of wilt which was identified by Dr. Orton's office as true cowpea wilt. If possible, I would very much like to have one-fourth of an acre of section A-North to put out the resistant strains of cowpeas and soybeans."

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: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

575. Morse, W.J. 1924. Re: Work at the greenhouses in Washington, D.C. Letter [memorandum] to Prof. C.V. Piper, Washington, DC, April 19. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Dr. Piper: Concerning my work at the greenhouses here in Washington, I submit the following:

"The largest amount of work is connected with velvet bean hybrids and our selections and hybrid seed are grown in the greenhouse during the winter and in the summer at McNeill, Mississippi. In this way we are enabled to gain a year on our work and obtain quicker results in breeding pure strains. We will average about 150 plants of velvet beans, In addition to the velvet bean work I have about 50 cowpea plants, and occasionally have special soybean work involving about 50 more plants. The work connected with the velvet beans, cowpeas and soybeans is such that I visited them every day during the winter. At times I may spend one or two hours; other times perhaps only a half hour taking notes on the various plants. If such work was removed at Arlington Farm [in Virginia], for instance, if I had only one-half hour's work at the greenhouse, I would have to spend the entire morning going back and forth to Arlington Farm, and therefore using an entire morning for perhaps one-half hour's work. All in all it seems to me that the removal of the greenhouses from their present place would mean a considerable waste of time in going and coming and would put the members of the office to a considerable amount of inconvenience. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

576. Morse, W.J. 1924. Re: Request for Mikado soybean seed. Letter to Parsons-McKinnis Co-operation, Camby, Indiana, May 3. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Gentlemen: In my variety test at Arlington Farm [Virginia] with soybeans, I am putting out some improved selections and wish to compare them with some of the standard sorts. I find that I do not have any good stock Mikado on hand, and am wondering if you would kindly send me about 2 pounds. Enclosed herewith you will find a franked tag which may be used in shipping the seed to me by mail free of charge."

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 102. Folders–Parsons, John E.; Parsons, A.A.; Parsons-

McKinnis Corporation. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

577. Pieters, A.J. 1924. Re: Chapter on hay-making. Letter to W.J. Morse, USDA, Forage-Crop Investigation [USDA, Washington, DC], May 10. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: You will have noted that Mr. Oakley has placed you on the Committee to prepare the Chapter on Hay-making for the Hay Article in the 1924 Year Book.

"I shall have to depend on you largely for that portion of the chapter which will treat on making soybeans and cowpeas hay and any other coarse hay made from summer legumes. I wish that you could give me by about Thursday, next, a brief note as to the scope which such a discussion should have, together with suggestions in regard to illustrations. Very truly yours,..."

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: Agronomist, Clover Investigations [Bureau of Plant Industry, USDA, Washington, DC].

578. Oakley, R.A. 1924. Re: Letter from Chicago Heights Oil Mfg. Co., by Mr. I.C. Bradley. Letter to W.J. Morse, USDA, Forage-Crop Investigation [USDA, Washington, DC], June 9. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Referring to the attached interesting letter from Chicago Heights Oil Mfg. Co., written by Mr. I.C. Bradley, relative to soy bean meal, I will be obliged if you will take up with Mr. Lyndenberg the matter of ordering for us 500 lbs. of meal to be shipped by freight, provided Mr. Fitts has enough meal on hand to last for the next month. If he has not, have 100 lbs. shipped by express and the remainder by freight. Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

579. Westover, H.L. 1924. Re: Mr. O'Grady of Buenos Aires, Argentina. Letter [memorandum] to W.J. Morse [USDA, Washington, DC], July 15. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: While I was in Argentina I spent quite a little time with Mr. O'Grady, who has quite a large tract of land some distance from Buenos Aires. He is a very intelligent man and much interested in trying out various crops. Last year he had a few soy beans but they did not make particularly good growth. I examined the plants and as there were no nodules on the roots, I thought possibly this might explain the difficulty. At that time I told him that I would send him some small lots of several varieties of soy beans, and that at the same time would send him some material for inoculating the seed.

"Since returning here I have had a letter from Mr. O'Grady who tells me that his brother is in this country for a couple of months and he wishes him to take the seed and inoculating material back with him. His address is as follows:

"Mr. Eugene T. O'Grady,
"c/o The Otto Garden Co.,
"14-16 Lisponard Street,
"New York City.

"I have written to this address and asked Mr. O'Grady to let us know when he is ready for the seed. As soon as you hear from him I wish you would kindly attend to this matter. Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

580. Morse, W.J. 1924. Re: Soybean movie film. Letter [memorandum] to Dr. Oakley [USDA, Washington, DC], July 17. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Dr. Oakley: In correspondence with Dr. J.B. Park, Chief of the Department of Farm Crops, Ohio Experiment Station, Columbus, Ohio, it has been suggested that a soybean movie film might be a good thing in view of the extensive interest that is being taken in the crop and its products and the great increase in acreage during the past five years. The soybean undoubtedly will become one of our major crops in the eastern half of the United States. In many sections of the Northern States and the Corn Belt, as well as the southern States, the soybean now occupies a permanent place in rotations. Naturally with a great increase in acreage many problems relative to varieties, methods of planting, culture, harvesting, thrashing and utilization of the crop have presented themselves. The Department of Agriculture with the State Experiment Stations have been studying these questions and have been of great aid in solving the problems and thereby extending the acreage and greater utility of the soybean.

"Many states, especially those of the northern and central portions of the country, hold county soybean days, state soybean days, and the northern and central sections hold a National Soybean Day once a year. At these various state, county, and national meetings the various problems connected with the soybean industry are discussed and demonstrations are held. It seems to me that a movie film showing the working out of these various problems, in fact the most interesting things connected with the soybean industry, would reach a greater number of people through the county agents and growers' associations, of which there are a number throughout the Southern and Central States.

"The Ohio State University, at Columbus, Ohio, is planning to hold a sectional soybean meeting, September 10, and in their preparation for this Field Day it will be possible to show on a film practically the entire series of operations connected with the whole soybean industry, presenting many troublesome problems which confront the grower and giving methods of handling these problems. The University people will have hay-making in all its stages, planting, inoculation, culture, harvesting, thrashing, preparing the seed-bed, pasturing with hogs and sheep, ensilage and feeding bean straw and hay to stock. With all these things being demonstrated, it would be possible with a minimum effort and expense to get a film which will be very useful to extension workers. Moreover, it will be of special value to stockmen, dairymen, hog raisers and farmers in general who are planning to include soybeans in their rotation either for hay or grain. In fact, the entire eastern half of the United States and a few states in the western half such as the Dakotas, Nebraska, Kansas and a portion of Texas would be benefitted by such a film. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

581. Westover, H.L. 1924. Re: Letter from Mr. Eugene O'Grady [in New York City]. Letter [memorandum] to W.J. Morse [USDA, Washington, DC], July 18. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Referring to the attached letter from Mr. Eugene O'Grady. I wish you would kindly see that he receives the seed of several varieties of soy beans, and the inoculating material. I think it would be well to ship this to him very shortly as I do not know just when he expects to leave for South America. Very truly yours,..."

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: Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

582. *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.

583. *Wallaces' Farmer.* 1924. Soybean growers in national meet: Fifth annual field meeting held at Ames last week. 49(36):1149, 1152. Sept. 5.
• ***Summary:*** "Three hundred members of the National Soybean Growers' Association caught a birdseye view of the soybean industry in the United States at the fifth annual meeting of the organization at Iowa State College, Ames, August 29 and 30. The meeting heard of the experiences and experiments of growers, experimentalists and seed men from a score of states.

"President Morse outlined briefly the work of the association during the past four years. At the time of its organization North Carolina had the largest acreage of soybeans, while at present Illinois leads with Missouri, North Carolina and Iowa following in the order named. The one big objective of the association at present, President Morse said, is the correlation of experiment station data on the introduction of new varieties adapted to various sections, methods of planting and cultivation and utilization of the crop."

Gives a brief summary of each of the papers presented at the meeting. The subjects included soybean inoculation (W.H. Wright, F.S. Wilkins), breeding experiments with soybeans (C.M. Woodworth), supply of soybeans for the soybean oil industry (I.C. Bradley of Chicago Heights, Illinois), the soybean-wheat combination for northern Iowa (J.N. Horlacher), feeding soybeans to dairy cattle (Earl Weaver), why Iowa farmers will continue to grow soybeans (F.G. Churchill). Churchill noted: "The soybean is the poor man's alfalfa because it will grow on all kinds of soil if you will just give it the proper cultivation... No crop which has been introduced into this country in the last 25 years has increased so fast in acreage and popularity as soybeans."

The two varieties that give the best yields for seed

production are Manchu and Black Eyebrow.

Note: This is the earliest document seen (Oct. 2007) concerning members of the American Soybean Association (as this association would later come to be known). Address: Des Moines, Iowa.

584. Morse, W.J. 1924. Re: I attended the fifth annual field meeting of the National Soybean Growers' Association, at Ames, Iowa. Letter to Prof. C.V. Piper, USDA, Nov. 7. 6 p. (including 4 pages of program from Ames, Iowa meeting). Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: Upon my return from my western field trip, during which I attended the fifth annual field meeting of the National Soybean Growers' Association, at Ames, Iowa, I advised you that the Association went on record as favoring Washington, D.C., as the summer meeting place for 1925, with the states of Maryland and Virginia cooperating as hosts. The final decision as to the meeting place in 1925, however, is decided at the winter meeting held in Chicago at the time of the International Stock Show. During the past two or three years, while attending these meetings, and even while attending State and County soybean meetings, I have been approached by prominent soybean growers as to holding the annual meeting one year at Washington. Nowhere in the country, or perhaps in the world for that matter, are so many varieties and so much breeding work done with soybeans as at our Experimental Farm at Arlington. Those attending the National Soybean Growers' Association meeting every year are enthusiastic soybean men and know that the Government is doing a very considerable amount of work in the development of new varieties suited for conditions throughout the Country. They are also aware of the fact that most of the varieties now on the market are the results of Government work in the introduction of new things from abroad and the development of pure lines from these introductions by breeding. I feel quite sure from talks with the different growers and officials of the Growers' Association, that they will decide upon Washington as the meeting place for 1925

""The Virginia Crop Association sent Mr. Breeden, one of their members, to Ames to attend the meeting and to invite the growers to meet in the East in 1925. One year ago at the winter meeting, Mr. Oldenburg, of the Maryland Agricultural College, invited the Association to meet sometime in the East. In view of the sentiment it would seem fitting that the Department of Agriculture, cooperating with the Maryland and Virginia colleges and experiment stations, would do well to bid the Association at their annual winter meeting, to have their field meeting held at Washington, College Park, and Mr. Clapp's farm, near Mt. Vernon, in 1925. Representatives of the Maryland and Virginia institutions have approached me on the subject, and said they would cooperate to the fullest extent in holding such a meeting.

"I wonder if it will not be possible for you to obtain an invitation from the Secretary, the Chief of Bureau, and from yourself, to the Soybean Growers' Association, to hold their field meeting in Washington in 1925. I expect to attend the meeting which will be held some time during the week of the International Stock Show, and would like to present such invitations at that time to the Association.

"I attach herewith the program of the Fifth Annual Meeting, which, in addition to the regular program, gives a few words of the history of the organization. I might say that at the meeting held at Ames there were about 400 members present. I feel quite sure that a meeting at Washington would bring a good many more than this number.

"Yours very truly, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

585. Nov. 22–Howard M. Gore (R), West Virginia, becomes U.S. Secretary of Agriculture under President Calvin Coolidge (1923-1929) (Important event). 1924.

• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

586. Morse, W.J. 1924. Re: Attaching a letter from Mr. Leon Canova, Miami, Florida. Letter to Prof. C.V. Piper, USDA, Dec. 12. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Dr. Piper: I am attaching herewith a letter from Mr. Leon Canova, Miami, Florida, who is interested in soybeans, and with whom I am planning to put out a small experimental planting of varieties for this coming season. You will note that Mr. Canova is developing considerable property in Florida, and offers land for experimental purposes to the Government. I have written Mr. Canova regarding the soybean work, and advised him that regarding the other matters I was referring the letter to you for attention.

"Yours very truly, 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–General Correspondence, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

587. Piper, C.V. 1924. Re: Send Dixie soybeans to Dr.

A.R. Shands who farms in southwestern Virginia. Letter [memorandum] to W.J. Morse, [USDA], Dec. 18. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Mr. Morse: Dr. A.R. Shands, of this city, 901 16th Street N.W., is an enthusiastic grower of soybeans, his farm being some place in southwestern Virginia. I should like very much for him to have for the coming season 10 pounds of the Dixie soybean. In sending these, tell him all about the Dixies, and advise him to save his entire crop for seed, and in case it proves promising under his conditions to plan all the seed next year for a seed crop. The chances are that in 1926 he would get very nice prices indeed for any seed that he would have for sale. Very truly yours,..."

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: Senior Agronomist in Charge of Forage Crop Investigations [Bureau of Plant Industry, USDA, Washington, DC].

588. Denison, C.A. 1924. Re: Use of combine to harvest soybeans. Letter to Mr. W.J. Morse, c/o Department of Agriculture, Washington, DC, Dec. 19. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "In talking with Mr. John Smith at Tolono, Champaign County, Illinois, regarding the culture and harvesting of soy beans, he referred to you as being interested in the subject and would, no doubt, be in position to supply us with some information.

"Our recollection is that Mr. Smith spoke of telling you about the Massey-Harris Combined Reaper-Thresher being operated successfully in harvesting soy beans on the farm of Garwood Bros., Stonington, Illinois, this year.

"We enclose a descriptive folder of this machine [which is missing]. It cuts a swath of 12-ft. harvesting and threshing the beans with one operation. It is capable of handling about 25 acres per day and is operated with four men. One on the Tractor, one on the Reaper-Thresher and two men to haul the beans to the granary. This enables the farmer to handle the crop much more economical [sic] and speedily than heretofore and is looked upon as the solution of the harvesting and threshing of the soy bean crop.

"Our figures at Stonington indicate that this crop can be harvested and threshed and placed in the granary for an actual current expense of about 5 cents per bushel and taking into consideration the over-head expense of depreciation, a total of about 8 cents per bushel, whereas it has been costing the farmer from 25 to 30 cents per bushel.

"It is also a saving of seed and we attach a copy of a testimonial letter from Garwood Bros. [which is included and cited separately; dated 17 Nov. 1924], indicating their satisfaction. Our opinion is that this will, within the next two or three years, become in general use throughout the soy bean growing locality, and will have a tendency to promote an increased acreage.

"We now have a satisfactory machine for this work. It is our regular stock machine that has been built for years having been sold in the grain sections of South America, Australia and the Central West of this country. For soy beans we supply additional sieves and reduce the speed. These are the only changes.

"We are, in order to place the matter before the growers intelligently, interested in some information as to the amount of soy bean meal or cake and oil imported into this country and as to it's [sic] general uses.

"Mr. Smith suggested that you would, in his opinion, be interested to the extent of being able to furnish us with such information as we would require in endeavoring to place the matter before the growers in an intelligent way so that they would realize the magnitude of the enterprise.

"Any interest you might take in this will be appreciated and we thank you in advance. Yours truly."

Note: The letterhead shows that the company's head office and factory are at Batavia, 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, 1905-1929. Box 87–Martin-Means. Folder–Massey Harris Harvester Co., Inc.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Manager, Massey-Harris Harvester Co., Inc., Branch Office at St. Louis, Missouri.

589. 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 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."

590. Liu, Peter. 1924-1927. List of plants and fruits collected in China by American agricultural explorer P.H. Dorsett, collaborator J.H. Dorsett, and interpreter Peter Liu [1924-27]. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. *
• ***Summary:*** 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." Roll 27, volume 102. This microfilm roll may also be available for viewing or duplication at one of the various regional branches of the National Archives (e.g. San Bruno, California).

591. Dorsett, Palemon Howard. 1924-1930. Photographs, notes, and observations on vegetables and seasoning plants of northern China, Manchuria, and Japan compiled almost wholly from agricultural exploration reports, 1924-26 and 1929-30. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. *
• ***Summary:*** 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." Roll 20, volume 73. This microfilm roll may also be available for viewing or duplication at one of the various regional branches of the National Archives (e.g. San Bruno, California). Address: Agricultural Explorers, USDA, Washington, DC.

592. Morse, W.J. 1925. Re: Soybean growers meeting. Soybean varieties. Letter to K.E. Beeson, Indiana Corn Growers' Assoc., La Fayette, Indiana, Feb. 12. 1 p. Typed, without signature (carbon copy). [1 ref]
• ***Summary:*** "Dear Mr. Beeson: I have your letter of February 4, making inquiry as to the date of the summer meeting of the National Soybean Growers' Association, and also the place. Although we have not set the exact dates, I have talked over the matter with the Maryland and Virginia representatives..."

"As to the varieties of soybeans adapted to your territory available through congressmen, I think that the only one available is the Manchu variety.

"Regarding your request for 5 pounds of the Columbia, Arlington, Sherwood, etc., through them, will say that such varieties are not available. These varieties are only handled by the Office of Forage Crops, and we have only limited amounts which we put out in different sections for cooperative tests. If you desire to put out a few tests, we would be very glad to arrange a cooperative test with you."

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–#11.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Agronomist, Bureau of Plant Industry, Washington, DC.

593. Piper, C.V. 1925. Re: Want to start plots of forage plants at new station in South Carolina. Letter [memorandum] to W.J. Morse, A.J. Pieters, and H.N. Vinall [USDA], Feb. 21. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Gentlemen: The Office of Cotton Investigations is starting a new station in South Carolina. The man in charge is D.M. Simpson, Route 1, Charleston, South Carolina. They are just starting out this spring, but want to put in a lot of 1/20 acre plots of forage plants. I suggested that they should include in this the following: soybeans, cowpeas, velvetbeans, beggarweed, Bermuda grass, carpet grass, bur clovers, narrow-leaf vetch, Melilotus, sorghums, and various grasses which I will attend to. Some of these, of course, should be planted in the spring, and some in the fall. The soil is Norfolk sandy loam. Will you kindly make up packages of the different seeds you think that they should have in their preliminary trial plots and send them direct to Mr. Simpson with such letter as you deem necessary. In the case of the soybeans, cowpeas, and velvetbeans I would suggest that they be sent not more than five varieties of each. Very truly yours,..."

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: Senior Agronomist in Charge, Office of Forage Crop Investigations [Bureau of Plant Industry, USDA, Washington, DC].

594. Morse, W.J. 1925. Re: Confusing mottling with crossing. Letter to Dr. R.A. Oakley, USDA, Washington, DC, Feb. 27. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Dr. Oakley: With reference to the correspondence from Prof. R.A. Moore, University of Wisconsin, Madison, Wisconsin, regarding the Manchu soybean seed, will say that I am afraid Prof. Moore is confusing mottling with crossing. I have looked over the sample and found, as one will with nearly all samples of the Manchu, a slight mottling, which is not always an indication of hybridization or crossing. In our experiments with mottled Manchus we have found very little crossing. The mottling problem is receiving considerable attention in the Middle West States, and results show that nearly all mottling is due to other than crossing. In some cases when pure yellow seed has been planted, there is a tendency under certain conditions for a considerable of the resulting seed to be mottled. On the other hand, cases are known where seed more or less mottled produced pure yellow seed. I doubt very much if you will find any samples of the Manchus but that will have a few mottled beans. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

595. March 5–William M. Jardine (R), Kansas, becomes U.S. Secretary of Agriculture under President Calvin Coolidge (1923-1929) (Important event). 1925.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

596. Piper, C.V. 1925. Re: New Iberia Experiment Station in Louisiana. Letter to Oakley, Forage Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC, March 12. 1 p. Typed, with signature on letterhead.
• ***Summary:*** Note: Dr. Piper is writing this letter from New Orleans, Louisiana

"New Iberia Experiment Station has improved greatly under Queenberry's management. They have splendid pastures,–white clover, Bermuda, lespedeza, Dallis mainly. The crops are corn, sorghum, soybean, melilotus indica, oats, alfalfa. The last is fine but it is essentially an annual crop, due to crabgrass and foxtail. The first group is nearly ready to cut. There is still a shortage of rain and the crops are beginning to show it. Dodson promised to supply an agronomist, part time at least. Kidder and I will make the plans for the plot work. It is hoped that some can be put in this spring, even if Purnell funds are not available until July. I suppose Kidder will write soon. The following plots seem to me advisable for spring sowing.

"Sorghums.–...

"Lespedeza.–...

"Soybeans.–Biloxi, Laredo, Barchet, Otootan are good. May be we can compare these with some of Morse's new ones, especially late ones.

"Cowpeas.–Victor, Brabham, to mature in October.

"Giant Bermuda.

"Guatemala Grass.

"Centipede Grass.

"Tracy Grass, for back wet pasture.

"Crotolaria striata (green manure).

"Bahia Grass.

"Panicum aquaticum.

"Desmodium supedum.

"Angleton Grass (Andropogon annulatus).

"Molasses Grass.

"1/20 acre plots. The live grasses can be sent mostly from McNeill. The fall plantings we can plan later.

"The present plan is to have Kidder superintend the plantings and visit them occasionally. Cobb on the station will look after the plots. Besides, there is a great field for

work.

"Better write Dodson to the effect that time is important if plots are to go in this spring.

"Hot summer weather here. Leave for Jacksonville this afternoon.

"Sincerely, C.V. Piper."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist, USDA Bureau of Plant Industry, Forage Crop Investigations.

597. Morse, W.J. 1925. Re: The best machine at present available for harvesting soybeans. Letter (memorandum) to Prof. C.V. Piper, USDA, April 14. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Prof. Piper: In regard to your request for information on the best machine at present available for harvesting soybeans, will say that there are several types of harvesters that are used in different places very successfully. In North Carolina, southern Virginia and some other parts of the South, the harvester known as the Carolina pickers is employed quite extensively and with success. One of the principal complaints against these machines is that only one row is harvested at a time. In the Middle West states the broadcast harvester, by means of which the beans are cut and thrown [?] to a cylinder where they are thrashed and then cleaned, is coming into use. A few were used last season for the first time, and very good results obtained.

"The trouble with this machine is that it is rather expensive. It is manufactured by the Massey Harris Harvester Company, St. Louis, Missouri. There is also another machine which beats out the seed from the standing vines on the principle of the Carolina Pickers, but this machine will harvest broadcast beans or row either. It is manufactured by the Union Harvester Co., Johnstown, Pennsylvania. I would suggest that Mr. Macrae write the following concerns and obtain their literature, which will give him a pretty good idea of the different types of harvesters.

"Gordon Harvester Co., Elizabeth City, North Carolina.

"Pritchard Harvester Co., Elizabeth City, N.C.

"Hardy & Newcome, La Grange, N.C.

"Union Harvester Co., Johnstown, Pennsylvania.

"Massey Harris Harvester Company, St. Louis, Missouri.

"Yours very truly, W.J. Morse."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

598. Morse, W.J. 1925. Re: Memorandum from Dr. Taylor. Letter (memorandum) to Prof. C.V. Piper, USDA, April 22. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Dear Dr. Piper: With reference to the memorandum from Dr. Taylor relative to information suitable for use to the Secretary in talks through the west, the soybean would come under the topic 'New Crops, if there are such, worthy of our consideration'. Although the soybean has been grown in the United States for many years, its culture has been confined, especially seed production, to the Middle and Southern states. With the introduction of early sorts suitable for Iowa, Minnesota, the eastern half of North and South Dakota and Nebraska, the soybean became increasingly popular in these states. In the above region, the soy bean undoubtedly has more uses than any other legume. The soybean plant is as high in feeding value as alfalfa, and may be used in the form of hay, pasture, silage, soilage, or as a protein concentrate.

"The production of seed of improved northern varieties in sections of Iowa, Nebraska, eastern South and North Dakota has proved a very profitable industry for many growers and is worthy of consideration by many more. Soybean acreage is devoted, at least ninety percent in the above states, to hay, pasture and silage. About ten per cent is given to seed production, and large quantities of seed must be imported from nearby States to plant the acreage which in increasing annually. The many uses of the soybean, the ease and certainty with which it may be grown and the profits derived from its production account for the fact that soybean acreage is more than doubling each year. This is especially true of Iowa conditions when in 1917 the first field acreage estimates were made, that state did not have sufficient soybean acreage to be listed, whereas in 1923 Iowa had a total of 164,000 acres, of which 157,000 acres were given to pasture, hay, and silage.

"Yours very truly, W.J. Morse."

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, 1905-1929. Piper, C.V. Box no. 108.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., April 2017. Address: Agrostologist [Forage Crop Investigations, Bureau of Plant Industry], USDA, Washington, DC.

599. Morse, W.J. 1925. Re: Soybeans mentioned in Mr. Bain's letter to Dr. Taylor. Letter to Walter B. Lydenberg,

Office of Forage Crops, BPI, USDA [Washington, DC], Aug. 13. 2 p. Handwritten, with signature on lined paper.
• ***Summary:*** Morse is writing from Lafayette, Indiana. "Dear Lydenberg: Am sending herewith statement relating to soybeans mentioned in Mr. Bain's letter to Dr. Taylor. I spoke to you regarding this matter the day I left and advised I would send to you. I wish you would have it typewritten and submitted to Dr. Piper for attention. Am also sending Mr. Bain's letter and I wish you would bring the matter to Dr. Piper's attention as soon as possible so that he may get the material in a form as he sees fit to Dr. Taylor and Secretary Jardine.

"Have had an excellent trip so far. Spent yesterday at the soybean sauce factory and count it as one of the most profitable days I have ever had on a trip."

Note: The soy sauce factory Morse visited was probably the Oriental Show-You Co. in Columbia City, Indiana, founded by Shinzo Ohki in 1918 in Detroit, Michigan. He moved the company to Columbia City in 1922 and began making fermented soy sauce there in 1924.

"I find very great interest in our [illegible].

"Will mail you in a day or two some material which I wished to have mimeographed. With best wishes,..."

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: Lafayette, Indiana.

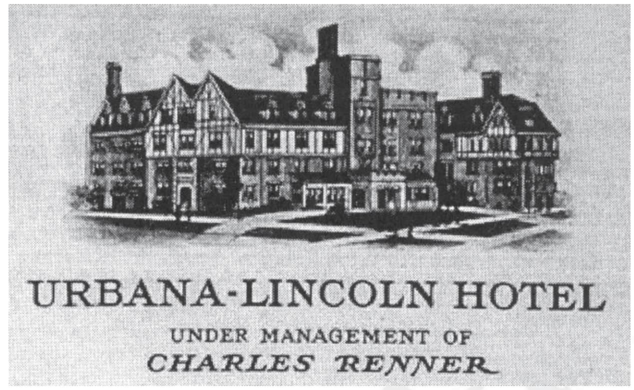
600. Morse, W.J. 1925. Re: Prof. Piper is quite sick. Letter to W.B. Lydenberg, Office of Forage Crops, USDA [Washington, DC], Aug. 15. 1 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** Morse is writing from Urbana, Illinois. "Dear Lydenberg: Had a letter from Miss Weston regarding soybean stickers. The Arion [?] Harvester Co., Johnston, Pennsylvania, sent them to me. Mr. Watts is the one from that company. If Mr. Hamilton desired more, would suggest that Miss Weston refer him to Mr. Watts of the Co. and I am sure that he can get some.

"Met Dr. Pieters here yesterday and learned that Prof. Piper is quite sick. Am certainly sorry to hear that he doesn't improve.

"This morning met Hollowell and we start tomorrow for Ames, Iowa and will be there Mon. and Tues. With best regards,..."

Note: On the letterhead is an illustration of the hotel. "Under management of Charles Renner."

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: Urbana-Lincoln Hotel, Urbana, Illinois.

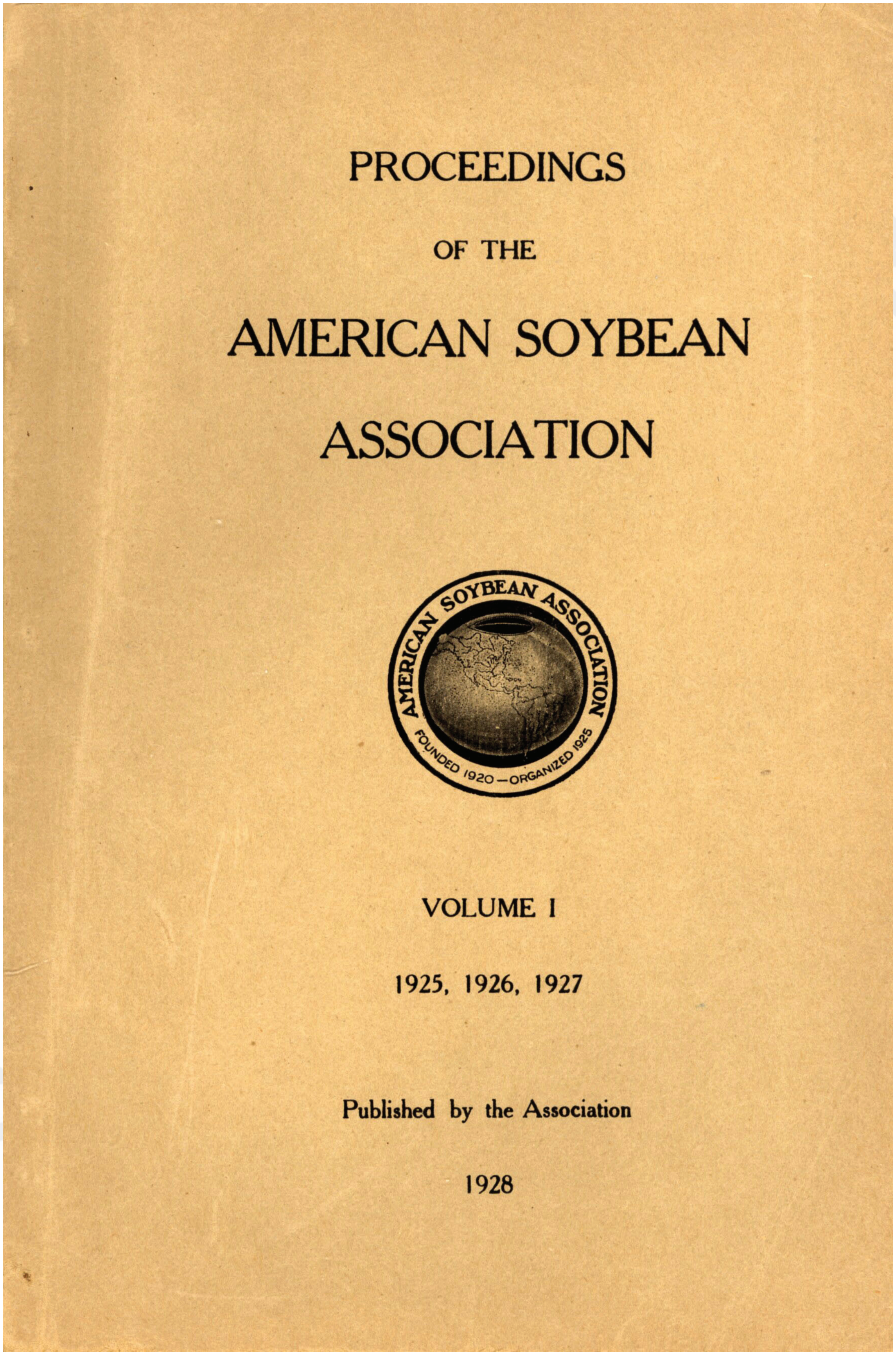
601. *Proceedings of the American Soybean Association.* 1925-1930, 1935-1940. Serial/periodical. American Soybean Assoc. Annual.
• ***Summary:*** Volume 1, covering the years 1920 to the fall of 1928, was published in late 1928. Volume 2, covering 1928-29, was published in 1930. Vol. 3, covering 1930, was published in 1931. 1931-34 were never published. The American Soybean Association (ASA) held annual meetings each year, starting in Sept. 1920. Proceedings of the first through 11th annual meetings were published once a year, starting in 1928. Most early issues were compiled and edited by William Morse of the USDA. Volume 1 contained no advertising; the costs of editing, printing and distribution were apparently borne by the USDA. Subsequent volumes each contained some advertising, which partially offset the publication costs.

The 11th annual meeting was held in Sept. 1930, early in the Great Depression. Then no proceedings were published for the next four years (1931-1934). Publication resumed with the proceedings of the 15th annual meeting in 1935.

Note: There are two publications for the 1935 proceedings; both are owned by the USDA National Agricultural Library (Beltsville, Maryland), One is only 20 pages (counting the front cover, inside cover, rear cover, and inside rear cover). This publication contains mostly ads and administrative-type information. The front and rear covers are the only two pages with color on them. On the cover, the background is black, typeset white, and the soybeans are kind of a natural tan color. The other publication is 52 pages, again counting the 4 cover pages, and contains the proceedings articles. It has the blue background, white lettering, and tan soybeans. The rear cover is the same as on the first publication described. So the front and rear cover of both publications are the only pages with color on them.

The 1936, 1937, 1938, and 1939 publications each had more two-color color pages.

The last published proceedings were those for the



PROCEEDINGS

OF THE

AMERICAN SOYBEAN ASSOCIATION

VOLUME I

1925, 1926, 1927

Published by the Association

1928

20th annual meeting held at the Dearborn Inn, Dearborn, Michigan, on 18-20 Aug. 1940, at the invitation of the Ford Motor Co. *Soybean Digest* began publication in Nov. 1940 as a monthly magazine, the official organ of the ASA. From then on, it published news of and selected papers presented at the annual meetings. So these proceedings can be considered the forerunner of *Soybean Digest.*

Note 1. This is the earliest document seen (Oct. 2007) that uses the term "American Soybean Association."

Note 2. This is the earliest periodical published by the American Soybean Association.

602. Deming, Macey F. 1925. Soybeans for human food. *Proceedings of the American Soybean Association* 1:71-76. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.

• ***Summary:*** Presented as part of the evening program at the new National Museum in Washington, DC. "It was rather a singular thing that the different speakers who got up to address the convention tonight had each been working on the same subject but in a different line for a number of years, and probably without knowing about the other fellow. Now, my interest is in the whole problem of utilization, but I have had more interest in the soybean as a human food.

"In 1908, I had the pleasure of first meeting Mr. [William] Morse. A doctor in a medical school of Baltimore had wanted to know whether soybeans could not be used in feeding children. I had been engaged in that study for a number of years, and in fact, in most of the original work that led up to the cleaning of New York City's milk supply. I had started in 1898, when there was a tremendous amount of sickness there. It may seem incredible to you, but I know a doctor who had 200 calls an hour. He would prescribe for the sick babies one after the other, and run through a list of 200 in an hour, sometimes. That was before the milk-feeding stations came into being. I have practically grown up in that work, and I have been in this phase of the work since 1898, and have seen all sorts of food supplies.

"So, I want to say that soybean milk has been a very great success in the feeding of children. I might have brought along with me letters I have received from patients all over the world. I have with me a letter from a lady who had spent $3,000 on the food of her child, and just one pint of soybean flour fixed the baby up; another case I had a telephone call from a woman in a town seven miles from where I lived. The woman was in distress about her sick baby; she said that the child could take no food whatever. I told her that I would fix up a diet for the baby; I was curious enough to follow that case up, and after the second day, I called to ask about the baby. The lady said, 'There it is on the front porch.' The baby had gone to sleep after the first feeding with soy milk, and it had been no trouble since.

"Now, that sort of thing is apt to happen to anybody who uses soy flour. You must know how to use it. As a food for children it has wonderful possibilities, and as this food question is so much to the front just now, I wanted particularly to accept Mr. Morse's invitation to speak about it to you. So, I prepared my paper very carefully, because I wished to have it without mistakes, when followed up."

The world is running out of food. One can read about food shortages in almost every country.

"Holland also is in need of more land for her population, and it is announced that unless something unforeseen arises, the grandchildren of the present generation will see 50,000,000 persons trying to make a living from an area one-twelfth the size of the state of Montana.

"Predictions also are made that before many years, the United States will have little surplus food to export, and, as other countries reach this condition, there will of necessity be a mad scramble to obtain food by force, or to seize territory where it may be produced.

"Thus, it is, while all talk peace and disarmament, no one dares to practice it, and we see, even in the United States, the urge toward military training and the recent plan to increase the students under training at the United States Naval Academy to 4,000.

"It is as certain as anything can be that the world is drifting towards a colossal War over food supplies which cannot be averted by a League of Nations, or a World Court, or by any other political agency. The only way it can be prevented is by the production of more food, and what is of far greater importance, the efficient use of the food so produced."

The people of Asia, such as China and Japan, "have learned to use the natural food stuffs nearly in their natural state and to avoid the expense of processing the materials [and feeding them to animals], which so greatly adds to the cost of living in America. The result is that the food costs are so small as to appear unbelievable to Americans of the present generation. Yet Asiatics get better food value for their small expenditure than Americans do for their large outlay."

"If the white races and Americans in particular would adopt efficient methods of utilization of food, the domestic problems and the gathering war clouds would disappear and all races of mankind could dwell more harmoniously. But there is still another strong reason why American food habits should be changed and new ideas of nutrition introduced, and that is the widespread malnutrition which is reported in all classes of society, and the poor physical condition of the young, to which attention was called recently in an article on military training, by General Pershing, in which he said, 'But what of our people? The world war revealed a startling decline in their physical strength. One young man in four had to be turned down for a physical disability of some kind. Every other man was unfit for battle service.' Nothing could be plainer than the fact that radical changes in food production and in habits of nutrition are necessary.

"In food production, an important start has been made

in the cultivation of soybeans. These, however, have been looked upon largely as a means for improving the soil through their ability to fix atmospheric nitrogen and at the same time serve as a food for cattle. But they have vast possibilities as food for human beings which needs to be appreciated by Americans. They contain nearly as much fat as meat and about twice as much protein of a high quality, and both are substantially as well utilized as the fats and proteins of milk, eggs and meats. And, furthermore, about 95 percent of the beans can be used for human food without undergoing expensive manufacturing processes."

"It is hardly too much to say that there is nothing that would help as much in solving the national and international problems that are perplexing the world as popularizing the use of soybeans as an article of human diet and of teaching the subject of nutrition from the standpoint of food production and its efficient use. Unless this is done, the solution will have to be found on the battle field."

"The soybean growers are the advance guards of the army that will conquer the war god by showing how to wrest a good living from Nature, and proving that it is not necessary to destroy someone else in order to live.

"With a well planned campaign to promote the intelligent use of soybeans, it is probable that inside of ten years, the food and population problems would be well out of the way for centuries to come." Address: Tappan, New York.

603. Howard, Bradshaw. 1925. A new plan for plowing. *Country Gentleman* 90(35):52, 55. Sept.
• ***Summary:*** A radically new plan for plowing is in operation on the farm of Harvey Clapp of Accotink, Virginia. The new plow does a better job at about half the cost.

The section titled "Soys need new tools" discusses shallow plowing with a "narrow shared bull tongue plow." This new planting method comes as farmers attempt to adjust their procedures to the soy-bean crop. Farmers started out cultivating soys like corn with corn machinery, then harvesting them like wheat with wheat machinery. But if they ever become a big crop, then will need their own machinery and cultural methods. Years ago, farmers in Eastern North Carolina, where wheat machines were not available, harvested soys with a special row harvester which threshed the pods from the standing stalk. Corn Belt farmers found that the rotary hoe worked well to clear the weeds from broadcast soybeans. Row-planted beans never make good hay; the stalks are too heavy and coarse. So soys are planted in rows only when they are needed for seed or silage.

Eight years ago Harvey Clapp was a lawyer with a large practice in Duluth, Minnesota. He suddenly decided to give up law and take up farming. Union farm, where he now resides, used to be part of George Washington's estate. Mr. Clapp "got the soy-bean bug" and his farm is now patterned around this crop. With fierce determination, and the help of William Morse ("America's soy-bean leader"), he set to work developing a harvester for broadcast soybeans. His new harvester goes on the market in a limited way this year. Now he is working on a cheaper way of plowing that is specifically designed for soy beans. The plow digs in without turning the soil upside down. Corn Belt farmers would do well to study his inventions.

604. Latham, F.P. 1925. The economic value of the soybean to southern agriculture. *Proceedings of the American Soybean Association* 1:63-65. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.
• ***Summary:*** "I remember very distinctly some fifteen years ago [in about 1910], one October afternoon, when a stranger came into my front yard, as I was in the midst of the unusual work that a farmer has to do to maintain his living. I asked the stranger what I might do for him. He said, 'Morse is my name and I am from Washington [DC]. I am making a soybean investigation and would be glad to go over the situation with you.'

"I took just about two minutes to find that I was right next to a man who had the information for which I had been thirsting for six or eight years, and it was my pleasure to be with him that whole afternoon, that night, and all the next day. And, gentlemen, that is the date of a period in my agricultural activities, a period that I look back to with great pleasure. I know it has been one of the most profitable and most pleasant periods, and I know that there has been no better time in all of my life than the time of my association with Mr. Morse.

"I come from a section of the country, that is a cotton country, that has been growing cotton for a century. I come from a section whose people have been losing in cotton, and during that time, the white plague [boll weevil] has worked on their sandy soils and erosion has made pock-marks all over the country of the south. Now when Mr. Morse asked me to speak here about the economic value of soybeans to southern agriculture, I felt that he had given me a subject that has been an injury to me for the past fifty years. But, gentlemen, since I have gone into that, I have realized that the subject is too big to be handled in one minute or five minutes. If I were to step into a conference and talk about nodules, I can see where I would be asked to step out of the scientific part of that field. If I would step over into hog feeding, I would see Mr. O.G. Hankins, of the Swine Investigations work, telling me that I was in his field. Mr. Fouts, of Indiana, puts the soybean on the hoof, and I would be asked to get off of his territory. Then Mr. Vestal would be asking me to get off of his territory, and, gentlemen, speaking seriously, I believe that there is no plant known to southern agriculture today that promises as many possibilities as the soybean. As I said, the coastal plains and the sandy sections of the South have been bled white by an ill-planned agriculture; but now, we are square up to the situation where

we must reverse ourselves and face the problem of taking care of the soil; and in all of life's problems, I believe there is no more serious one anywhere.

"We have a condition in the South that is unknown to the people of the North and the West. We have a race of people with us who have not yet reached the point of stability of the people of the North, or of the West. We are on the up-grade, however. It is impossible to talk to these people about such things as alfalfa, red clover, etc., the plants that pick the nitrogen out of the air. It is our interest to get that, however; and the soybean will do it. A farmer can sow his soybeans in March and realize on them in August; and he can sow them in August and realize on them in March. Thereupon, we can appeal to the men of the South to add to the soil the vegetable formation that will bring it back to nature. I happen to reside on a farm that, twenty-five years ago, would not bring an average of fifteen bushels of corn, but that same farm today, and this very season, will average fifty bushels, or better, and I say to you, gentlemen, that whenever any commodity of such vast economic value can be passed to the people that the South may fill its graineries [sic, granaries] and feed its animals, it is you who have bred into them their new spirit of independence and freedom.

"I believe this, as clearly as I believe I am before you now, that the boll weevil in the South is going to drive us to produce our own foodstuffs; and when the day comes that the South sits up to breakfast and a soybean cereal is served with rich, yellow, soybean cream; when the table is supplied with ham, eggs, bacon, all made from a soybean product and as a result of the humus the soybean puts into the soil; when our new meal and even our livestock comes from the soybean, then I believe that the greatest territory will lie between the Virginia line and the Rio Grande territory, and I believe that God is the only one who knows what our land will do under those conditions. I am particularly delighted to meet the faces that I have met here today, people who each have a mission with the soybean convention and I believe this convention is going to be of inestimable value to the South, North, East and West, because there is no legume that will adapt itself into the whole United States as does the soybean. It will fit anywhere; you can start it in March or in August and it will make good in every kind of season and when everything else quits. It is one of the greatest plants ever introduced into our whole agriculture, and I want to say to you, gentlemen, that I have been wonderfully interested in what I have heard and learned here with you today." Address: Belhaven, North Carolina.

605. Meharry, Charles L. 1925. First annual field meeting: Camden, Indiana–September 1 [sic. September 3], 1920. *Proceedings of the American Soybean Association* 1:39-42. • ***Summary:*** "/1925-55335a" "Under the auspices of the Indiana Experiment Station and with the support of the Crops Extension Department and the cooperation of the Farm Bureau of the Corn Belt states, a Corn Belt Soybean Conference was held at the Soyland Farms of the Fouts Brothers, pioneer soybean growers, near Camden, Indiana, Friday, September 3, 1920.

"Wide publicity by the Agricultural Extension Service through circular letters and the agricultural press brought together more than a thousand people from Ohio, Illinois, Michigan, Wisconsin, Kentucky, Indiana, and the United States Department of Agriculture.

"The forenoon was spent in getting acquainted and in inspection of soybean fields, corn and beans, and hogs and lambs in the fields. Seed fields of the Indiana Hollybrook and Mongol varieties, methods of planting, cultivation and inoculation were discussed under the leadership of County Agent A.L. Hodgston and W.A. Ostrander of the Indiana Crops Extension Service. Fields of corn and soybeans were visited where western lambs were harvesting the crop and also where hogs were pasturing corn and beans. An automobile tour was made over the Soyland Farms, where 150 acres of seed beans and 200 acres of the corn-soybean combination were growing. Several large fields grown for seed and for hay in the immediate neighborhood were also visited.

"An excellent cafeteria lunch was served at noon by the Presbyterian Ladies' Aid Society. Soybean dishes, such as baked soybean salad and roasted, salted soybeans were served.

Note: This is the earliest English-language document seen (Dec. 2012) that uses the term "salted soybeans" or the term "roasted, salted soybeans" to refer to soynuts.

"The meeting was called to order after lunch by W.A. Ostrander, of the Purdue Soils and Crops Department, who was chosen Chairman of the Conference by unanimous consent. Mr. Ostrander gave an interesting review of soybean demonstration work throughout Indiana and similar work developed in adjoining states.

"A quartette of local soybean growers sang a very appropriately worded song: "Growing Soybeans to Get Along."

"Dr. G.I. Christie addressed the growers, giving numerous facts and reasons for the need of improving farm rotations by the more extensive use of legumes. He stated that about 200,000 acres of soybeans were being grown in Indiana and emphasized the practice of hogging and lambing off corn and soybeans to reduce production costs and improve soil fertility.

"Prof. W.E. Hangar of Ohio State University told of the increasing popularity of the soybean in Ohio and estimated that more than 15,000 acres were being grown in 1920. Dr. W.L. Burlison of the University of Illinois commented on the status of soybean growing in Illinois. Data were presented showing the relative yields of soybeans and corn in combination.

"Prof. George Briggs of the Wisconsin Extension Service told of the value of the soybean in Wisconsin, especially the dairy sections where soybeans were producing 'two squirts of milk where one squirt dribbled out before.'

"Prof. C.R. Megee of the Michigan Agricultural College talked on the use of soybeans as a forage crop for Michigan farmers.

"Mr. I.J. Matthews, County Agent of Pulaski County, Indiana, presented very interesting data on the cost of production of soybeans on a series of farms under his supervision. Mr. W.J. Morse, in Charge of Soybean Investigations, United States Department of Agriculture, gave a review of the soybean throughout the United States, elaborating on the breeding and developing of new varieties carried on at the Arlington Experimental Farm, Virginia.

"Short talks were given by prominent soybean growers, W.E. Riegel of Tolono, Illinois; C.B. Newton, Bowling Green, Ohio; E.F. Johnson of Stryker, Ohio, and Guy McKinnis of Camby, Indiana.

"After discussion, the growers were of the opinion that a definite organization seemed necessary for the soybean industry, and the name, 'The National Soybean Growers' Association' was agreed upon. A motion was presented and carried that a business session and program be held during the coming International Hay and Grain Show in Chicago. A motion was made and carried that a National Soybean Field Day be arranged for the fall of 1921."

A photo (p. 41) shows "The First Annual Meeting of the Association at the Soyland Farms, Camden, Indiana, Sept. 1920." The three Fouts brothers, Taylor, Finis, and Noah (from left to right, each wearing a hat, coat, and tie) are standing in front of a barn on which is written "Soyland–Taylor Fouts." Between the three brothers and the barn, many farmers are standing in line. Address: Acting secretary.

606. Meharry, Charles L. 1925. Second annual field meeting: Illinois–September 1, 1921. *Proceedings of the American Soybean Association* 1:42-46.

• ***Summary:*** "The Second Annual Field Meeting of the National Soybean Growers' Association was held on 1 Sept. at the University of Illinois and at the A.P. Meharry Farm near Tolono, Illinois, the University of Illinois Extension Service, the Champaign County Soybean Growers' Association cooperating in arranging and conducting the program. The Champaign County Soybean Association and the Champaign County Farm Bureau furnished transportation and lunch was served by the Crittenden Unit of the Champaign County Farm Bureau.

"More than 1,600 people representing 35 counties in Illinois, 9 counties in Indiana, 3 counties in Kentucky, one county each in Missouri, Ohio and Wisconsin and the United States Department of Agriculture assembled at the South Farm of the University of Illinois, where representatives of the Extension Department explained the various soybean experiments, and the use and place of soybeans in rotations for Corn Belt conditions. Field plot tests of varieties suitable for different uses, soil types and latitude were inspected and the characters and behavior of each variety discussed. A special feature of variety demonstration was a test of sixteen varieties secured from each of ten different states... Visitors were then shown the work of Dr. Woodworth and others who are developing new varieties through selection and breeding. Dr. Woodworth discussed quite fully the principles of breeding and their application to natural and artificial crossing."

"At 10:30 the visitors started in automobiles for the A.P. Meharry Farm near Tolono... After arrival at the farm, several hay varieties, Illinois 13-19 (Ilsoy), Virginia, Mongol (Mid-west [Midwest]) and others were inspected. Several large fields of the Manchu, A.K., and Mongol (Midwest) for seed production were viewed."

"At noon a cafeteria lunch was served in the grove. In addition to the regular lunch, the A.P. Meharry Farm served a number of soybean dishes, including baked soybeans, soybean coffee, soybean milk, and soy sauce. An exhibit of soybean products consisting of soybean oil, soybean oil meal and flour, various paints and varnishes, soaps and photographs of various operations in the soybean field was furnished by County Agent C.H. Oathout.

"After luncheon President Riegel called the meeting to order, and Professor J.C. Hackleman, Illinois Extension Specialist in Farm Crops, presided.

"Mr. Charles L. Meharry welcomed the visitors to the A.P. Meharry Farm and spoke briefly of the place and importance of soybeans on the Meharry Farms.

Mr. Henry J. Waters, former President of the Kansas State Agricultural College, addressed the growers on the economic distress of the times and the economic situation at the close of the World War.

Professor E.J. Kinney, of the Kentucky Experiment Station, told briefly of the soybean in Kentucky...

For Kentucky conditions the Mammoth Yellow was recommended for forage and the Haberlandt for seed.

"Mr. Charles Caldwell, soybean grower of Kentucky, told briefly of ten years' experience with soybeans."

"Mr. Taylor Fouts, soybean grower of Indiana, stated that he had been growing soybeans for a great many years, and emphasized their value as a soil-building leguminous crop on poor soils, especially where clover fails. He suggested that while corn is King of the midwest crops, the soybean would be known as the Queen, when we realize the wonderful possibilities and many uses of the crop.

Note: This is the earliest English-language document seen (July 2007) that uses the word "Queen" to refer to the soybean.

"Mr. C.E. Carter, of the Missouri Experiment Station, reported on the soybean situation in Missouri... The Morse and Medium Yellow (Midwest) are regarded as the best seed varieties and Wilson and Virginia as the best forage sorts.

"Professor George M. Briggs, of the Wisconsin Experiment Station, praised the performance of soybeans in his state."

"Mr. W.J. Morse, of the United States Department of Agriculture, gave a general review of the soybean situation in the United States. He stated that the interest in soybeans has increased very rapidly during the past few years, not only in the Middle West, but also on the Pacific Coast, in New England and throughout the Northern and Southern States."

"Mr. O.L. Cunningham, Kentucky, reported that soybeans were so generally grown and favored in Fulton County that soybean demonstrations were not essential. Of the 20,000 acres of corn, at least 16,000 acres were said to be planted with soybeans. The Mammoth Yellow variety was grown with late corn and the Haberlandt with early corn for pasturage. In Fulton County the corn is cut off and the hogs allowed to pasture the soybeans.

"Mr. C.B. Newton, Ohio, reported on soybeans growing in Ohio."

"Mr. W.E. Riegel, manager of the A.P. Meharry Farm, in a brief talk, stated that there was a place for soybeans on every farm to produce whatever amount of feed could be fed upon the farm, and that farmers should produce their protein feed instead of buying tankage, cottonseed meal and other high-priced feeds. It was also thought that soybeans should be developed as a human food in the United States as already had been done in the Orient."

"Chairman Hackleman emphasized his belief that the farmer should think of the soybean crop as a feed, forage, and pasture crop, and as a legume to enrich the soil. He made the point very emphatically that farmers should not depend on growing the soybean crop for seed alone, and more converts are needed to soybeans for their value on the farm. When the farmers get this attitude towards the crop, the seed crop will take care of itself.

"A demonstration of threshing soybeans followed the program of speakers. Several loads of unhulled beans of the 1920 crop were threshed to demonstrate that the proper adjustment of an ordinary grain separator is all that is necessary to successfully thresh beans. The growers were shown the necessary adjustments and attachments in the way of different sized pulleys which reduced the cylinder speed without reducing the speed of the remainder of the thresher.

"The growers and guests after a unanimous vote of thanks to the hosts of the A.P. Meharry Farms departed about sundown."

Four small photos (p. 41) show "The Second Annual Field Meeting of the Association at the A.P. Meharry Farm near Tolono, Illinois, September 1, 1921." (1) Men standing in a field with silos and barns in the background. (2) People and children standing around luncheon tables covered with white table cloths. (3) Many men seated on the ground under trees, wearing white dress shirts (some wearing straw hats) and listening to a speaker. (4) Men standing around talking under trees. Address: Acting secretary.

607. Meharry, Charles L. 1925. Fifth annual field meeting: Ames, Iowa–August 29 and 30, 1924. *Proceedings of the American Soybean Association* 1:49-52.

• ***Summary:*** "The Fifth Annual Field Meeting was held at Ames, Iowa, under the auspices of the Extension and Agronomy Divisions of the Iowa Agricultural College and the Iowa Experiment Station... Soybean growers and agronomists from fourteen states assembled at a soybean dinner at 'The Maples.' After dinner the meeting adjourned to the Agricultural Assembly Hall where it was called to order by President W.J. Morse. The following papers were presented: "Soybean in the South, by Prof. A.F. Kidder (Louisiana). "Breeding soybeans," by Dr. C.M. Woodworth (Illinois Experiment Station). "Inoculation studies with soybeans," by Dr. W.H. Wright (Wisconsin Experiment Station). Results of inoculation experiments with soybeans, by Prof. F.S. Wilkins (Iowa Experiment Station). "Progress in the study of soybean grades," by Mr. J.E. Barr (USDA).

"On Saturday morning, August 30th, growers again met in the Agricultural Assembly Hall for a continuation of the program. More papers were presented: Investigations to determine the cause of mottling in soybean seed, by Mr. E.A. Hollowell (Iowa Experiment Station). "Diseases of soybeans," by Dr. J.B. Kendrick (Indiana Experiment Station). "The soybean-wheat combination for Iowa," by Mr. J.N. Horlacker (Iowa soybean grower). "The cooperative marketing of soybeans," by Mr. J.B. Edmondson (Indiana soybean grower). "Standardization of varieties," by Mr. John T. Smith (Illinois soybean grower). "The present status of the domestic soybean oil industry and future prospects," by Mr. I.C. Bradley (Illinois soybean oil manufacturer).

"At 10:30 a.m. the meeting was adjourned that the growers might inspect the soybean experiments on the college field. After luncheon a short program was held under

the maples on the campus. More papers were presented: "Why the Iowa farmer will continue to increase his soybean acreage, by Professor F.G. Churchill. "The feeding of soybeans to dairy cattle, by Professor G.E. Weaver (Iowa Experiment Station). "The future of soybeans in the northwest," by Professor George M. Briggs (Wisconsin Experiment Station).

"At the conclusion of the program the growers were taken to the Agronomy Farm where the following soybean experiments were inspected: 1. Methods of curing soybean hay. 2. Thirty-five varieties compared for hay. 3. Varieties of soybeans from different states. 4. Soybean varieties for grain production. 5. Methods and rates of planting soybeans in corn for hogging down and silage. 6. Methods and rates of seeding solid for seed as compared with cultivated rows. 7. Comparison of width of rows and rate of planting in cultivated rows. 8. Two soybean hay crops versus one hay crop per season. 9. Soybean inoculation studies. 10. The effect of lime and fertilizers on soybeans.

"After inspection of the soybean fields, a demonstration of farm machinery most efficient in the production of soybeans was held.

"A discussion on 'some machinery the soybean grower needs' led by Mr. W.E. Riegel of Illinois, brought to a close one of the most successful field meetings of the Association."

A full-page photo shows many people meeting during a short program, seated on the grass, under the maples on the campus of the Iowa State College. Most are wearing a long-sleeved white dress shirt and a necktie; quite a few are wearing flat-brimmed straw hats. Address: Secretary.

608. Meharry, Charles L. 1925. Fourth annual business meeting: Chicago, Illinois–1923. *Proceedings of the American Soybean Association* 1:24.

• ***Summary:*** "The fourth winter meeting was held in the assembly room of the Saddle and Sirloin Club, Union Stock yards, President George M. Briggs, Wisconsin, presiding. The problem of soybean mottling was the chief topic of discussion. Many theories were advanced concerning the cause of mottling. Many experiment station men planned investigations on this subject as mottling was becoming rather serious in many sections of the Corn Belt states.

"Iowa State College of Agriculture was chosen for the next summer field meeting.

"Officers were elected as follows: President, W.J. Morse, United States Department of Agriculture; Vice-Presidents, E.C. Johnson, Ohio, and J.L. Robinson, Iowa; Secretary, Charles L. Meharry, Indiana."

Note: This is the second earliest document seen (Oct. 2014) that mentions E.C. Johnson of Ohio. Address: Secretary, National Soybean Assoc.

609. Meharry, Charles L. 1925. Fifth annual business meeting: Chicago, Illinois–1924. *Proceedings of the American Soybean Association* 1:24-25.

• ***Summary:*** "The fifth winter meeting of the Association had been arranged to be held in the Saddle and Sirloin Club. On account of a conflict between the meetings of the extension agronomists and the soybean growers, the soybean meeting was adjourned to meet with the agronomists in the assembly room of the Hotel Atlantic. "President W.J. Morse called the meeting to order.

"The attendance of soybean growers at this winter meeting was the smallest of any winter meeting ever held.

This was undoubtedly due to the fact that the meeting place was changed at the last moment.

"It was urged by Professor G.M. Briggs, Wisconsin, that the Association try to get a larger attendance to the winter meetings. Practically all of the business of the Association is conducted and the officers for the ensuing year elected at these winter meetings.

"The matter of a membership fee was discussed by W.A. Ostrander and C.L. Meharry. It was moved that a committee be appointed by Mr. Morse to consider the feasibility of a regular membership with a fee attached and report at the next field meeting.

"There was some discussion as to methods of obtaining the cooperation of county agents in getting publicity for the field meetings. Professor G.W. Patterson, Virginia, suggested that the Virginia Crop Improvement Association aid in obtaining the cooperation of county agents in that state.

"Mr. John T. Smith, Illinois, discussed the relation of soybean inoculation to the value of the crop for fertility purposes, explaining why wheat is sometimes benefited and at other times apparently injured. It was shown that a well inoculated crop of soybeans usually increases the succeeding wheat crop, while a poorly inoculated one is usually detrimental. Professor G.M. Briggs, Wisconsin, criticized the judging of hay samples of the International Hay and Grain Show."

"In the election of officers for 1925, Professor G.M. Briggs moved that the entire list of officers of 1924 be re-elected by acclamation. The motion was seconded and carried. The following officers were re-elected: President, W.J. Morse, United States Department of Agriculture; Vice-Presidents, E.C. Johnson, Ohio, and J.L. Robinson, Iowa; Secretary, C.L. Meharry, Indiana.

"A discussion of the meeting place for 1925 was settled by the decision that it go to Washington, D.C. A motion to adjourn was seconded and carried."

Note: This is the third earliest document seen (Oct. 2014) that mentions E.C. Johnson of Ohio. Address: Secretary, National Soybean Assoc.

610. Morse, W.J. 1925. History of the American Soybean Association. *Proceedings of the American Soybean Association* 1:9-11. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.

• ***Summary:*** The best early history of the association. "The beginnings of the cultivation and adoption of a farm crop are usually in obscurity and priority is hard to establish. The motives of the experimenter are as varied as his decisions, and the occasional farmer who adopts a crop for improvement and development is exhibiting a faith and a vision in its latent possibilities that is truly commendable. This is especially true of the pioneer soybean growers of the great Corn Belt, where corn, wheat, oats and the clovers are so well adapted and established.

"Introduced into the United States, as early as 1804, the soybean has met the difficulties with which a new crop has to contend in order to become part of an established farming system... About 1900, soybeans were beginning to attract more attention through the efforts of the United States Department of Agriculture, state experiment stations and a number of hopeful growers. Several varieties rather limited as to adaptation, as the Ogemaw, Ito San, Early Brown, U.S. No. 9414 (Ebony), No. 13399 (Midwest) and Mammoth Yellow were being grown at that time in a small way. By the dissemination of seed, and literature on cultural methods and utilization, the early growers enlisted new friends in increasing numbers for the crop. It became possible to interest counties in Soybean Days as early as 1910 and by 1912 in many sections of the Corn Belt states, through the efforts of growers and extension crops men of the state colleges, Soybean Days were becoming quite common.

"The meetings offered interesting programs and were generally well attended and the increasing number of soybean enthusiasts began expressing a desire for a representative organization worthy of the coming industry. By 1920, the possibilities of the soybean industry had become so well recognized through County and State Soybean Days that it seemed an opportune time to perfect such an organization. Experiment station workers and growers of the Corn Belt states responded freely to the idea.

"Under the auspices of Indiana Experiment Station Extension Service and the county agents of Indiana the first Soybean Day of a national character was celebrated September 3, 1920 on the Soyland Farms of the Fouts Brothers, Carroll County, Indiana, and was known as 'The First Corn Belt Soybean Field Day.' More than a thousand were in attendance at this first meeting, representing growers and experiment station men from six states and representatives from the United States Department of Agriculture.

"Following the program the growers agreed that a definite organization seemed necessary and the name 'The National Soybean Growers' Association' was agreed upon. A motion was presented and carried that a business session and program be held during the coming International Hay and Grain Show in Chicago. A motion was also carried that a National Soybean Field Day be arranged for the fall of 1921.

"The second field meeting was held in Illinois in 1921 at the Illinois College of Agriculture and the Meharry Farm near Tolono. The third meeting was conducted in 1922 at Columbia, Missouri." The 1923 meeting was at Madison, Wisconsin, the 1924 one at Ames, Iowa, and the 1925 one at Washington, DC. At this latter meeting, "eighteen states and Canada were represented by growers, seedsmen, experiment station men, and others interested in the industrial uses of the soybean and its products.

"The organization founded in 1920 had performed the pioneer work and had been of incalculable service to

the soybean industry in the United States, but by 1924 the leaders of the movement became aware of the enormous possibilities of a more highly organized association. The original organization required no dues, hence there were no funds to further the interests of the movement nor to take care of current obligations. Up to this period the little band represented the enthusiastic expression of interest on the part of experiment stations, colleges and several prominent soybean growers in an exceedingly promising experiment. The period of experiment was quite over, the soybean was beginning to receive the recognition it deserved, the time had come for a definite organization with definite aims and a clear cut policy.

"Accordingly the request was made that a committee be appointed and instructed to meet and draw up a constitution and by-laws to present at the annual business meeting to be held in Chicago, December 1, 1925. Four members of this committee, C.L. Meharry (Indiana), J.T. Smith (Illinois), Taylor Fouts (Indiana), and W.E. Ayres (Mississippi) prepared a tentative constitution and by-laws which was presented to and adopted by the Association at the 1925 winter meeting. The name was changed to 'American Soybean Association,' and the object of the Association was set forth in the constitution which may be found on page 15.

"The American Soybean Association met as a definite organization for the first time in the Mississippi Delta in 1926 where four days of meetings were thoroughly enjoyed by members. The 1927 meeting was held in eastern North Carolina, one of the oldest soybean producing sections in the country."

"With an increasing membership, a definite organization, and available funds [from $1 per year membership dues] the Association is now able to be of more value in presenting to the members through its annual reports the best available information relating to the practical and scientific phases of the soybean industry."

Note: This is the earliest document seen (Oct. 2012) which mentions that 'The National Soybean Growers' Association' was formed at this meeting in Sept. 1920 in Indiana. Address: USDA, Washington, DC.

611. Morse, W.J. ed. 1925. Preface: *Proceedings of the American Soybean Association* 1:7-8. Sixth annual field meeting. Held 1-3 Sept. at Washington, DC.

• ***Summary:*** "At a field meeting held at the Soyland Farms of the Fouts Brothers, Camden, Indiana, September 3, 1920, the American Soybean Association was founded. It was not until the sixth annual business meeting held at Chicago, Illinois, December 1, 1925, that a constitution and by-laws were adopted and the Association formally organized.

"Eight annual field meetings have been held, beginning 1920, in the following places: Indiana, Illinois, Missouri, Wisconsin, Iowa, Washington, D.C., Mississippi and North Carolina. The annual business meetings have been held in Chicago, Illinois, each year at the time of the International Livestock Exposition.

"The Board of Directors at a special meeting after the 1925 business meeting elected an editor to the Association. The publication of the reports of the meetings of the Association was discussed at the 1927 business meeting and it was voted that the editor be instructed to proceed with the publication of these reports in bulletin form as soon as possible.

The present volume includes brief reports and programs of the first five field meetings and thirty-five papers and addresses delivered at the field meetings of 1925, 1926 and 1927. Unfortunately we were able to obtain only seven of the eleven papers given at the 1926 field-meeting.

"The minutes and reports of the eight annual business meetings have in most cases been condensed. The Association is especially indebted to Mr. Charles L. Meharry and also Mr. Taylor Fouts for the early history of the Association, and for the minutes and records of the first business and field meetings. We are also indebted to Mrs. Bessie W. Gahn of the United States Department of Agriculture for the very full and complete reports of the field meetings of 1925 and 1927.

"The value of the soybean to American agriculture has now reached the point where there is need of a suitable medium for the publication of papers relating to the various phases of this important industry. The papers given at our field meetings discussing the many problems connected with the culture and utilization of the soybean should have prompt publication for the members of the Association.

"It should be the purpose of the Association to build a strong supporting constituency by largely increasing our membership. Attention is called to the directory giving the list of members with their addresses.

"In presenting the first publication of the Association to the members, the editor expresses the hope that errors and omissions may be few."

612. Wand, Frederick A. 1925. Feeding value of soy bean meal. *Staley Journal* (*Decatur, Illinois*) 9(3):5-7. Sept.

• ***Summary:*** Note: Soybean oil meal is a new product to feed compounders and to farmers. So in this article Staley is providing basic information about livestock nutrition, feed compounding, and soybean oil meal.

"The substances found in feed are grouped into six classes: proteins, carbohydrates, fats, mineral matter, vitamins and water. Every stock feeder and dairyman should know these classes; should know what part they play in the nourishment of the animal, and what common feeds will best supply them in the most economical form.

"Protein is of first importance. It is the element that is indispensable for repair of muscle and glandular tissue. Without protein growth would be impossible. Protein compounds taken as food are by the process of digestion

broken down into amino acids. The amino acids, derived from protein, constitute the great primary nitrogenous building material out of which the tissues of the animal body are built. Protein is usually the most expensive constituent of the ration, for feeds rich in this element are relatively scarce.

"As a source of protein, the soy bean and its products are among the best available material known at the present time. The high quality of the protein of the soy bean as a food element for sustaining life and promoting growth is testified to by the fact that in the Orient it has been used for human consumption for more than 5,000 years. The soy bean is the only source of protein in the diet of many Orientals. According to William J. Morse, B.S.A. Agronomist, United States Department of Agriculture, the protein of the soy bean compares very favorably with that of cow's milk. As shown by the percentage composition and comparison of the amino acids or the protein of the soy bean and cow's milk in the following table:

A table compares the content of 15 amino acids (such as glycine, valine, leucine, proline, lysine, etc.) in soybeans and in cow's milk.

"Osborne and Mendel (1917c) proved that the proteins of the soy bean, unlike those of other leguminous seeds thus far investigated, are adequate for promoting growth.

"Carbohydrates consist of starches, sugars, etc., and crude fiber. Starch constitutes a large proportion of the farm grains of the corn belt such as corn, oats and barley.

"The general term fats includes what are commonly recognized as fats and oils. These true fats and oils serve the same purpose in the animal body as carbohydrates; that is, they produce energy and fat.

"Mineral matter (or ash), is an essential in the growth of the skeleton. This element is present in all the vital parts of the body and in some unknown manner controls the life processes.

"Vitamins, which have been discovered only within the last few years, are as essential in the ration as the protein, carbohydrates, fats and minerals. Although their composition is as yet undetermined, it is known that they are indispensable not only for growth, but for healthy maintenance as well. They are present in feeds in smaller amounts than any of the above constituents but according to Dr. Charles V. Piper, the soy bean contains the two vitamins necessary to sustain life in higher animals including man.

"Livestock feeding experiments conducted by a number of agricultural experiment stations, emphasize the fact that the oil must be extracted from the soy bean before one can hope to obtain a satisfactory protein supplement for a livestock ration. Different methods are used in extracting oil from soy beans, Old process or hydraulic soy bean oil meal is made in the same manner as old process linseed oil meal. In the manufacture of new process or solvent soy bean oil meal, the oil is removed by some chemical solvent such as benzol.

"A third method is to remove the oil by what is known as an expeller. Whether the meal manufactured in this manner has a raw taste or a nut-like taste and odor depends upon the temperature developed while the oil is being extracted and this, in turn depends upon the moisture content of the beans, the lower the moisture content, the greater the friction and the higher the temperature.

"Experiments with soy bean oil meal have shown a wide variation in their worth for supplementing corn in a livestock ration. Feeding experiments indicate that the best grade of soy bean oil meal is obtained by the expeller process. According to results obtained at the Iowa, Indiana and Ohio experiment stations, this soy bean oil meal is superior in feeding value to linseed oil meal or cottonseed meal. The keeping quality of soy bean oil meal is far superior to that of other similar protein feeds.

"In an experiment conducted by the Ohio agricultural experiment station, soy bean oil meal obtained by expeller process was compared with tankage in a hog ration. In this experiment a mineral mixture consisting of ground limestone 1; Ucopco bone meal 1; salt 5; was self-fed to the hogs in both lots. The lot receiving soy bean oil meal made faster and more economical gains. This was due, no doubt, to the vitamins present in the soy bean oil meal which are not present in tankage. Figuring tankage at $60.00 per ton, the expeller processed soy bean oil meal had a replacement value at $57.15 a ton.

"Feeding experiments emphasize the need of having a mineral mixture placed in a self-feeder before hogs at all times. The Iowa Station recommends the following mixture, that pretty well balances the mineral shortcomings, may be made as follows: 20 parts common salt; 40 parts spent bone black, or finely ground bone meal, or steamed bone meal or rock phosphate or acid phosphate; and 40 parts finely ground, high calcium limestone or air-slaked lime, or wood ashes, or finely ground oyster shell or clam shell (all by weight); total 100 parts, plus one-half ounce of potassium iodide to each 100 pounds of the mixture, all thoroughly mixed together and placed in a self-feeder before the pigs.

"Purdue university has obtained some excellent results with a mineral mixture consisting of wood ashes 10 parts, 16% acid phosphate 10 parts, common salt part by weight. Finely pulverized limestone may be substituted for wood ashes.

"The Illinois experiment station uses a mixture consisting of ground limestone 2 parts; rock phosphate 2 parts; salt 1 part.

"Soy bean oil meal may he self-fed to hogs along with shelled corn and a mineral mixture, the feeds being placed in separate compartments in the self-feeder. When hogs are hand fed, feed about 4 pounds corn, ½ pound soy bean oil meal and 0.12 pound of mineral mixture per day.

Exact formulas, each containing soy bean meal, are then given for the following: Cattle feeding (2 formulas for steers

from Purdue University). Dairy cattle. Rations for Holsteins, Brown Swiss, and Ayrshires. Rations for Jerseys and Guernseys. Sheep feeding. Yearling wethers (Note: A wether is a castrated ram–a male sheep). Pregnant ewes (Note: A ewe is a female sheep). Ewes–suckling lambs.

"The foregoing facts indicate that the soy bean is a valuable product from which to obtain the elements necessary to balance feeding rations. The beans themselves contain more oil than is necessary and more than can be utilized for feeding. Consequently the economical process would be to extract the excess oil for commercial uses and utilize the residual cake or meal for feeding."

Note 1. The author's name is incorrectly spelled at the start of this article. It should be: Frederick A. Wand.

Note 2. This is the earliest English-language document seen (Oct. 2016) that contains the term "new process" applied to crushing soybeans. Formerly it had been applied to crushing linseed. Address: A.E. Staley Mfg. Co., Decatur, Illinois.

613. Morse, W.J. 1925. Re: Soybean convention at Arlington Farm. Letter [memorandum] to Dr. C.V. Piper, Washington, DC, Oct. 14. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Dr. Piper: Just recently, Mr. Butterfield, Superintendent of Arlington Farm, advised me that the expense in connection with the soybean convention at Arlington amounted to about $250.00. He was in question as to just how much of this expense in our office would be willing to bear. He suggested that he would be perfectly willing to go half with us on the proposition. However, in talking the matter over with him, I thought it might be well to take the matter up with Dr. Taylor and Mr. Alanson to see if there was not some fund in the Bureau or Department that could take care of the matter. It surely was a Department matter; in fact, a good advertisement for the Department and Bureau of Plant Industry, and I would think that some sort of fund would take care of the matter instead of having the entire expense come from one or two offices. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

614. Meharry, Charles L. 1925. Sixth annual business meeting: Chicago, Illinois–1925. *Proceedings of the American Soybean Association* 1:25-29.

• ***Summary:*** "The National Soybean Association met at 10:15 o'clock in the morning of December 1, 1925, in the Record Building, Union Stock Yards. President W.J. Morse was unable to be present and Vice-President J.L. Robinson presided. He reported to the meeting that it had been Mr. Morse's plan that as much time as necessary be given to the consideration of a constitution and by-laws for the organization and, therefore, no program as in previous meetings had been prepared. Mr. Robinson reported that invitations for the 1926 field meeting had been received from North Carolina, South Carolina and Mississippi at the field meeting held at Washington, D.C. A committee was appointed, consisting of Professor G.M. Briggs, Wisconsin, Mr. W.E. Riegel, Illinois, and Professor E.G. Churchill, Iowa, to make nominations for officers of the Association and to consider the invitations from the above three states.

"The Chairman of the Committee on Constitution and By-laws appointed by President Morse was called upon to make their report and suggestions.

"Chairman Charles L. Meharry, Indiana, reported that the Committee consisted of the following members: W.E. Ayres, Mississippi; H.S. Clapp. Virginia; F.P. Latham, North Carolina; Taylor Fouts, Indiana; John T. Smith, Illinois; and C.B. Newton, Ohio. Of these members, Mr. Newton declined to serve as he had discontinued the growing of soybeans for seed, and Mr. Clapp and Mr. Latham were unable to be present. The four members of the Committee present had worked on the problem and were ready to report their recommendations for a Constitution and By-laws. Mr. Meharry moved the adoption of the Constitution and By-laws as read, the motion was seconded. Mr. Robinson asked the members whether they cared to consider the document as a whole or article by article. It was moved, seconded, and carried that consideration be given the Constitution as a whole. The vote upon the motion resulted in a unanimous adoption of the Constitution and By-laws recommended by the Committee.

"Professor Briggs, Chairman of the Committee on Exhibition Standards reported that some progress had been made but that much more might be accomplished. The Committee's report was received and the Committee continued.

"Mr. I.C. Bradley, in charge of the soybean oil mill of the Funk Seed Company, was called upon to talk on the soybean industry."

"Mr. F.A. Wand, of the soybean department of the Staley Corn Products Company, discussed the price of soybeans as related to the extension of the soybean oil crushing industry. It was pointed out that the price to be paid by the oil mills was strictly limited by the price of their products. The color of soybean seed as related to the crushing industry was discussed and it was insisted that the manufacturers preferred a light-colored bean, preferably yellow. Mr. Wand stated that his company was not pushing the sale of soybean oil meal but was trying to develop a demand for soybean flour for human consumption. This would bring a much higher price for the product and, therefore, permit the manufacturer

to pay a higher price to the bean producer. He reported that the company had developed two new soybean products, namely: a core oil and a core binder which are used in the manufacture of iron and steel castings. These products create no dangerous gas or disagreeable odor and are very desirable from these standpoints. Mr. Wand discussed briefly methods of harvesting and the creating of central markets for beans. He spoke of the handling of beans by the Chicago Board of Trade and said that the Staley Company had been buying beans contracted for through this source.

"Professor J. Buchanan, Canada, discussed variety tests, methods of seeding and cultivation, and the introduction of a new selection known as O.A.C. No. 211, developed from the Habaro variety. He favored cultivation with the harrow and weeder, and emphasized the importance of cultivating when the weeds are small. It was stated that the best results were obtained from the row method of seeding.

"Mr. Justus Miller, Canada, spoke of the injury to their corn crop by the European corn borer and said their acreage of corn would need to be cut at least forty percent to check the depredations of the pest. He suggested that one of the chief substitutes for corn should be soybeans. Soybeans have proved successful in Ontario, and the O.A.C. No. 211 and Manchu varieties were most promising.

"Mr. C.W. Tabaka, Mr. W.E. Riegel and Mr. J.T. Smith of Illinois, spoke of their experiences in the use of the harvester-thresher combine. Mr. Tabaka reported there was very little waste and not nearly so much damage to the crop when this method of harvesting was used. A yield of forty-nine bushels to the acre was obtained on one of his fields of soybeans. Mr. Riegel reported threshing soybeans with the combine which showed 14.4 percent moisture. On the same day a neighbor using an ordinary grain separator had threshed beans which had been bound with a grain binder and shocked in the manner customary in Champaign County, Illinois, and these beans showed a moisture of 24.6 percent. The difference of more than 10 percent would probably make a very great difference in the way the seed of these two crops would keep in the bin. Mr. Riegel reported a very great saving of labor with the combine over the old methods of harvesting and threshing. Mr. Smith stated that he had successfully harvested soybeans, oats, wheat, clover, and timothy seed with the combine."

"The members in attendance were urged to join the new Association which is to be known as The American Soybean Association, and to pay their dues immediately in order to have a fund with which to publish a report of the Washington, D.C., meeting. The following persons were enrolled as members of the new Association: Walter Godchaux, G.M. Briggs, Taylor Fouts, W.E. Riegel, J.T. Smith, A.G. Obrecht, C.W. Tabaka, I.C. Bradley, W.E. Ayres, W. Ostrander, J. Miller, J.L. Robinson, and C.L. Meharry.

"The meeting adjourned about 12:00 noon.

"At a meeting of the Board of Directors, held after the adjournment of the regular meeting, Mr. W.J. Morse was appointed to edit the publications of the Association."

Note: The name "American Soybean Association" was first used officially at this meeting on 1 December 1925. Address: Secretary, National Soybean Assoc.

615. Piper, C.V.; Oakley, R.A.; Vinall, H.N.; Pieters, A.J.; Morse, W.J.; et al. 1925. Hay. *Agriculture Yearbook* (*USDA*) p. 285-376. For the year 1924. See p. 322. [4 ref]
• ***Summary:*** The section titled "Soybeans" states: "Like cowpeas, the production of soybeans is confined principally to the Eastern States (See fig. 27)... Unlike the cowpea, the soybean acreage has increased rapidly in recent years principally in the Corn Belt and adjoining States. The estimated acreage of soybeans in 1923 was 2,037,000. There were 794,000 acres of this total [39%] cut for hay, producing 1,155,000 tons. A large acreage of soybeans is interplanted with corn and pastured off when the crops have matured.

"Soybeans are not so sensitive to cool weather as are cowpeas and they succeed better on heavy clay soils... The plants are upright and are easier to harvest for hay than are cowpeas. The hay, although coarse, is relished by all kinds of livestock.

"Soybeans should be cut for hay as soon as the pods are formed. Not more than half of the roughage given to horses should be soybean hay, and in fattening steers the quantity should be limited on account of its laxitiveness. The extent of this laxative effect depends largely upon the quantity of beans which the hay contains. It is a valuable hay for growing stock and for dairy cattle it ranks just below alfalfa and red clover. It is considered second only to alfalfa as a roughage for sheep and goats. or hogs the value depends largely upon the content of the beans. Soybean hay cut early and cured properly may be fed to poultry with good results."

A map (p. 320) shows the acreage of annual legumes cut for hay in 1919. Each dot represents 2,000 acres. "The annual legumes, including cowpeas, soybeans, field peas, peanuts, and vetches, are most important in the Southeastern States. That portion of the crop cut for hay represents only a small part of the total acreage of these legumes." A photo (p. 322) shows soybeans being harvested for hay by a farmer on horse-drawn farm machinery. It notes that soybean hay is especially valuable as a feed for dairy cattle. Address: Bureau of Plant Industry, USDA, Washington, DC.

616. Morse, W.J. 1926. Re: Mr. L.L. Hidinger, Memphis, Tennessee, wants information about soybeans. Letter to Prof. C.V. Piper, USDA, Washington, DC, Jan. 15. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Dr. Piper: With regard to the request of Mr. L.L. Hidinger, Memphis, Tennessee, for information as to the best kind of soybeans that will grow on the Delta land on the Arkansas side of the Mississippi river, will say that the Laredo and Otootan have given the best esults for forage

purposes on this type of land. Last fall I had occasion to visit the Upper Delta of the Mississippi, which is directly across from the region referred to by Mr. Hidinger. Throughout the Upper Mississippi Delta and the Otootan and Laredo are grown very extensively for hay and give very high yields. It is noted that Mr. Hidinger does not look with favor on planting soybeans because of the high cost of the seed. Although Otootan and Laredo are selling from 7 1/2 to 10 dollars per bushel, it must be remembered that a bushel of either of these varieties will plant about 6 to 8 acres in rows. Throughout the Mississippi Delta all soybeans were planted in rows even for forage purposes. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

617. Westover, H.L. 1926. Re: Mr. Morse's baby son has died. Letter to Prof. J.C. Hackleman, Agricultural Experiment, Urbana, Illinois, Jan. 20. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Professor Hackleman: Mr. Morse has had the misfortune to lose a baby son and is so broken up over it that he will not be in the office for a few days. He asked me if I would attend to your letter of January 15 in which you request the material presented by Mr. Bradley in the soybean meeting.

"Mr. Morse has only one complete report of the meeting and he said that he would loan it to you for a short time. After you have had an opportunity to get the information you desire from this report, I wish you would kindly return it to him."

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. Box 12–Illinois-Indiana.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., Dec. 2012.

Note: W. Shurtleff asked W.J. Morse's granddaughter if she was aware of this death in the family. Joyce asked her mother, then replied (20 Dec. 2012).

"Yes, I did know about this, although I wasn't sure of the date. My mother remembers learning that she was going to have a baby brother or sister, but then her parents came home from the hospital and told her they couldn't find one they liked. When she was older her mother told her that the baby was stillborn and had his umbilical cord wrapped around his neck.

"We were both surprised that there would be references to it anywhere, although certainly my grandfather's coworkers would have known. It would be interesting to see the letter that referenced it. My mother is doing well, by the way. Enjoy the holidays. Joyce." Address: Associate Agronomist [Bureau of Plant Industry, USDA, Washington, DC].

618. Hackleman, J.C. 1926. Re: Sorry to learn of Mr. Morse's misfortune. Letter to Mr. H.L. Westover, Bureau of Plant Industry, Washington, D.C., Jan. 25. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Westover: Mrs. Hackleman and I are certainly very sorry to learn of Mr. Morse's misfortune. This was certainly a great shock to them. We have been wondering how old the baby was.

"Since I hate to write Mr. Morse for details, I wonder if you would be kind enough to give us some information when you find it convenient.

"I saw Mr. Miller this week, and got a copy of the report from him, so if you have not already sent Mr. Morse's report, you do not need to do so. If it does come in, we will return it immediately."

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. Box 12–Illinois-Indiana.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., Dec. 2012. Address: Dep. of Agronomy, Univ. of Illinois, College of Agriculture, Agric. Exp. Station, Urbana, Illinois.

619. Piper, C.V. 1926. Re: Where to purchase best soybean varieties for Beltsville station. Letter to W.J. Morse, [USDA], March 17. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Mr. Morse: Mr. Sheets [?] desires to purchase 200 bushels of soybeans for planting at Beltsville this spring. He would like to know where the beans can be purchased most advantageously and what varieties he should use. It would be well for you to get in touch with him, as I do not know exactly for what purpose he wishes the beans. Very truly yours,..."

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: Senior Agrostologist in Charge of Forage Crop Investigations [Bureau of Plant Industry, USDA, Washington, DC].

620. Morse, W.J. 1926. Re: Material for the Secretary of

Agriculture on his southern trip. Letter (memorandum) to Dr. R.A. Oakley, USDA, Washington, DC, March 22. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Dr. Oakley: With reference to the attached B.P.I. [Bureau of Plant Industry] Memorandum 204 from Dr. Taylor regarding material for the Secretary on his southern trip, the soybean, cowpea and velvet bean may offer some helpful suggestions. Practical experience and extensive investigations have shown that these leguminous crops are of the utmost importance in the greater development of southern agriculture.

"The cowpea is the best known legume in the South, and is used extensively for soil improvement, fed to livestock, as pasturage, hay or ensilage, and the seed used as human food. The velvet bean is especially valuable as a grazing crop of cattle and hogs in autumn and winter for soil improvement. It is doubtful if any other crop offers so many opportunities to southern agriculture as the soybean. It may be grown as a cash crop, for hay, pasturage, ensilage, oil and oil meal, human food and soil improvement.

"Attached herewith are brief articles giving data and possibilities of each of the above crops. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

621. Morse, W.J. 1926. Re: Material for the B.P.I. exhibit for the Sesquicentennial Exposition. Letter (memorandum) to Dr. R.A. Oakley, USDA, Washington, DC, March 24. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "Dear Dr. Oakley: With reference to the attached memorandum of March 11 from Dr. W.A. Taylor regarding the B.P.I. [Bureau of Plant Industry] exhibit for the Sesquicentennial Exposition, will say that we have here at the office the materials shown on the accompanying sheet labeled, 'Soybean Material for Exhibition Purposes.'

"In a recent letter from the Henry Bower Chemical Co., Philadelphia [Pennsylvania], I have been advised by Mr. Sydney Thayer, Jr., Assistant Secretary of this company, that they have been offered exhibition space at the above exposition, and it is stated that they have no chemicals that they could exhibit for public interest, but they have considered taking some small space to demonstrate the results of their work with soybean. It may interest you to know that this company has been conducting experimental work with soybeans for about one year now, especially as to the milk and flour products which can be made from the soybean. Mr. Thayer states that it occurred to him perhaps the Department of Agriculture would be represented with some sort of an exhibit, and that in our exhibit of soybeans we might include the products which they are interested in. It is further stated that if we were planning this soybean exhibit, they would be very glad to cooperate with us and furnish us any material that they may have to make the soybean exhibit a successful one. 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–General Correspondence, 1905-29. Box 92–Morgan-Morse.

Sent to Soyinfo Center by Matthew Roth of Rutgers Univ., March 2012. Address: Agronomist, Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

622. Vinall, H.N. 1926. Charles Vancouver Piper [Obituary]. *J. of the American Society of Agronomy* 18(3):295-300. March. [66* ref]

• ***Summary:*** This obituary contains the best biography of Charles V. Piper we have seen to date. An ex-president and recently elected Fellow of the American Society of Agronomy, he died on February 11, 1926 at Washington, DC, at age 58. He is survived by a wife, mother, three brothers, and three sisters. "The immediate cause of his death was uremic poisoning due to Bright's disease" [a kidney disease]. High blood pressure forced him to be careful in his work for several years before his death.

He was born on 16 June 1867 in Victoria, BC, Canada, one of the nine children of Andrew William and Minna (Hausman) Piper. After completing his common school education, he entered the University of Washington and received the degrees of Bachelor of Science in 1885, and Master of Science in 1892. In 1893 he went to Pullman, Washington, as Professor of Botany and Zoology in the Washington Agricultural College (now State College of Washington) and remained as head of the department until 1903. He married Laura Maude Hungate on 15 Sept. 1897. In 1900 he attended summer school at Harvard University (in Massachusetts) and earned an M.S. degree there.

In 1903 he went to work for the U.S. Department of Agriculture in Washington, DC. He was in charge of the Office of Forage Crop Investigations from the time of its organization as a separate unit in 1905 until his death.

"Mr. Piper was elected to two honor fraternities, Phi Beta Kappa and Sigma Xi, and was granted the D.Sc. degree by the Kansas Agricultural College in 1921. Besides the American Society of Agronomy, he was a member of the American Association for Advancement of Science, the Washington Academy of Science, the Biological Society of Washington, and the Botanical Society of Washington (President 1908-09). He was a member of the Division of Biology and Agriculture in The National Research Council,

and chairman of the Subcommittee on Crops in the Advisory Board from the American Society of Agronomy.

"In the death of Dr. Piper, agriculture and the biological science in general lost a most efficient worker. A survey of his life work indicates that he had an astonishing capacity for productive effort. In the last ten years of his life he was successfully discharging tasks that would ordinarily demand the time and energies of at least three men. He was administrative officer in charge of the Office of Forage-Crop Investigations, U.S. Department of Agriculture, and personally directed and carried on the experimental work with grasses and miscellaneous forage plants; chairman of the Green Committee of the U.S. Golf Association, and Editor of the Green Section Bulletin; Editor of the Agricultural Series of McGraw Hill books and of the agronomy division of Botanical Abstracts; and Associate Editor (Crops) for the *Journal of the American Society of Agronomy.* With all these duties demanding his attention, he found time to write an authoritative text book on forage crops and numerous scientific articles and papers relating to botany and agronomy.

"He was first and foremost a botanist, recognized all over the world for his broad knowledge of plants and their taxonomic relationships. His interest in biology in general was such, however, that his activities were not confined to systematic botany. He knew insects almost as well as he knew plants,..." "He became the proponent of many new agronomic terms and served as chairman of the standing committee on Agronomic Terminology in the American Society of Agronomy."

In 1911 at the request of the War Department, he spent 4½ months in the Philippines surveying forage crops potentially useful to army horses and mules. He returned via Java, India, Egypt, and Europe, collecting plants and seeds for the USDA and visiting botanic gardens and museums en route.

"In Dr. Piper's conduct of forage investigations his most spectacular achievement was his introduction of Sudan grass into the United States. Since 1918 it has been worth an estimated $10 million annually to the country.

His seven books include three, *The Flora of the Palouse Region* (1901), *Flora of Southeastern Washington and Adjacent Idaho* (1914), and *Flora of the Northwest Coast* in collaboration with R. Kent Beattie; *Turf for Golf Courses* (1917) in collaboration with R.A. Oakley; *The Soybean* (1923) in collaboration with W.J. Morse; and two of which he was the sole author, *Flora of the State of Washington* (1906), and *Forage Plants and Their Culture* (1914, 1924).

Between 1893 and 1926 some 51 botanical papers (all but one of which he was sole author) and 55 agricultural papers and bulletins were published. A detailed chronological bibliography of these is given (p. 298-300).

623. Rast, L.E. 1926. Soybeans in the Mississippi Delta: American Soybean Association holds meeting in delta and sees what crop will do. *Progressive Farmer* (*Mississippi Valley edition*) 41(35):855, 863. Aug. 28.
• ***Summary:*** Contents: Introduction. Soys build soils. Soys make good feed. Methods of harvesting.

Photos show: (1) A small oval portrait of L.E. Rast. (2) W.J. Morse "standing in a field of Biloxi beans."

624. Meharry, Charles L. 1926. Seventh annual field meeting: Mississippi–August 9, 10, 11 and 12, 1926. *Proceedings of the American Soybean Association* 1:129-32.
• ***Summary:*** "The Seventh Annual Field Meeting held in the Yazoo-Mississippi Delta, Mississippi was described as one of the most interesting, practical and constructive conventions ever held in the State of Mississippi."

On Aug. 9, in Clarksdale, Mississippi, at 8 P.M. "the growers assembled at the Elks Club and the meeting was called to order by President W.E. Ayres. The following program was presented:

"Welcome to Mississippi–E.L. Anderson, President, Clarksdale Chamber of Commerce.

"Welcome to Clarksdale–Arthur J. Mosely, Mississippi.

"The distribution of soybeans in the United States–W.J. Morse, United States Department of Agriculture.

"Producing soybean seed for the oil mills–C.B. Williams, North Carolina.

Soybeans for southern livestock–G.E. Templeton, Mississippi.

"On Tuesday, August 10, the growers left Clarksdale in tour of the State Penal Farm at Parchman. Along the way the attention of growers was called to various soybean fields ranging in size from 50 to 500 acres... The evening meeting was held in the auditorium of the Greenwood High School and the following program was presented.

"Welcome to Greenwood–Mayor W.K. Clements.

"The History and Development of the Delta–A.H. Stone, Mississippi.

"Soybeans in the Delta–C. G. Steele, Mississippi.

"The Evolution and Future of the Broadcast Soybean Harvester–H.S. Clapp, Virginia.

"The Row Harvester for Soybeans–F.P. Latham, North Carolina.

"Combines for Harvesting Soybeans and Other Crops–John T. Smith, Illinois.

"Machinery for Harvesting and Threshing Soybeans–I.P. Blauser, Illinois.

"Efficiency of the Combine for Soybeans and Wheat–W.E. Riegel, Illinois.

"Soybeans on Sugar Plantations–Walter Godchaux, Louisiana.

"On Wednesday, August 10, the growers left Greenwood at 8:30 A.M. for the Delta Experiment Station at Stoneville. En route many large fields of soybeans were seen, as well as several variety demonstrations. Arriving at the Delta Station

about 11:30 A.M., the visitors went over the station grounds to view the extensive field crop experiments. Luncheon with barbacued [sic] beef, mutton and pork, was served on the station grounds by the Rotary Club of Leland. After luncheon Dr. B.M. Walker, President of the Mississippi A.&M. College, delivered an address on 'The History and Development of the Mississippi A.&M. College and Experiment Stations.' Demonstrations were held in the fields with the Massey-Harris, International and Case Combines, a broadcast harvester, and several types of row harvesters. Following the demonstrations of machinery, the growers left for Greenville, inspecting enroute soybean fields and variety plots.

"The evening meeting was held at 8:30 in the Greenville Grand Theatre and the following program presented:

"Welcome to Greenville–J. L. Hebron, Mississippi.

"The Soybean Industry and United States Standards–J.E. Barr–United States Department of Agriculture.

"Soybeans and Corn in the Delta–E.C. McInnis, Mississippi.

"Soybeans on Ricelands–J.M. Jenkins, Louisiana.

"Soybeans in the Southeast–Paul Tabor, Georgia.

"Soybeans as an Economic Factor in Southern Agriculture–C.K. McClelland, Arkansas.

"The growers left Greenville at 9:00 A.M., August 12, for the Scott Plantation, Scott, Mississippi. En route various points along the Mississippi levee and several large plantations growing considerable acreages of soybeans were visited."

Photos show two events at the Delta Experiment Station, Stoneville, Mississippi, 11 Aug. 1926: (1) Dr. B.M. Walker, President Mississippi A&M College, addressing American Soybean Association Convention. The audience is seated on the grass under a large tree. (2) Demonstration of soybean harvesting with a combine in a field. Address: Secretary.

625. Morse, W.J. 1926. The distribution of soybeans in the United States. *Proceedings of the American Soybean Association* 1:132-37. Seventh annual field meeting. Held 9-12 Aug. in Mississippi.

• ***Summary:*** "The soybean, according to our earliest records, was first grown in the United States in 1804 and until about 1880 was considered chiefly as a curious plant from the Orient. Since about 1880, when the soybean was first looked upon as having agricultural possibilities, the crop has greatly increased in acreage, production and utilization.

"Available statistics show that about 500,000 acres of soybeans were grown in 1917 and more than 2,500,000 acres in 1924. The production of seed increased from about 3,000,000 bushels in 1917 to more than 9,500,000 bushels in 1924. The statistics for 1924 also show that about 1,200,000 acres were grown for hay, about 1,000,000 acres for pasturage and silage, and more than 500,000 acres for seed."

Note 1. This is the earliest document seen (June 2017) which states that about 500,000 acres of soybeans were grown in 1917.

Note 2. This is the earliest document seen (June 2017) which states that about 2,500,000 acres of soybeans were grown in 1924.

"What has been the cause of this marked increase in acreage and utilization of the soybean crop? The development of varieties, adapted to a wide range of conditions and uses, undoubtedly, has been one of the most important factors. The number of varieties has been increased extensively in the past fifteen years. Soybeans vary widely in their adaptation to climate and soil. Some varieties are especially suitable for fertile land, others for less productive land; some for a seed crop, others for forage; some for planting with corn for pasturage or silage, others for planting with sorghum or Sudan grass. One may, however, find a few varieties or even a single variety adapted to the climate of a certain section, which will fill all of the local requirements of the crop.

"Other factors, such as improved methods and greater use of inoculation, improved and more economical methods of planting, culture and harvest, and successful results in extensive feeding trials by experiment stations, without doubt, have played no small part in extending the popularity of the soybean. A careful study of the history of the development of the soybean in the United States shows, however, very clearly that increased acreage and utilization of the crop has followed increased development of varieties.

"At this point–for it fits well into a logical discussion of the adaptability and distribution of the soybean in our country–I wish to pay a brief tribute to a man, who, more than two decades ago, very frequently prophesied that the soybean would, in the not distant future, be one of our major farm crops, especially in the eastern half of the country. I refer to Dr. C.V. Piper of the Office of Forage Crops of the United States Department of Agriculture, who passed away last February. Dr. Piper was responsible for the many hundreds of introductions received from the soybean regions of the Orient. Not only was Dr. Piper interested in the development of new varieties, and he held this of the greatest importance, but he also urged a greater utilization of the soybean, as an oil crop, for human food in various forms, and a more general use for pasturage and forage purposes. We, of the Association, owe much to Dr. Piper, and I know of no greater tribute to the man than to carry on his work and fulfill his prophesy.

"Previous to 1907 not more than eight varieties of soy beans were grown in the United States. In the Southern States, principally North Carolina, was the Mammoth Yellow, and in the North–Indiana, Illinois, Ohio and a few sections in New England, Wisconsin, and Michigan–were the Ito San, Buckshot, Ogemaw, Black Beauty (Ebony), Medium Yellow (Midwest), and Medium Green varieties, all of which were quite limited in adaptation to soil and climatic

conditions, and to use. At the present time about forty-five varieties are handled by growers and seedsmen and the Mammoth Yellow is the only one of our early introduced varieties grown to any appreciable extent.

"The culture of the soybean is confined at present, almost entirely, to the eastern half of the country. The states, however, bordering the west bank of the Mississippi River are increasing their soybean acreage. The distribution and adaptability of the soybean, perhaps, will be more clearly understood if we draw a line from Canada through the center of North Dakota, South Dakota, Iowa, Kansas, and Oklahoma, which is about the 99th meridian west. Then from the Atlantic Ocean at the northern border of North Carolina let us extend a line west and along the northern borders of Tennessee, Arkansas, Oklahoma, New Mexico, Arizona, and take in the southern third of California. We now have the country divided into four sections, the northeast, southeast, northwest and southwest.

"Northeastern Section: The greatest increase in acreage and utilization has been in the northeastern section, especially in the Corn Belt area. As yet the soybean is not extensively grown in the New England States, and very little seed is produced, the seed for planting coming from the seed producing sections of Delaware, Ohio, Indiana, and Illinois. In this region the soybean is used mainly for pasturage, hay and ensilage, although considerable quantities of seed have been crushed during the past two or three years for oil and oil meal in the Corn Belt states. Food companies in this section have for several years manufactured special soybean flour products. Such concerns have increased to a considerable extent during the last few years. Soybeans are now being made into breakfast foods, soy flour, soy sauce, bean curd and special flour preparations for various purposes. Two of the most recent developments are the manufacture of soy sauce and bean curd. Soy sauce, especially, has found a very favorable and extensive market throughout the United States.

"We can divide this section into three regions, namely: northern, central and southern, basing the division on the maturity and use of the varieties most generally grown.

"Northern Region.–In this region, the Mandarin, Wisconsin Black, Minsoy, and Soysota will under normal conditions mature seed. For hay, pasturage and silage, later varieties may be used as full maturity of the crop is not essential. The forage varieties most generally grown are the Black Eyebrow, Ito San, Manchu, Wisconsin Black and Mandarin.

"Central Region.–Varieties for seed production are Ito San, Dunfield, Elton, Habaro, Manchu, and Black Eyebrow. For hay, silage and pasturage, the varieties generally used are Illini, Black Eyebrow, Peking, Wilson, Midwest, Mansoy and Virginia.

"Southern Region.–The most suitable varieties for seed are Illini, Haberlandt, Lexington, Mansoy, Midwest, Morse, and Dixie. The Ebony, Herman, Ilsoy Illini, Laredo, Peking, Wilson and Virginia are good forage varieties.

Southeastern Section: In the southeastern section we find the oldest and largest seed producing section of the country. For many years, North Carolina has led all other states in acreage and production of seed, the eastern counties being especially adapted to seed production. The acreage and utilization of the soybean is not so extensive as in the northeast region but with the new varieties being distributed indications are for a much greater utilization and increase in acreage. At the present time the soybean is used most extensively for pasturage and for hay. In years of surplus seed, the cottonseed oil mills of North Carolina have crushed more or less seed for oil and oil meal. With suitable varieties, the crushing of soybeans by southern cottonseed oil mills should become an important industry throughout the Cotton Belt states.

"In view of the fact that the varieties for the southeastern section are not so numerous and the lines of maturity not quite so marked as in the Northeast section, two divisions are sufficient–northern and southern regions.

"Northern Region.–Varieties suitable for seed production are the Dixie, Chiquita, Haberlandt, Herman, Mammoth Yellow and Tokio. The Laredo, Virginia, Goshen Prolific, Herman, Old Dominion, George Washington, Otootan, Tarheel Black, and Mammoth Brown and Biloxi are most generally grown for forage purposes.

"Southern Region.–The same varieties grown for seed in the northern region are also used in this region with the exception of the Biloxi, Otootan, and Barchet which are rather late and adapted only to the southern part for seed. For pasturage, hay and ensilage the same varieties are used as in the northern region" (Continued). Address: USDA, Washington, DC.

626. Morse, W.J. 1926. The distribution of soybeans in the United States (Continued–Document part II). *Proceedings of the American Soybean Association* 1:132-37. Seventh annual field meeting. Held 9-12 Aug. in Mississippi.

• ***Summary:*** (Continued): "Northwest Section: Extensive variety trials have been conducted throughout this region but with only successful results in the Willamette Valley in Oregon. Varieties as the Dunfield, Wea, Manchu, and a few unnamed early selections from Manchuria have given the best results for forage and seed production. Due to climatic conditions, it is doubtful if the soybean will be grown very much outside of Oregon. "Southwest Section: The soybean is of value in many of the irrigated sections of the southwest region as indicated by numerous variety tests. In the irrigated districts of California, especially the orange section and the river valleys of Arizona, the soybean has proved a valuable summer cover crop. In California, the Virginia variety has given best results while in Arizona, the Otootan and Laredo are used mainly. Variety tests in eastern New Mexico show that the soybean has possibilities for forage and seed.

"In California and Arizona the soybean seldom develops seed normally, although an excellent growth of forage is produced. This abnormal development of seed is undoubtedly due to the prevalence of extremely hot weather during the period when the seed is forming. Seed must be imported from the southeastern section. It is rather doubtful if the soybean will ever be extensively grown in this section, although continued research may find better adapted varieties and a solution of the seed development problem.

"I believe that doubt no longer exists as to the high value of the soybean and its products to American agriculture. It is not likely that the soybean will become one of our major field crops for forage purposes alone. It will, no doubt, continue to grow in importance as such but indications are that the future increase in acres will be largely for the production of oil and oil meal. Oil mills in the Corn Belt states and cottonseed oil mills in the Southern States have crushed fairly large quantities of domestic grown beans, and found ready markets for the oil and oil meal.

"Increased acreage and greater utilization of the crop have brought about more efficient methods and new or improved machinery in the handling of the soybean crop. The development of more economical methods of harvesting and threshing has been one of the serious problems in the production of soybean seed. Many types of machines are now available, ranging from the single row harvester and broadcast harvesters of the beater type to the combine harvester used in the harvesting and threshing of wheat and other small grains.

"Numerous state experiment stations have made extensive investigations of the different feeding problems of the soybean. Feeding tests of silage, hay, grain, pasturage, and oil meal have shown the high value of the soybean and its products for all kinds of farm livestock. Outstanding results in these experiments have been obtained from the use of mineral mixtures with the grain and oil meal, especially in feeding tests with swine and poultry.

"The soybean has advanced in the last decade from the place of a substitute crop to one of major importance. It is now grown in the regular rotation for hay, grain, pasturage, and with corn as silage. The many uses of the soybean in the manufacture of food products, oil and oil meal and the more general utilization for forage, pasturage, and ensilage point to the high potential value of the crop, and its greater agricultural development in America." Address: USDA, Washington, DC.

627. Horvath, A.A. 1926. The soybean as human food. *Chinese Economic Monthly* 3(9):392-400. Sept. [Eng]

• ***Summary:*** Contents: Introduction. 1. General ingredients [composition] of the various Manchurian beans. 2. Composition of some Japanese soybeans and of the common American varieties. 3. Value of the soybean as food.

Introduction: "The soybean is a plant of very early cultivation in China. Its use dates back to the beginning of China's agricultural age under the Emperor Shen Nung. It is mentioned in the *Ben Tsao Gang Mu* [*Pen-ts'ao kang-mu*], the ancient materia medica, written by Shen Nung himself in the year 2838 B.C. The celebrated dictionary of Sui Sham describes the plant under the name of *tchouan.* In another ancient dictionary, the *Kouang-ia* [*Guangya,* 230 AD], dating from the time of the Han dynasty, the soybean is called *ta-teou* [*dadou*], 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.*

Note 1. This brief history of the soybean in China (above) is largely borrowed from Piper and Morse. 1923. *The Soybean.* p. 36-37.

In numerous ancient books the philosopher Hamintze [Lord Liu An of Huai-nan], a prince of the Han dynasty, is given as the inventor of soybean curd. The soybean and the soybean curd (*tofu*) are mentioned in many of the ancient Chinese poems, as for example in the rhymes of the great poet Sou, of the 2nd century: 'The tender jade* gets perfumed by it in the kettle' and 'to boil the pea to milk and the seed to butter' (Li Yu-ying et Grandvoinnet)." (Footnote: *"The poet emphasizes the resemblance of the fresh *tofu* with jade.")

"In 1921 China produced 80 per cent of the world's soybean production, 70 per cent of the latter being harvested in Manchuria. The 1921 crop of soybean in Manchuria was approximately 4,500,000 tons. The total acreage of soybean in the three provinces was 8,000,000 acres, covering 25 per cent of the total cultivated area."

In the section titled "General ingredients of the various Manchurian beans," four long tables give the nutritional composition of some of the roughly 500 different varieties of Manchurian soybeans, including black soybeans. The Chinese names of the varieties are given. Most of the analyses were conducted by the South Manchuria Railway Co. Table 1 gives the names (all are Chinese names), composition (water, fats, and protein) of 26 Chinese soybean varieties. The averages are: Water 8.60%. Fatty substance 19.90%. Protein 42.84%.

Table II gives the composition of 15 soybeans grouped by color, including the Chinese name, place of production, water, protein, fat, carbohydrates, fibrous tissue, "ashy substance," and analyst (incl. Fengtien Experimental Farm, Mantetsu Experimental Farm, and Mantetsu Central Exp. Farm). "Generally speaking, yellow beans are richest in protein and fat, especially the latter, then comes green beans with black beans last.

In Table III the "Kung Chu Ling Experimental Station classified the different kinds of yellow soybeans produced in Manchuria by the colours of navel [hilum] and compared their chemical composition. No significant differences were found. Table IV shows the composition of mixed soybeans stored in Manchuria during 1919 and 1920. A Manchurian

grading system is described based on five factors: Shape and size (15 points), weight of 1 *sho* (10 points), lustre (15 points), dryness (25 points), purity (cleanness) (30 points). Soybeans receiving a score of 90-100 points are graded as a Special Class, those with 80-90 points as First Class, and those with 70-80 points as Second Class (Nakao and Usami). This table shows the average composition to be: water 8.5%, fatty substance 18%, protein 40%, soluble non-nitrogenous substance and fibrous tissue 28%, ashy substance 5.5%. The higher grades contain more oil and protein.

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 water content averages 16.47%, the protein content ranges from 39.34 to 36.86% (average 37.62%), and the fat content ranges from 19.08 to 17.86% (average 18.66%). Table VI gives the composition of six leading American soybean varieties: Mammoth, Ito San, Haberlandt, Guelph, Midwest, and Kingston. The water content averages 7.74%, the protein content ranges from 36.59 to 32.99% (average 35.00%), and the fat content ranges from 22.72 to 18.96% (average 20.37). Note that the Hokkaido soybeans contain more than twice as much moisture, 7% more protein, and only 91.6% as much fat.

The section titled "The value of the soybean as food," states: "One of the certain evidences that the soybean is making god headway in the Occident is the fact that about 10 years ago [during World War I] the French army replaced a large portion of the meat powder in the army ration pottage by soybean products, and has used it in several forms as part of the regular ration. Germany and Austria also tried to compensate the poor protein diet of their army and population during the Great War by using soybean products."

"The soybean contains a double amount of the protein and of calories present in beefsteak. Therefore, in Peking, where the retail price for soybean in 1925 averaged 4 cents (Mex.) per one pound, half of a pound, costing 2 cents, may provide for an adult the necessary protein minimum, which otherwise would have to be purchased in the form of one pound of meat, costing at least 20 cents. According to Li Yu-ying, author of the well-known monograph (in French), 'Le Soya,' and now connected with the Kai Cheng Bean Products Company in Peking, the market prices for an equivalent of 100 calories in soybean were, in Paris in 1912, thirty times cheaper than for the same 100 calories in beef." In Germany, Ehrhorn (a well-known soybean food specialist, formerly of the Aguma factories in Harburg, Germany) calculates that 500,000 tons of soybean residue [meal and cake] are available every year. Soybean protein in Germany is now 25 times cheaper than beef protein. In China, where undernutrition is found on a large scale and famine is a common occurrence, soybean cake is used mainly as a fertiliser for rice fields and sugar plantations–rather than as a low cost source of protein. Numerous famine relief committees in China "have come to the conclusion that one key to the famine relief problem in China is to stop the waste of precious soybean cake for fertiliser." Note 2. This is the earliest English-language document seen (Nov. 2002) that uses the word "undernutrition."

Reprinted in 1927 as part of an 86-page monograph titled "The Soybean as Human Food" (Peking, China).

Note 3. This is the earliest document seen (May 2011) in which Dr. Horvath gives his title as "M.D.

Note 4. This is the earliest document seen (June 2013) that mentions the soybean variety Kanro, or any other large-seeded variety–but only outside the United States. Address: M.D., Peking Union Medical College, China.

628. Morse, W.J. 1926. Re: Sending soybean and cowpea varieties. Letter to Dr. Henrique Lobbe dated 28 Sept. 1926. In: Henrique Löbbe. 1942. Cultura da soja no Brasil. 6a ed. [Culture of soybeans in Brazil. 6th ed.]. Rio de Janeiro, Brazil: Serviço de Informaçao Agrícola, Ministerio da Agricultura. 35 p. See p. 9.
• ***Summary:*** "Dear Dr. Lobbe (c.o. Hotel McAlpin, New York, N.Y.): "In accordance with a promise made to you on your visit to Arlington Farm, I am taking pleasure in sending you one ounce each of the following varieties of soybeans, and one ounce each of the following varieties of cowpeas:

Soybeans: Haberlandt, Minsoy, Ilsoy, Mammoth Brown, Ito San, Sooty, Yokoten, Mandarin, Midwest, Merko, Hongkong, Virginia, Wea, Easycook, Barcher [Barchet], Ebony, Hahto, Chiquita, Dixie, Medium Green, Laredo, Hoosier, Aksarben, Wilson-Five, Brooks, Mikado, Sherwood, Mammoth Yellow, Morse, George Washington, Habaro, Old Dominion, Peking, Austin, Goshen, Prolific, Chestnut, Jet, Hamilton, Dunfield, Arlington, Wellmann, Hermann, Tokio, Southern Prolific, Lexington, Tarheel Black, Pinpu."

"As you may know, when we sent out seed shipments to foreign countries, it must pass through our Inspection House first. I, personally, took the seed to the Inspection House today, and they promised to rush it through..."

"As yet, I have not had an opportunity to look up the photographs which you desire of the farm and some of the crops... I appreciate very much indeed your kindness for the seed which you gave me, and also the publications relating to certain forage crops." Morse regrets that his is unable to send the variety *Stizolobium* [later renamed "velvet bean"] since he is presently out of seed.

Note: Dr. Lobbe is a soybean expert in Brazil. Address: Agronomist, Forage Crop Investigations, Bureau of Plant Industry, Washington, DC.

629. Schwietert, H.J. 1926. Many at soy bean convention. *Illinois Central Magazine.* Oct. p. 44-46.
• ***Summary:*** Contents: Introduction. Many varieties grown. Second evening at Greenwood. Rice-growing touched upon.

Photos show: (1) "Two national soy bean experts. Prof. C.K. McClelland of the State Agricultural College of Arkansas (left); Prof. W.J. Morse, U.S. Department of Agriculture, Washington, D.C. Prof. McClelland originated the Otootan soy bean and Prof. Morse propagated the Laredo soy bean. These two men have produced most of the profitable soy beans now grown." (2) "Some of the notables who attended the American Soy Bean Convention," including W.E. Ayres, C.K. McClelland, E.P. Latham, and W.J. Morse. (3) "Soy bean delegates eating barbecue dinner at the State Farm, Parchman, Mississippi." (4) "A group of delegates watching the work of threshing soy beans at the Delta Experiment Station." (5) Dr. Fox, W.E. Ayres, and E.P. Latham. (6) "A block of corn and Laredo soy beans, grown on the land at the Delta Experiment Station, Stoneville, Mississippi." (7) Laredo soy beans and Van C. Henderson, grower (left); H.J. Simmons with Virginia soy beans, Mosby corn (right). Address: General Development Agent, Illinois Central R.R.

630. American Soybean Association. 1926. Pictures of the Yazoo-Mississippi meeting (Leaflet). 1 p. Single sided.
• ***Summary:*** Contains seven photographs (with captions) reproduced from Schwietert, H.J. 1926. "Many at soy bean convention." *Illinois Central Magazine.* Oct. p. 44-46. Address: General Development Agent, Illinois Central R.R.

631. Horvath, A.A. 1927. The soybean as human food. *Chinese Economic Journal* 1(1):24-32. Jan. [17 footnotes. Eng]
• ***Summary:*** Contents: The whole soybean as food: Immature or green soybeans, mature or dry soybeans, the digestibility of the boiled soybean seeds, boiled soybeans as a food of predominant importance in China, soybean coffee, soybean chocolate, soybean sprouts.

Concerning mature or dry soybeans: "In China the green seeded variety is soaked in fresh water or salted water and roasted, the product being eaten after the manner of roasted peanuts. In Japan the black soybeans are used chiefly for cooking, with sugar and soy sauce; the green variety is also used in this way, either in the fresh state or after being dried (Oshima). Generally speaking, the use of whole soybeans has not been attended with much success either in the Orient or Western countries, because, with the ordinary method of cooking, they remained hard and unpalatable. It has been found that cooking at a temperature somewhat above boiling breaks up the cellulose structure and develops a richness of flavor that is not obtainable at the lower temperature. Although this result can readily be secured in high pressure steam cookers [pressure cookers], the problem is to know how to accomplish this with ordinary household equipment."

Dr. J.H. Kellogg cooks the beans in a saturated solution of salt at about 107ºC. "The method of Durand does not require a special jar. The soybean seeds are soaked overnight in salt water and boiled in fresh water to which some sodium bicarbonate is added. If the foam is not allowed to flow over, the seeds will be ready for consumption in two hours. Lachaume claims that the removal of the skin of the beans after five minutes of immersion in hot water increases markedly the speed of boiling.

"Experiments by the Office of Home Economics, U.S. Department of Agriculture, and by the home economics departments of many colleges, have shown that mature or dry soybeans can be used satisfactorily after the manner of navy or other beans. Soybeans are very palatable. The lighter colored varieties, yellow and green, are best for food, as the dark ones usually have a stronger, less pleasant taste [sic]; some of the light brown varieties have a very agreeable flavor. Because of their high fat content and compactness, most varieties of soybeans do not cook soft as readily as the navy or field beans. The method of cooking, however, may cause the beans to remain hard and tough. If cooked properly, soybeans do not require much longer soaking and cooking than ordinary beans. One variety, the Easycook, has been found by the U.S. Department of Agriculture to cook fully as soft as the navy bean in less time after the preliminary soaking of 12 hours."

"Professor Haberlandt, the soybean pioneer of Central Europe, fifty years ago prepared a nourishing food, mixing boiled soybeans with potatoes or rice. This food was called *sojenta,* in analogy to the name of the Italian national food, *polenta.* At present in Central Europe boiled soybeans are mixed with boiled potatoes in the proportion of one to two, to which are added table salt and onions. Boiled soybeans may be also added to cereal gruels. In this way a food is obtained which is rich in protein and fat, and which can be completely substituted for products of animal origin.

"The digestibility of the boiled soybean seeds is, according to Lipsky, 80.5 per cent for protein and 80.8 per cent for fat. Goessman's figures of digestibility for protein and fat are on the average 90 per cent (Li Yu-ying). Oshima conducted two digestion experiments, which continued for three days. The diet consisted of cooked dried beans (outer skin not removed), eaten with a considerable amount of sugar and some shoyu (soy sauce). The per cent digested was: protein, 61.8-69.1 per cent; fat, 34.7-37.8 per cent; and carbohydrates (including fiber), 81.4-89.9 per cent."

"Liebig said that the method of preparing the food is of no less importance than its chemical composition. According to von Noorden and Salomon, the proteins of the beans give with calcium an insoluble compound; that is why hard water (rich in calcium) cannot be used for the boiling of leguminous seeds. It makes them hard and kernelly. If soft water is not available, it is necessary to add a little sodium bicarbonate, which precipitates the calcium salts. Richter demonstrated that from peas (the proteins of which behave toward calcium like those of the soybean) boiled in soft water, 10.2 per cent of the nitrogen and 19 per cent of the

ash were eliminated in the stools. If boiled in hard water (the method of cooking remaining the same) the corresponding values for protein and ash in the stools were 16.6 and 42 per cent.

"The digestibility of the soybeans depends largely on the thoroughness of cooking and also on the state of division. The protein of boiled beans eaten as such is digested to 60 per cent, but if given in a state of fine division (puree) it rises to 90 per cent."

"According to von Noorden and Salomon: 'It will be correct to connect a satisfactory digestion of food with the presence and co-operation of a corresponding bacterial flora and it makes it clear why, especially in leguminous seeds, habit plays such a large and evident role.'"

"The water in China is known to be hard as a rule and this may be the chief reason why the Chinese are not using boiled soybeans in a noticeable amount. If soda [a natural product of China, being collected in Mongolia from soda lakes] were used in China for boiling the soybean seed soft, thus doubling the digestibility, it may revolutionize the nutrition of the Chinese population" (p. 31-35).

Concerning soybean coffee (p. 30-31): "During the period of the Civil War in America, the soybean was extensively used in the southern states as a coffee substitute. For a considerable time seedmen sold the Ito San variety under the name of Coffee Berry and Coffee Bean (Piper & Morse [1923]). Soybean coffee has been used in Western Europe, in Switzerland, and in the Alpine Provinces of former Austria since the introduction of the soybean to Europe. Horvath [probably the writer's father], 50 years ago [i.e., about 1877], was the first to prepare soybean coffee for the market in South Russia. In 1913 Marschner (Bohemia) put on the market a soybean 'coffee without caffein' [caffeine] under the trade mark 'Santosa.' In Germany, Fischer and Follmann (Dresden) also manufactured soybean coffee for the market... In China an 'artificial bean coffee' is prepared by the Kai Cheng Bean Products Company, Peking. (Note: Li Yu-ying is connected with the company). It is claimed to be 'a good substitute for real coffee, cures constipation, and improves the appetite."

Concerning soybean chocolate (p. 31): "In recent years the demand for cocoa has risen sharply and the supply has run short... Li Yu-ying's soybean products factory in the vicinity of Paris* succeeded in preparing a chocolate from soybeans, sugar, and cocoa butter. The chemical composition, the aspect and the taste are close to that of real chocolate (Footnote: *"Formerly *L'usine de la Caseo-Sojaine* [*Caséo-Sojaïne*], now *Société Française pour l'exploitation du soja et de ses dérivés,* 48 Rue Denis-Papin, Les Vallées-Colombes.)" Note: This is the earliest document seen (July 1996) that mentions Li's *Société Française...*

Concerning soybean sprouts: "Soybeans soaked in water and allowed to sprout are much relished as a vegetable by the Chinese." One kg of soybeans yields about 4 kg of sprouts. The yellow- or green-seeded varieties are generally used for growing sprouts.

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.

632. *New York Times.* 1927. Department of Agriculture scouts scour the world for useful horticultural specimens. March 27. p. XX8.
• ***Summary:*** "P.H. Dorsett, a department explorer, returned recently from a 2½ year trip through China, the tropical islands of Sumatra, Java and Ceylon, where he collected new varieties of wheat, barley, soybeans and mungbeans. He obtained, with the help of B.W. Skvortzow, a Russian botanist at Harbin, Manchuria, what is regarded as the best collection of soybean varieties ever brought to the United States." Many varieties on the roughly 4,000,000 acres now grown in the USA are the result of previous introductions by plant explorers.

Note 1. This is the earliest English-language document seen (Dec. 2012) that contains the word "mungbean" (or "mungbeans").

633. 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).

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 (Aug. 2013) 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 (Aug. 2013) 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 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.

634. Ayres, W.E. 1927. Eighth annual field meeting. North Carolina, August 9, 10, and 11, 1927. *Proceedings of the American Soybean Association* 1:159-61.
• ***Summary:*** "In arranging the program for the Eighth Annual Field Meeting of the American Soybean Association, the committee in charge set aside practically all of the time for automobile tours through the soybean sections and other interesting parts of eastern North Carolina.

"The members and guests of the Association gathered at Washington, North Carolina, August 9th, where they registered and were assigned to rooms."

"On the second day, August 10th, the members left Washington, North Carolina at 8:00 a.m. for a tour through historic Beaufort and Hyde Counties. Hyde County is said to be the original home of the soybean in the United States and for many years has been the leading soybean producing county in the country."

"A very interesting motion picture 'Soybeans at Home Ä Manchuria,' was shown by Mr. Dorsett who secured the pictures during a trip of exploration in China and Manchuria."

"After lunch a demonstration was given of several types of soybean harvesters manufactured in North Carolina and used quite extensively in the seed producing sections of the Southern States. Following the demonstrations of the harvesters, a tour was made of selected soybean fields and soybean variety demonstrations in the territory immediately surrounding Elizabeth City."

Detailed summaries of the many papers presented are given on pages 162-90. Address: Secretary-Treasurer.

635. Dorsett, P.H. 1927. Soybeans in Manchuria. *Proceedings of the American Soybean Association* 1:173-76. Eighth annual field meeting. Held 9-12 Aug. 1927 in North Carolina.
• ***Summary:*** "Mr. W.J. Morse, soybean specialist of the United States Department of Agriculture, is responsible for my being with you on this occasion, and I am delighted that such is the case, for it affords me an opportunity to learn a great deal about the progress of the soybean industry in America. You will also have to hold Mr. Morse responsible for the valuable time I consume, not only in connection with the few remarks I have to make concerning our agricultural explorations in the Orient, but also that taken up in showing you the motion pictures we secured of the Chinese practices employed in the growing and handling of this important crop in Manchuria.

"On account of our personal friendship for Mr. Morse, supplemented by his enthusiastic letters about the success of the soybean at home, we were impelled to give this crop special attention. We not only made observations and notes and secured seed samples where possible, but also visualized as best we could by means of still and motion pictures, the methods and practices followed in the growing and handling of soybeans in Manchuria, a country which leads the world in their production.

"Manchuria, in extreme northeastern China, is embraced practically between the 39th and 53rd degrees North latitude. Between these same lie the portions of the United States north of an imaginary line passing Carson City, Nevada; Colorado Springs, Colorado; Kansas City, Missouri; and a little south of Baltimore, Maryland. The natural features of the two regions are, in many respects, quite similar, and on this account, it is logical to expect that much of the plant material in our two-and-a-half years' explorations of northeastern China may find a congenial home throughout the region noted, and it is hoped, after naturalization, that some of them may prove not only interesting, but also of real value and economic importance to American farmers.

"The total area of Manchuria is given as 365,000 square miles, and its cultivated area as something over 27,000,000 acres. It is estimated that of this amount something like 8,000,000 or 9,000,000 acres are devoted to the cultivation of soybeans.

"The soybean is the cash money crop of the country. The yield from the immense acreage planted is handled primarily as a grain crop for export and crushed for oil and bean cake. Almost the entire output of bean cake is consumed in Japan for fertilizer. The climate of Manchuria is classed as 'continental' The country is subject to decided extremes of temperature, with hot summers and long, severe winters, the mercury sometimes falling 40 to 50 degrees Fahr. below zero.

"Manchuria has been classed as the 'Garden Spot of China' and also as 'The most favored spot for agriculture in the Far East.' From our observation and experience in connection with our work of general agricultural explorations from Shanghai almost to the Mongolian border, we feel safe in saying that it surely is a land of opportunity with very great potential possibilities.

"The principal staple farm crops of Manchuria and their yield as given for 1920 areas follows:"

A table shows:

"Kaoliang, a species of sorghum, 6,730,000 tons.

"Millet 5,128,900 tons.

"Soybeans 3,789,500 tons.

"Corn 1,724,000 tons.

"Barley 1,552,000 tons.

"Wheat 1,093,100 tons.

"Small beans, primarily mung beans, 361,200 tons.

"Seeing is believing, but as it is quite probable that few, if any, of you have visited Manchuria and seen for yourselves, you will have to take my word for it that all of the above crops, as well as all others grown, are harvested with a small harvest hook, threshed with rolling stones, and cleaned by the wind.

"Through the cooperation of American government officials, Chinese authorities, fruit growers and farmers, and especially that of Prof. W.E. Chamberlain, then in charge of the agricultural work of the Peking University, we were successful in securing a fine collection of seed and plant material from Peking and vicinity for trial in America. In Harbin, Manchuria, we not only had the cooperation and assistance of those in the same walks of life, but also that of Russian scientists, scientific institutions, the Chinese Eastern Railway, and the Postal Commissioner and his assistants.

"The officials of the Chinese Eastern Railway supplied us with a special car, without expense either for the car and attendant or for transportation. In this car we were sidetracked at the stations along their lines in the regions where we wished to explore, and, using it as headquarters, worked out into the country in any direction. When our work there was finished, we were taken to another station and repeated the operation. By this means we were able to visit localities and to accomplish results which, under the existing conditions, otherwise would not have been possible.

"The Postal Commissioner and his assistants at Harbin became interested in our undertaking and worked hand in hand with us in our endeavor to obtain four ounce samples of seed of four of the staple farm crops of Manchuria:–wheat, barley, soybeans and mung beans. The first two are staple crops in America and the other two are promising new crops of very great economic importance. Through this channel seed samples were secured from the majority of the five hundred rural post offices scattered through the two north provinces of Manchuria–Kirin and Heilung Kiang [Heilongjiang]. The expense to our Government, incident to securing this collection of upwards of 1200 to 1500 seed samples exclusive of postage, was a bill from one Chinese farmer for 14 cents Mex., about 7 cents in United States gold.

"Through the activities of the officials of the Manchurian Research Society, which is supported by the Chinese Eastern Railway, we obtained something over 500 seed samples of commercial soybeans, from their railway stations in the principal soybean-growing sections in North Manchuria.

"The value to the farmers of the United States of this large collection of something like 1500 numbers of soybean introductions, from nearby and far-distant regions of northeastern China, remains for Mr. Morse's work and the future to determine, but we hope for the best and sincerely trust that some of them will prove to be of economic importance. As to the interest and value of the motion pictures visualizing soybean production in Manchuria, its native home, which will now be shown, it remains for you to judge." Address: United States Dep. of Agriculture.

636. Dorsett, P.H. 1927. Soy beans at home–Manchuria (Color motion picture). *
• ***Summary:*** Proceedings of the American Soybean Association. 1927. Aug. p. 159-61. "A very interesting motion picture 'Soybeans at Home Ä Manchuria,' was shown by Mr. Dorsett who secured the pictures during a trip of exploration in China and Manchuria."

Note: We do not know the length of the film in minutes. It was probably in black-and-white–not color.

637. 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 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.

638. *Proceedings of the American Soybean Association.* 1927. Directory of the American Soybean Association. 1:191-92. Eighth annual field meeting. Held 9-12 Aug. in North Carolina.
• ***Summary:*** The 146 members are listed in alphabetical order by last name, with a city and state for each. There are members in the following states, listed here in descending order of number of members: North Carolina (27 members), Indiana 27 (incl. M.S. Blish, Seymour [probably of the Blish Milling Co.]), Mississippi 22, Illinois 14, Louisiana 11, Missouri 6, Ohio 5, Tennessee 5, Virginia 5, Georgia 4, Canada 3 (all in Ontario: John Buchanan, Guelph; Justus Miller, Essex; S.B. Strothers, Essex), Iowa 3, Arkansas 2 (incl. A.H. Hermance, Kingston; C.K. McClelland, Fayetteville), DC 2 (J.E. Barr and W.J. Morse), South Carolina 2 (T.O. Epps, Kingstree; G.J. Wilds, Hartsville [Note: Wilds was a soybean breeder with Coker Pedigreed Seed Co.]), Wisconsin 2 (G.M. Briggs, Madison; E.J. Delwiche, Green Bay), Alabama 1 (M.S. Pearson, Beatrice), Kentucky 1 (H.H. Givin, Napfor), Nebraska 1 (C.B. Turner, Grand Island), New York 1 (Margaret Simmons, Long Island City), New Jersey 1 (G.A. Mitchell, Vineland), and West Virginia (T.E. Odland, Morgantown).

Note: This is the earliest directory seen listing all members of the American Soybean Association. Membership dues are now $1 per year. It may also be the only such directory.

639. Morse, W.J. 1927. Soybean variety registration. *Proceedings of the American Soybean Association* 1:14.
• ***Summary:*** "At the annual meeting of the American Society of Agronomy held in Washington, D.C., November 1926, the society approved a general plan for the registration of varieties of merit of other agronomic crops when such registration appeared desirable to the members of the Committee on Varietal Standardization.

"Investigators of soybean improvement asked for the appointment of a committee to register soybean varieties. With the approval of the President of the Society, A.G. McCall, the following sub-committee has been appointed: W.J. Morse, Chairman, Washington, D.C. C.M. Woodworth, Urbana, Illinois. J.W. Zahnley, Manhattan, Kansas.

"The actual details of registration will be handled by M.A. McCall of the Office of Cereal Crops and Diseases, U.S. Department of Agriculture, who will act as registration officer." Address: USDA, Washington, DC.

640. Morse, W.J. 1927. Soy-bean output increasing in United States. *Yearbook of Agriculture* (*USDA*) p. 671-73. For the year 1926.
• ***Summary:*** "Although introduced as an unknown immigrant from the Orient many decades ago, not until recently has the soy bean won a recognized place in the cropping system of American farmers. The great interest shown in the soy bean and its products and the largely increased acreage and production during the last decade indicate that it is destined to become a crop of considerable economic importance in the United States.

"In 1917 less than 500,000 acres were devoted to soy beans for all purposes. In 1924 there were 2,500,000 acres, of which about 1,000,000 acres were grown for hay, about 1,000,000 acres for pasture and silage, and more than 500,000 acres for seed production. About 2,283,000 bushels of seed were produced in 1917, while in 1924 nearly 10,000,000 bushels of seed and 1,360,000 tons of hay were produced. Although the increase in acreage has been general over the eastern half of the United States, the most marked increases have been in the Corn Belt States and in a few of the Southern States. In 1924 the five leading States for total acreage were Illinois, 747,000; Missouri, 400,000; North Carolina, 255,000; Indiana, 210,000; and Tennessee, 167,000; and for seed production North Carolina, 2,560,000 bushels; Illinois, 1,548,000 bushels; Missouri, 1,379,000 bushels; Ohio, 728,000 bushels; and Indiana, 650,000 bushels. The soy bean can now be grown successfully in any climate suitable to corn or cotton. The Department of Agriculture during the past 10 years has developed, through introduction and by breeding methods, varieties which have extended the range of profitable soybean culture far beyond what were at first considered its limits. The principal uses of the soy bean are hay, pasture, silage, grain, oil and oil meal, and human food. With such a wide range of uses the production of the soy bean is no longer localized and its increasing importance is assured.

"Gaining Favor as Forage: As a forage crop alone, it is not likely that the soy bean will become a major field crop in the United States. However, even as a forage crop it has gained steadily in favor as indicated by the increased acreage from year to year. The forage is preserved either as hay or silage, or cut and fed green as soilage. It is also pastured extensively with sheep and hogs. Not infrequently, the soy bean is employed as a green manure or summer cover crop

in orchards. Unlike most other legumes the seed is rich in oil which makes the soy bean an important source of vegetable oil. Although the soy bean will no doubt continue to grow in importance as a forage crop, indications are that the future increase in soy bean acreage will be largely for the production of oil and oil meal. During the past few years, oil mills in the Corn Belt States and some of the Southern States have crushed fairly large quantities of domestic beans, and found ready markets for the oil and oil meal.

"Soy-bean oil is used largely in the manufacture of soaps, paints, varnishes, linoleum, enamels, lubricating oils, printing ink, waterproof goods, salad oils, and substitutes for rubber, lard, and butter. The oil has now an important place in the world's trade and commercial utilization of vegetable oils. The cake or oil meal remaining after the oil is extracted is a highly concentrated and nutritious feed, and is relished by all kinds of livestock.

"As an article of food, the use of the soy bean in the United States has been very limited. For many years a few food companies have manufactured special soy-bean flour products. The number of such concerns producing soy-bean food products has increased to a considerable extent during the last few years. Soy beans are now being made into breakfast foods, crackers, wafers, soy sauce, bean curd, soy flour, and special flour preparations for various purposes. One of the most recent developments is the manufacture of soy sauce and bean curd from domestic grown beans. This has been found a most profitable industry in some parts of the Corn Belt, and soy sauce has now a fairly extensive market in the United States.

"Improved Production Methods: Increased acreage and greater utilization of the soy bean have brought about improved methods in planting, culture, and harvesting. Implement manufacturers, who in the past took no interest in the soy bean, are now actively engaged in a study of the planting, cultural, and harvesting problems of the crop. The development of an efficient method of harvesting the seed crop has been one of the serious problems connected with the production of soy beans. Many types of machines are now on the market, ranging from the single-row harvester to broadcast harvesters of the beater type and the combine harvester like those used in harvesting wheat and other small grains.

"Because of this rapid increase in the importance of the soy bean, State experiment stations have greatly extended their investigations of the different feeding problems, such as the value of soy-bean silage, hay, grain, pasture, and oil meal. One of the most outstanding results of this work has been the use of a mineral mixture with the grain and meal. Extensive feeding trials with hogs and poultry have shown that when minerals are added to a soy-bean ration the results compare favorably with those from a ration of tankage and meat scrap.

"In the last decade the soy bean has advanced from a position of minor to one of major importance. Previously soy beans were grown only occasionally, usually as a substitute crop when clover or some other crop failed. At the present time the plant is grown regularly for hay, grain, and pasture, and with corn as silage."

A photo shows: "Best results in making soy-bean hay are obtained where the vines are piled in tall, narrow cocks." Address: USDA, Washington, DC.

641. 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 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.

642. Morse, W.J. 1928. Soybeans for feed and fertility. Paper presented at the 29th annual meeting of the Association of Southern Agricultural Workers. 5 p. Held 2 Feb. 1928 at Memphis, Tennessee. *

• ***Summary:*** "More general recognition by farmers of the value of hay, pasture, seed, and oil meal undoubtedly will further stimulate the production of soybeans, especially in livestock sections. Reduced cost of production which agronomists are successfully bringing about, will naturally provide cheaper home-grown protein concentrates, and, therefore, more economical production of farm animals." Address: USDA, Washington, DC.

643. Morse, W.J. 1928. Re: Enclosing five tentative articles for 1928 Yearbook. Letter (memorandum) to Mr. H.N. Vinall, July 27. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "I submit the following:–1. America's new industry: Soybean oil and soybean oil meal production, 1000 words; 1 illustration.

"2. Japanese forage plant: Kudzu, 500 words; 1 illustration.

"3. Valuable Oriental foods from the soybean. 1000 words; 1 illustration.

4. New promising varieties of bush velvet beans. 500 words; 1 illustration.

5. Pigeon pea for food, feed and forage in the Cotton Belt. 500 words; 1 illustration.

Location: National Archives, College Park, Maryland. Record group 54–Bureau of Plant Industry, Soils and Agricultural Engineering. Subgroup–Div. of Forage Crops and Diseases [NA-RG54-DFCD]. 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, Bureau of Plant Industry, USDA, Washington, DC.

644. Morse, W.J. 1928. Re: Soy bean meetings. Change of itinerary. Letter to Dr. A.J. Pieters, USDA, Aug. 19. 2 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** "Tuesday. In all my travels in the Corn Belt, never have seen such soybeans as this year. With good weather for soybean hay and soybean __ bumper crops should result, which should bring a much larger acreage next season."

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: The Fowler [hotel], La Fayette [Lafayette], Indiana.

645. *Prairie Farmer.* 1928. Soybeans–A coming corn belt crop: Culture and uses discussed at annual meeting of American Soybean Association. 100(34):5, 22. Aug. 25.
• ***Summary:*** The ninth annual meeting of the American Soybean Association was held in Indiana, at La Fayette and other points in the state from August 15-17. "If any crop ever deserved glorifying, it is soybeans. Twenty years ago it was little known in the United States, while today it rates as a major crop, particularly in corn belt states."

The American Soybean Association was "organized eight years ago on the farm of Taylor Fouts, pioneer soybean grower of Carroll county, Indiana, who is now president."

The three-day meeting in the Hoosier State began on Wednesday with four local tours held in four widely separated parts of the state in prominent soybean growing regions." Southern Indiana: the J.B. Edmondson farm in Hendricks county. Eastern Indiana (Wayne and Henry counties): the J.A. Jenkins farm and the J.P. Ice farm. Northern Indiana: the Fouts Brothers' farms in Carroll county. Western Indiana and Illinois: the Charles Meharry farm in Tippecanoe county. A total of about 1,000 farmers attended these regional meetings. The next day about 300 people met at Purdue University for a full day of soybean activities. "Prominent among the Hoosier farmers were Taylor Fouts and his brothers, Noah and Finis, J.P. Edmondson, Ralph Edmondson, A.T. Edmondson, J.A. Jenkins, Joe P. Ice, Chas. Meharry, Adrian Parsons, Roy Caldwell, Chester Joyce, Forrest Modisett, Claude Wickard, and Purdue leaders including G.I. Christie, Dean Skinner, and K.E. Beeson. From Illinois came Will Riegel, John Smith, Bill Tabaka, Wilfred Shaw, J.C. Hackleman, and Frank Drury, Jr."

"The two days at La Fayette were devoted to studying the results of experimental work carried on by the Purdue experiment station on all phases of soybean culture and utilization."

"Soybeans in Commerce: Thursday evening was given over to a banquet held at Lincoln Lodge on the banks of the Wabash, north of Lafayette. Preceding the banquet, an opportunity was given to all attending to see and taste most appetizing dishes prepared from soybeans and soybean products. These dishes were prepared by the Home Economics Extension Department and showed the possibilities of including soybeans and soybean products in the diet. Recipes for the dishes served were distributed. The subject of the discussion after dinner was the utilization of soybeans in commerce. President Taylor Fouts turned the meeting over to Director Christie of Purdue, who acted as toastmaster and presented several men who are prominent in soybean utilization industries.

"Wilfred Shaw, of Peoria county, Illinois, acting as a representative of the American Milling Company, told of the plan which had been devised to create an acreage of soybeans for milling purposes by guaranteeing Illinois growers $1.35 a bushel for No. 2 beans this fall. Roy Chastine [sic, Chasteen], representing the Blish Milling Company of Seymour, Indiana, which company is equipped to mill about 65,000 bushels of soybeans annually, told of their work in the bean products manufacturing business. He stressed the point that in the opinion of the millers, the industry is now waiting for production of beans to become large enough to warrant them to put in bean milling machinery, so their plants can operate daily the year 'round, thereby guaranteeing buyers of bean products ample supplies of oil, meal and other products.

Note 1. This is the earliest document seen (Aug.

2011) concerning the Blish Milling Company's work with soybeans.

"Following the discussion were musical numbers by 'Uncle Joe' Cannon, of Purdue's dairy extension staff, and Roy Caldwell and Chester Joyce, soybean growers of Carroll county, Indiana.

"On Friday were more tours of Purdue University's experimental soybean plots and feeding plants and further discussions led by growers, county agents and extension men. Prominent among the Friday speakers was W.J. Morse of the United States Department of Agriculture..."

The ninth annual meeting closed at noon following committee reports and a brief business session."

There follows a brief history of the American Soybean Association, which began in 1920 at Soyland in Carroll County.

A photo shows some of the people visiting the Meharry farm in Illinois, including E.G. and C.W. Tabaka, O.H. Sears, W.E. Riegel, C.M. Woodworth, Mrs. Woodworth, and baby, Ruth, Will, Catherine, and Mrs. Riegel.

646. Edmondson, C.V.; Briggs, George M.; Ogden, H.P. 1928. Resolutions–Passed by the American Soybean Association in its Ninth Annual Convention held at Purdue University, August, 1928. *Proceedings of the American Soybean Association* 2:38. Ninth annual field meeting. Held 15-17 Aug. at Indiana.

• ***Summary:*** "1. Whereas, the research work of the United States Department of Agriculture and the State Agricultural Colleges and Experiment Stations has been of great value to American Farming, and

"Whereas, the soybean is of great economic importance in furnishing home grown protein for all classes of livestock, in maintaining farm fertility, and providing an additional cash crop;

"Be It Resolved that this Association requests that all Federal and State aid in connection with the growing and utilizing of soybeans be continued.

"Be It Further Resolved that all literature of the Association be sent to all directors and deans of agriculture in order that they be more familiar with this organization.

"2. Whereas, soybeans and soybean products have not sufficient tariff protection,

"Be It Resolved that the Association shall continue its efforts toward securing just protection.

"Be It Further Resolved that the sincere thanks and appreciation of this association be extended to W.J. Morse, U.S.D.A., for his untiring labor in connection with the publication of the Proceedings of American Soybean Association, and that this association wishes him every success and safe return from his two year pilgrimage through the soybean land of the Orient.

"Be It Further Resolved that this association extends to Director Christie a note of thanks for his co-operation and support in furthering the interests of soybean growers, and wishes him every success in his new position.

"Be It Further Resolved that this Association expresses its appreciation to the Indiana Corn Growers Association for its assistance in this meeting.

"Be It Further Resolved that this association expresses its thanks to the Blish Milling Company, American Milling Company and Funk Brothers for their co-operation and financial support and that a copy of these resolutions be sent to each of these companies.

"Be It Further Resolved that a note of thanks be extended to the staff of Purdue University and all others who have in any way contributed to the success of this meeting and the enjoyment of all those in attendance." Address: 1. Chairman.

647. Morse, W.J. 1928. Officers of the American Soybean Association (1920-28). Special committees. *Proceedings of the American Soybean Association* 2:12-14.

• ***Summary:*** 1920: President Taylor Fouts, Camden, Indiana. Secretary–W.A. Ostrander, Indiana Experiment Station. 1921: President–W.E. Riegel, Tolono, Illinois. Secretary–W.A. Ostrander, Indiana Experiment Station.

1922: President–C.E. Carter, Missouri Experiment Station. Secretary–W.A. Ostrander, Indiana Experiment Station. 1923: President–G.M. Briggs, Wisconsin Experiment Station. Secretary–W.A. Ostrander, Indiana Experiment Station.

1924: President–W.J. Morse, United States Department of Agriculture [Washington, DC]. Vice-presidents–E.C. Johnson, Stryker, Ohio, and J.L. Robinson, Iowa Experiment Station. Secretary–C.L. Meharry, Attica, Indiana.

1925: President–W.J. Morse, United States Department of Agriculture [Washington, DC]. Vice-presidents–E.C. Johnson, Stryker, Ohio, and J.L. Robinson, Iowa Experiment Station. Secretary–C.L. Meharry, Attica, Indiana.

1926: President–W.E. Ayres, Mississippi Delta Experiment Station. Vice-president–F.P. Latham, Belhaven, North Carolina. Secretary-treasurer–C.L. Meharry, Attica, Indiana. Directors–W.E. Ayres, Mississippi Delta Experiment Station. F.P. Latham, Belhaven, North Carolina. J.S. Cutler, Ohio Experiment Station. E.J. Delwiche, Wisconsin Experiment Station. J.T. Smith, Tolono, Illinois. F.S. Wilkins, Iowa Experiment Station.

1927: President–F.P. Latham, Belhaven, North Carolina. Vice-President–Taylor Fouts, Camden, Indiana. Secretary-Treasurer–W.E. Ayres, Mississippi Delta Experiment Station. Directors–F.P. Latham, Belhaven, North Carolina. Taylor Fouts, Camden, Indiana. W.E. Ayres, Mississippi Delta Experiment Station. Walter Godchaux, New Orleans, Louisiana. C.W. Tabaka, Ivesdale, Illinois. J.S. Cutler, Ohio Experiment Station. E.J. Delwiche, Wisconsin Experiment Station.

1928: President–Taylor Fouts, Camden, Indiana. Vice-

President–Walter Godchaux, New Orleans, Louisiana. Secretary-Treasurer–W.E. Ayres, Mississippi Delta Experiment Station. Directors–Taylor Fouts, Camden, Indiana. Walter Godchaux, New Orleans, Louisiana. W.E. Ayres, Mississippi Delta Experiment Station. C.W. Tabaka, Ivesdale, Illinois. J.S. Cutler, Ohio Experiment Station. E.J. Delwiche, Wisconsin Experiment Station.

Special Committees–Constitution: C.L. Meharry, Chairman, Attica, Indiana. H.S. Clapp, Accotink, Virginia. F.P. Latham, Belhaven, North Carolina. J.T. Smith, Tolono, Illinois. W.E. Ayres, Mississippi Delta Experiment Station. Taylor Fouts, Camden, Indiana.

Soybean nomenclature: W.J. Morse, Chairman, United States Department of Agriculture. J.C. Hackleman, Illinois Experiment Station. F.S. Wilkins, Iowa Experiment Station. E.J. Delwiche, Wisconsin Experiment Station.

Soybean score cards: W.J. Morse, Chairman, United States Department of Agriculture. K.E. Beeson, Indiana Experiment Station. C.B. Williams, North Carolina Experiment Station. J.C. Hackleman, Illinois Experiment Station. G.M. Briggs, Wisconsin Experiment Station.

Soybean seal: J.T. Smith, Chairman, Tolono, Illinois. W.E. Riegel, Tolono, Illinois. C. Burns, Champaign, Illinois. Address: USDA, Washington, DC.

648. Morse, W.J. 1928. El cultivo de la soja [The cultivation of soybeans]. *Hacienda* (*La*) (*Buffalo, New York*) 23(7):231-33. July; 23(8):286-89. Aug. [Spa]
• ***Summary:*** This is a translation of many parts of *USDA Farmers' Bulletin* No. 1520 titled "Soy Beans: Culture and Varieties" (Morse, April 1927). Address: USDA, Washington, DC.

649. *Proceedings of the American Soybean Association.* 1928. Ninth annual meeting, American Soybean Association, Indiana: August 15, 16 and 17, 1928. 2:3-11.
• ***Summary:*** "Over one thousand farmers and soybean enthusiasts from Indiana and adjoining states attended the various meetings which comprised the ninth annual meeting of the American Soybean Association. On August 15, regional meetings were held in four different sections of Indiana which were attended by Purdue specialists and representatives of the Associations and interested growers. These meetings were designed to spread the influence of the Association's annual meeting over as much territory as possible, and the interest certainly justified this plan.

"Much of the material that follows is extracted from the August 25, 1928, issue of the *Prairie Farmer.*"

Note: The portions concerning regional meetings must be extracted from a regional edition (or editions) of *Prairie Farmer.*

The article is divided into the following parts: Introduction (incl. list of prominent Hoosier soybean farmers). Soybeans in commerce. Northern Indiana regional meeting. Western Indiana regional meeting. Central Indiana regional meeting. Eastern Indiana regional meeting.

"Northern Indiana regional meeting: Perhaps no better point in the Middle West could have been selected for a regional meeting of the American Soybean Association than Soyland, the farm of Taylor Fouts, and those of his brothers, Noah and Finis, in Carroll county, Indiana, where more than 150 farmers and soybean growers gathered August 15 to talk their favorite subject–soybeans.

"Soyland, with its 200-odd acres of certified soys of the varieties Manchu, Midwest and Dunfield, is one of the pioneer soybean growing regions in Indiana, and is today one of the greatest centers of production of fine soybeans in the United States.

"A score or so of years ago, when Taylor Fouts was a student at Purdue University, the soybean was being 'played with' by experimenters at Purdue. Taylor took a small quantity of seed home with him and planted the first patch on the Fouts farm. Today it is the major crop on the farm, and the practice has spread to neighboring farms in Carroll county and adjoining counties."

"Following an ample repast served by the ladies of the Presbyterian church, the ladies assembled on Taylor Fouts' front lawn, where Taylor, who was president of the Association, introduced prominent soybeaners," including William Morse. "A comedy sketch was enacted by Chester Royce and Roy Caldwell, who kept the crowd in an uproar with their humorous discussion of the relative merits of the Dunfield and Manchu varieties... They closed their number by singing the latest rural hit song of the season–'Soybeans, That's All' by themselves. With their guitars they made an excellent harmony team." At Finis Fouts' farm, Claude Harper of Purdue discussed the results of lamb feeding trials in which soybeans and soybean hay played an important part in the ration.

A photo shows an aerial view of Finis Fouts' farm in Carroll County at the time of the meeting.

Western Indiana regional meeting: Between 150 and 200 farmers from West Central Indiana and Illinois attended the meeting at the Charles Meharry farm near Odell in the southwest corner of Tippecanoe county. "For 20 years, Meharry has been growing soybeans on his farms, the one of 320 acres at Odell; two others of the same size at Romney, Indiana, in Tippecanoe county, and another of about 800 acres in Champaign county, Illinois." Meharry's farm manager, Edmund N. Stafford, showed the 60 acres of soybeans and variety trials. A number of speakers discussed various topics.

Central Indiana regional meeting: Some 250 soybean growers met on the J. Ben Edmondson farm, which is "not far distant from the home of A.A. [Adrian Alkanah] Parsons, Indiana pioneer grower, who first planted soybeans 37 years ago [about 1891] and who has grown them every year since without a single crop failure. The men who are enthusiastic

about this crop in this community... know what a good crop soys are and they are making money from the crop." At noon, the group transferred the discussion to the grove, where the Hazelwood Home Economic Club served a fine luncheon, with baked soybeans as one of the inviting dishes." After the meeting, a "tour was made of the community where nine farmers, members of the Midwest Association, are growing Dunfield beans for certification.

Eastern Indiana regional meeting: The meeting, attended by 100 people, was held on the farm of J.A. Jenkins in Wayne county, where soybean acreage has tripled in the last 3 years. Jenkins "has been growing soybeans for 10 years and is generally considered to be the pioneer of the county with this new crop. He was conducting a trial of 13 different varieties: Dunfield, Ito San, Manchu, Mansoy, Illini, Midwest (formerly called Hollybrook), Wilson 5 [Wilson-Five], Virginia, George Washington, Peking or Sable, Laredo and Illinois 1319." Details are given for each variety; each has its own particular growing habit and characteristics. The earliest maturing is Ito San; the first soybean to be introduced into Indiana, it is still widely grown. Manchu, probably the most widely grown variety in the state, matures about one week after Ito San.

Note: This is the earliest document seen (Dec. 1998) that mentions the soybean variety George Washington.

650. *USDA Plant Inventory.* 1928. Plant material introduced by the Office of Foreign Plant Introduction, Bureau of Plant Industry, Jan. 1 to March 31, 1926 (F.P.I. Nos. 65708 to 66698). No. 86. 51 p. Aug.

• ***Summary:*** 66260 to 66266 (p. 29). "From Ceylon and Italy. Seeds obtained by David Fairchild and P.H. Dorsett, agricultural explorers, Bureau of Plant Industry, with the Allison V. Armour expedition. Received March 12, 1926."

66263. Botor tetragonoloba (L.) Kuntze. (*Psophocarpus tetragonolobus* DC.). Fabaceae. Goa bean. No. 341. From Peradeniya, Ceylon, February 1, 1926. A bean with winged pods, much used in curries by the Singhalese. The wings are torn off before cooking.

"For previous introduction see No. 51765." Address: Washington, DC.

651. *USDA Plant Inventory.* 1928. Plant material introduced by the Office of Foreign Plant Introduction, Bureau of Plant Industry, Jan. 1 to March 31, 1926 (F.P.I. Nos. 65708 to 66698). No. 86. 51 p. Aug.

• ***Summary:*** Soja max (L.) Piper (Glycine hispida Maxim.). Fabaceae. Soy bean.

65782 to 65784. From Matania el Saff, Egypt. Seeds presented by Alfred Bircher, Middle Egypt Botanic Station. Received March 9, 1926. 65782. A large flattened brown bean. 65783. A large flattened creamy-color bean. 65784. A small round light-green bean.

65819 to 65853. From Kangtung, China, and the Philippine Islands. Seeds collected by F.A. McClure, agricultural explorer, Bureau of Plant Industry. Received Jan. 4, 1926.

65852 and 65853. No. 224. From Nodoa, Hainan Island, China. *Tung tau; siu tau.* A small black bean usually planted in December and grown during the winter months. No. 225. From Nodoa, Hainan Island, China. *Ch'un tau; taai tau* (spring bean; big bean). A spring variety planted in May.

65906 to 65961. From Harbin, Manchuria. Seeds obtained by P.H. Dorsett, agricultural explorer, Bureau of Plant Industry. Received Jan. 8, 1926.

65945 to 65955. November, 1925. From the Agricultural Experiment Station, Harbin. 65945. No. 4787. *Huang tou,* No. 6. An attractive yellow bean of good size. 65946. No. 4788. *Tha hei wehi huang tou,* No. 20. A fine large yellow bean, practically round, with a large black eye [hilum]. 65947. No. 4789. *Scheum huang tou,* No. 60. An almost round bean of good size, with a reddish brown eye. 65948. No. 4790. *Tha hei tou,* No. 123. A good-sized, almost round, black bean. 65949. No. 4791. *Seo hei tcher huang tou jofiu,* No. 40. A medium-sized, almost round, yellow bean with a dark-brown eye. 65950. No. 4792. *Thyanvo dam tao,* No. 74. An almost round yellow bean with a deeper colored eye. 65951. No. 4793. *Dtchou lau tou,* No. 180. An almost round black and brown bean, of good size. 65952. No. 4794. *Lu tuiang tou,* No. 100. A large green roundish bean. 65953. No. 4795. *Pheo litchin tou,* No. 104. A medium-sized dark-green, almost round bean with a black eye. 65954. No. 4796. *Tha lau za tou,* No. 143. A medium-sized brown bean, almost round, with a lighter colored eye. 65955. No. 4797. *Tchali tcher huang tou,* No. 80. An oblong yellow bean of good size, with a brown eye.

66341 to 66419. From Tiehlingho, Kirin Province, Manchuria. Seeds presented by A.D. Woeikoff, director, Experimental Farm, Echo. Received March 1926.

66401 to 66418. 66401. No. 277. *Huang tou tsa.* 66402. No. 1153. A black variety from the experiment farm, Chinese Eastern Railway, Harbin, Manchuria. 66403. No. 1159. A black variety with gray pubescence. From the experiment farm, Chinese Eastern Railway, Harbin, Manchuria. 66404. No. 1237. *Hei tou.* From Ninguta district, Kirin Province. 66405. No. 1238. *Yuan tou* (yellow). From Ninguta district, Kirin Province. 66406. No. 1239. *Huang tou* [yellow bean]. From Ninguta district, Kirin Province. 66407. No. 1248. *Kaiyuan pai hua.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66408. No. 1249. *Ssupingchieh hei chi.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66409. No. 1250. *Kungchuling won sin hei shih.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66410. No. 1255. *Hsia er tai.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province,

Manchuria. 66411. No. 1256. *Mukden hei chi.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66412. No. 1275. *Er shih li pao.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66413. No. 1259. *Hsiao hei chi.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66414. No. 1261. *Kuei tzu yen.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66415. No. 1263. *Ssu li huan improved.* No. 4. 66416. No. 1270. *Ju shu tai.* From the agricultural experiment station, South Manchurian Railway, Kungchuling, Mukden Province, Manchuria. 66417. No. 1299. A yellow variety with a black [eye] brow. From the experiment farm, Chinese Eastern Railway, Harbin, Manchuria. 66418. No. 1802. *Kirin* (green). From the commercial agency of the Chinese Eastern Railway, Laoshaokou, Kirin Province [Manchuria]. Address: Washington, DC.

652. 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 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.

653. Ohki, Shinzo. 1928. Re: Introducing William J. Morse to Noda Shoyu Co. Letter to Mr. Shinzaburo Mogi of Noda Shoyu at 133 Onden, Aoyama, Tokyo, Nov. 2. 2 p. Typed, without signature (carbon copy). Typed. Bound in Log of Dorsett Morse Expedition to East Asia, p. 51-52. [Eng]

• ***Summary:*** "This is to introduce you to Dr. [sic] W.J. Morse of the Bureau of Plant Industry, U.S. Department of Agriculture. Dr. Morse has been investigating soybeans for a number of years and has written a book entitled 'Soybeans with Dr. Piper' [sic, 'The Soybean'], which book I presented to you before you left the United States... I wish you would direct him to Noda Shoyu Company and show him the wonderful plant your company is operating... He also wishes to visit some company manufacturing Tofu."

Note: Mr. Ohki's company makes fermented, Japanese-style shoyu in Indiana. On the next page (p. 52) of the Log, in a similar letter to Noda Shoyu Company in Noda, Japan (with the same date, translated from Japanese into English), Mr. Ohki notes: "When I visited your factory in 1917, I was greatly impressed by the magnitude of your plant, as well as the improved machineries [sic] you are using."

Note: This is the earliest document seen (April 2017) concerning the Dorsett-Morse Expedition to East Asia. Address: Oriental Show-You Company, Brewers-Packers-Distributors, Columbia City, Indiana.

654. Morse, W.J. 1928. Re: Two radio flashes. Letter to Dr. A.J. Pieters, USDA, Nov. 13. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "With regard to two Radio Flashes, 'Varieties of Soybeans to Grow in the West,' and 'Kudzu for Pasture and Soil Building,' suggested for December 17, both of these are very poor titles and are ill-timed."

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, Bureau of Plant Industry, USDA, Washington, DC.

655. Dorsett, P.H.; Morse, W.J. 1928. Preface (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 1. No author, date or place are given. However the author was P.H. Dorsett. "Shortly after Jim [James H. Dorsett, his son] and I returned, January 1927, from our agricultural activities in Northeastern China, 1924 to 1927, with the exception of the period from November 1925 to May 1926 when we were associated with Dr. David Fairchild and the Allison V. Armour Agricultural Expedition in Ceylon, Sumatra and Java, I was asked if I would be willing to make another similar trip to the Orient within a year or two. Dr. Henry M. Allanson, Assistant Chief of the Bureau, asked the question. He explained that they would like to send Mr. W.J. Morse, soybean expert in the Office of Forage Crop Investigations over as soon as he could get his work here adjusted so that it could be handled during his absence..."

Page 2. "Shortly after this matter was broached Mr. Morse decided that he would like to take Mrs. Morse and their little girl. I told him that if he did that I would arrange to take Ruth, Jim's wife [Jim died on 8 Oct. 1927] and also my daughter by adoption, and these arrangements are being planned and arranged for."

"Specific details relative to the desirability and needs of this work are set forth in more or less detail in the introduction and also in the memorandum which Mr. Morse and I prepared in March 1928 and submitted to the head of the Office of Foreign Plant Introduction to be transmitted to the Chief of the Bureau of Plant Industry." Address: Agricultural Explorers, USDA, Washington, DC.

656. 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 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 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.

657. 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 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].

658. Meeting of Morse and Harvey Clapp on George Washington's Union Farm, Accotink, Virginia (Photograph). 1928.
• ***Summary:*** This photo shows six men standing side by side, most dressed in coats and ties. Only the left-most two are identified: Harvey S. Clapp and William J. Morse. The lower caption states: "Farm owned now by Harvey Clapp and his father, U.S. Senator Moses E. Clapp (Minnesota)."

Note 1. Harvey S. Clapp was raising 100 acres of soybean on this farm (which was entirely motorized) by July 1923; by that time he had developed an early soybean harvester, considered a forerunner of the combine. In 1928-1929 he was a member of the board of directors of the American Soybean Association. In 1929 he selected the soybean variety named George Washington.

Note 2. Moses Edwin Clapp (1851-1929) served from 23 Jan. 1901 to 3 March 1917 in the U.S. Senate as a Republican from Minnesota. He died on 6 March 1929 at his country home 'Union Farm,' near Accotink, Virginia.

Note 3. Accotink (pronounced AK-o-teenk) is a hamlet of population 200 (1990) in Fairfax Co., northern Virginia, near the Potomac River, 9 miles southwest of Alexandria.

George Washington's Mount Vernon home is just to the east.

659. Smith, John T. 1929. Re: Letter introducing W.J. Morse to Dr. Albert M. Dunlap of Peking (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. See p. 108. Jan. 22. Unpublished log.

• ***Summary:*** This letter dated 22 Jan. 1929 is to Dr. Albert M. Dunlap, Union Medical College, 43 North Compound, Peking, China. "This letter will introduce Mr. W.J. Morse, Senior Agronomist of the United States Department of Agriculture. Mr. Morse will be spending the next two years in China studying soybeans and their uses. Any assistance you may be able to render him will be greatly appreciated."

Note: W.E. Riegel is president and T.H. Jordan is vice president of this seed company of which Smith is Secretary-Treasurer. Address: Secretary-Treasurer, Tolono Soybean-Seed Assoc. Incorporated, Tolono, Illinois.

660. 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.

661. 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:*** See next page. "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 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.

662. Pope, Felix T. 1929. World trade in soy beans. *Oil Miller and Cotton Ginner* (*The*) 33(5):30-31. Jan.

• ***Summary:*** From Commerce Reports: "Owing to the many new uses that are constantly being found for vegetable oils and the ever-increasing popularity of oil cake and meal as a stock feed, oilseeds are year by year assuming a more important place in world trade. World production for the year 1926 approximated 35,900,000 short tons, of which about one-third was exported from the country where it was grown, either in the form of seed or as oil and oil cake and meal.

"Cottonseed is by far the most important of all oilseeds, world production in 1926 having been nearly 14,000,000 short tons, or about 40 per cent of the total production of all oilseeds. Other oilseeds in the order of their relative importance are sesame seed, flax, and soy beans (peanuts not being considered, as a comparatively small proportion of them are crushed.) Soy beans are of Asiatic origin and have been raised in China for many centuries. That country is still the chief source of supply and they play an important part in China's foreign trade. Manchuria is the great producing area, supplying about 40 per cent of China's total crop.

"In Asiatic countries–especially China and Japan–the soy bean is largely used as human food, being second only to rice in its importance as a food crop.

"Exports of soy beans and their by-products from China during 1925 were 5,824,296,000 pounds; in 1926, 6,877,302,000 pounds; in 1927, 7,576,493,000 pounds.

"Production of Soy Beans in the United States: The soy bean was introduced in 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. With the

The United States of America,

DEPARTMENT OF AGRICULTURE.

To all who shall see these presents, Greeting:

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 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.

In witness whereof I have hereunto subscribed my name and caused the seal of the Department of Agriculture to be affixed. Done at the City of Washington, District of Columbia, this twenty-sixth day of January , A. D. 1929 , and of the Independence of the United States of America the one hundred and fifty-third.

W M Jardine

Secretary of Agriculture.

introduction from Asiatic countries of new varieties into the United States, the soy bean has assumed great importance and offers far-reaching possibilities to the future agriculture of this country. A short ton of soy beans (33½ bushels) produces about 240 pounds of oil when crushed and 1,620 pounds of cake or meal, the remaining 140 pounds being invisible waste, mostly moisture thrown off in the process of manufacturing. Soy beans bring the highest price for seed and for food purposes, and least for crushing, so that with the limited supply of home-grown beans available, it is only after other demands are met that mills are able to buy. In spite of this, cotton-oil mills are active in promoting the growth of soy beans, as it gives them an opportunity to use their plants for longer seasons than they can depending entirely on cottonseed, the same machinery being used without additional equipment being required. Soy beans were first used for the production of oil and meal in the United States in 1910, imported seed being used.

"American-grown seeds were first used in 1915 by cottonseed oil mills in North Carolina. according to Dr. W.J. Morse, of the United States Department of Agriculture. The production in this country has increased rapidly in recent years. While no accurate figures are available back of [before] 1924, it is estimated that in 1917 only about 1,000,000 bushels were produced for seed. In 1924 production had increased to 5,190,000 bushels, the succeeding years being as follows: 1925, 5,131,000 bushels; 1926. 6,063,000 bushels; 1927, 7,925,000 bushels; 1928 (estimated), 8,052,4100 bushels. (These figures do not include soy beans grown as a forage crop.) The increase has been the most marked in the State of Illinois, production in that State having increased from 30,000 bushels in 1919 to 1,750,000 bushels in 1926, 2,405,000 bushels in 1927, and 2,650,000 bushels (estimated) for 1928.

"Imports Into the United States: Production has not kept pace with the demand, however, and the United States is still a large importer, not only of the beans, but also of the cake and oil. Imports of cake and meal for the first nine months of 1928 approximated 40,000 short tons.

Soy-Bean-Oil Industry and Trade of the United States: Soy-bean oil, the product of the soy bean, is perhaps one of the most versatile of the great varieties of vegetable oils in world commerce to-day. Its most extensive use as an edible oil is in the manufacture of lard compounds and oleomargarine, and a small amount in salad oil. In addition to its uses as an edible product, it has the properties of a drying oil, which lends itself to the paint and varnish industry, the soap kettle, and the manufacture of linoleum and oilcloth, while small amounts are used for illuminating and lubricating purposes in its native country.

"Soy-bean oil is obtained by two methods–pressure and solvent, the former producing the better grade products, oil and cake. The oil content of soy beans ranges from 12 to 23 per cent, depending on the locality of production and the efficiency of the presses–many of the bean mills in China and Manchuria being so primitive that they get only about 8 to 10 per cent of oil. The following table shows the extent of this industry in the United States today:

"Soy-Bean Cake and Meal: Owing to its high protein content, ranging from 46 to 52 per cent and from 5 to 8 per cent oil, soy-bean meal is in great demand as cattle feed and commands a considerably higher price than either cottonseed meal or linseed meal. Soy-bean meal at Portland, Oregon, one of the principal markets, has ranged from $50 to $60 per ton in the past five years.

"The accompanying chart, furnished by the Department of Agriculture graphically shows the many uses of the soy bean, starting with plant and seed. The plant can be used as forage, pasture, or green manure. The types of forage are hay, ensilage, soilage, and straw.

The seed can be used for oil, food products, or oil meal. The oil can be used for soap stock (soft of hard soaps), enamels, varnishes, paints, rubber substitutes, food products (salad oils, lard substitutes, butter substitutes, edible oils), linoleum, printing inks, lubricating, lecithin, waterproof goods, celluloid, petroleum, lighting [illumination], explosives, glycerine. The food products consist of dried beans or green beans. The dried beans can be made into soy sauce, coffee substitute, soups, sprouts, roasted beans, baked beans, vegetable milk (confection, casein milk powder, condensed milk, cheese [tofu] (fresh, dried, fermented, smoked). The green beans can be used for canned green beans, green vegetables, or salads). The oil meal can be used to make flour, diabetic foods, infant foods, macaroni, breakfast foods, feeds, glue, or fertilizer.

Tables show: (1) Imports of soy-bean oil, soy-bean cake, and soy beans into the United States (pounds), 1925-1928. (2) United States production, consumption, imports and exports of soy-bean oil (thousands of pounds), 1925-1927.

Note: The front cover has Vol. XXXII, No. 5 and the inside "title page" has Vol. XXXIII, No. 5–Vol. 33 is correct. Address: Foodstuffs Div., U.S. Dep. of Commerce.

663. 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."

664. Morse, W.J. 1929. Re: About to sail from San Francisco to Asia. Letter to J.L. Cartter, USDA, Feb. 27. 3 p. Handwritten, with signature on letterhead.

• ***Summary:*** "Getting ready to try the water for a while. Have had sufficient land travel. We all had a very enjoyable trip across the country.

"At last have finished the soybean work of the states and am enclosing it. I do not think it necessary to increase our work with the states at present."

"It is best to carry always a small supply of seed of the named varieties to supply foreign requests. Such requests can be given ¼ to ½ lb. each. We also have requests from seedsmen and schools for typical seed of commercial sorts and they can be sent 2 to 4 oz. each of the varieties."

"At Los Angeles saw the new Vitacolor motion pictures and they sure were great. Mr. Dorsett took some Sunday of orange and flower scenes. We saw them projected Monday and they were wonderful. We have one motion picture camera now fitted up for this colored work and hope to get some back to Washington in late summer or early fall."

Note: The letterhead reads: United States Department of Agriculture. Bureau of Plant Industry. Forage crops.

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: San Francisco, California.

665. March 6–Arthur M. Hyde (R), Missouri, becomes U.S. Secretary of Agriculture under President Herbert Hoover (1929-1933) (Important event). 1929.

• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

666. Morse, W.J. 1929. Re: Morse and Dorsett families. Thanks for the fine box of candy. Letter to Dr. R.A. Oakley, Monrovia, California, March 6. 4 p. Handwritten, with signature on American Mail Line letterhead.

• ***Summary:*** "En route. Dear Oakley: On behalf of the Morse and Dorsett families, I wish to thank Mrs. Oakley and you for the fine box of candy we found in our stateroom when we boarded the President Grant last Friday afternoon. We were certainly remembered by friends in Washington and California for we found flowers, fruit, presents, candy, letters, and telegrams... In going over the things Margaret [Morse's daughter] said 'I like to go away because its almost like Christmas...'"

"The trip so far sure has been good for Margaret; she looks so much better. There are several children on board so that she is thoroughly enjoying herself..."

"Last night Dr. Roy Chapman Andrews who is one of the passengers gave a lecture and motion pictures on his Mongolian Explorations seeking the birthplace of man. It was mighty fine and the pictures were excellent."

"Have found plenty to do since on the water. Completed all of my project plans for the next three years if I happen to come back too late for the 1931 planting season.

"Dorsett had a letter from Ryerson at Washington regarding the Vitacolor motion picture demonstration. It created some sensation and three more had to be given for government... able to get some good colored pictures.

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: En route from San Francisco to Japan on steamship President Grant, American Mail Line.

667. 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.

668. *Japan Advertiser* (*Tokyo, Japan*). 1929. Fruit and beans lure scientists: American botanists here to study persimmon and lowly soy bean. Would popularize them. State most American flowers and ornamental shrubbery foreign in origin. March 24.

• ***Summary:*** "Mr. P.H. Dorsett and Mr. W.J. Morse, two American botanists who know as much about certain plants and seeds as any other men alive, have set up their headquarters in Tokyo and are ready to commence an extensive examination of Japan's flora and fauna."

"Mr. Dorsett is known officially as the persimmon expert of the Bureau of Foreign Seed and Plant Introduction of the United States Department of Agriculture, and Mr. Morse is the soy bean expert of the same bureau."

Mr. Morse hopes to find and send back to the United States many new soybean varieties. He also hopes to learn new ways of using the soybean, especially as human food.

Note: This is the earliest document seen (July 2009) with the adjective "lowly" in the title, used to describe the soy bean.

669. Dorsett, P.H.; Morse, W.J. 1929. In Japan, mostly in Tokyo (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 514-515 (5 April 1929, Japan). Continued. "We left Okitsu at 3:34 and fully two hours or more we caught wonderful views of Mt. Fuji. It is a most wonderful mountain and we were fortunate in having an excellent day and most glorious views of this, the famed Sacred Mountain of Japan.

"Yesterday on the way out, we did not get even so much as a glimpse of Fuji san, but today surely had as many as 100 or more beautiful views of this snow capped, actually worshipped mountain.

"We arrived in Tokyo at 8:45 and by 9:00 p.m. or a little later were enjoying a nice not supper in the grill of the Imperial Hotel.

"Such of the pictures made today as are really worth while follow.

"The account from Mr. Morse's dairy goes like this.

"About 10:00 a.m. Mrs. Morse, Margaret and I, with Mr. Suyetake, went to visit the Imperial Experiment Station at Nishigahara, a suburb of Tokyo.

"We got off at the entrance to Asukayama Park, famous for its cherry trees. Some time was spent in looking at the many hundreds of cherry trees which resemble an immense grove. The trees are in very poor condition, having many dead branches, poorly pruned, and showed general neglect. The trees are in bud and should be full bloom in about a week.

"Extensive preparations are being made for the cherry blossom viewing. Refreshment stands are being put up and large lines of Japanese lanterns are being placed in the park and streets adjacent to the park.

"At the Imperial Experiment Station we were taken to the Chief Director of Experiment Stations, Mr. Ando, with whom we had a very pleasant hour, being served with tea after being seated. The Imperial Station consists of new buildings as the station was entirely destroyed by the earthquake in 1925 [sic, 1923; the Great Kantô Earthquake], The central building is a magnificent building of stone with excellent offices and well equipped laboratories.

"We found that soybean breeding and experimental work is being carried on at the stations in Northeastern Japan. Especially in Hokkaido, at the station there. Considerable research work is being done at the Nishigahara station on the manufacture of soy sauce and miso. Cards to the men in charge of these problems were given us by Mr. Ando so that we may study thoroughly the manufacture of these products.

"The station has also an extensive silk worm department near the main building. The entire silk culture is being studied and attended by large classes. In addition the station has very extensive greenhouse space which is new and not yet in operation.

"The Imperial Station at Nishigahara is head of all the Japanese experiment stations, and the work of the stations is directed from there.

Page 516: "After our visit to the experiment station we

went to Ueno park, famous for its cherry trees, to see the condition of the trees there.

"There are many hundreds of cherry trees lining the drives and scattered about in the landscape. Many of the trees are very large and quite old. They were in much better condition than those in Asukayama park.

"The National Food show was being held in a large building in the park and some time we spent in visiting the many exhibits of foods throughout the Japanese Empire. Large exhibits of soybean food products were shown and in some cases the processes of manufacture. Extensive exhibits of fruits and vegetables were shown, and lights on a large map of the Japanese Empire indicated where each was grown most extensively.

"Many of the exhibits, such as the vitamin, railroad lunches [*bento*], and others with electric light features were very ingenious and very instructive." Address: Agricultural Explorers, USDA, Washington, DC.

670. Dorsett, P.H.; Morse, W.J. 1929. Adzuki (adsuki) beans 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 559-62 (8 April 1929). The authors photograph "two boxes of Adzuki bean candy." The photo is shown on p. 562. Pages 567-69 (April 9). They photograph a candy made of adzuki (adsuki) bean paste. Page 589 (April 10). They ask Mr. Sakata to collect for them from Yokohama 4 ounce samples of different varieties of adsuki beans and soybeans that are not of American origin. He agrees to write a tag for each giving the Japanese characters, Japanese name, Romanization, and if possible the source. Pages 645 (April 15). Mr. Suyetake (interpreter) and Mr. Morse go on a "seed hunting expedition." They collect numerous samples of garden beans, soybeans, and adsuki beans from small grocery stores and seedsmen in the northwest section of Tokyo. Pages 729, 741-42 (April 23). Life sized photos show adzuki bean candy (plain, wrapped in preserved cherry leaves, and with beans imbedded). Pages 754 (April 24). They received a package containing several varieties of soybeans, adsuki beans, and jack beans from the Sakata Seed Co. of Yokohama. Page 761 (April 27). They ship 11 lb of seeds (including new varieties of soybeans, mung beans and adsuki beans) to the United States. Pages 802-03 (April 24). Dorsett purchases from T. Sakata & Co. in Japan eleven varieties of soybeans (8 oz each), one variety of Dainagon Azuki, and 2 varieties of swordbeans.

Pages 1009-10 (May 14). Morse visits the Matsuzakaya store in Tokyo to look for bean products. They secured 17 different soybean products. "The number of adsuki bean products seemed unlimited and we plan to collect these later. We were also able to collect three kinds of yuba, a thin skin-like product (very rich in protein) obtained by boiling soybean milk." Pages 1051-52 (May 16). A photo shows adsuke [adzuki] bean cakes served with tea. Pages 1147-48 (May 22). Traveling by railway in Iwate prefecture (northeast provinces), shortly before reaching Morioka they came to a farming region extensively cultivated in soybeans, adsuki beans, rice, barley, etc. Pages 1201-02 (May 26). At the Hokkaido Agricultural Experiment Station in Kotoni, Sapporo, they saw extensive fields where adsuki beans were being tested.

Page 2487 (Sept. 24). At the Kitami Branch Agricultural Experiment Station (145 miles northeast of Sapporo in Hokkaido) they were told that about 3,000 acres of adzuke beans were grown in the region. Address: Agricultural Explorers, USDA, Washington, DC.

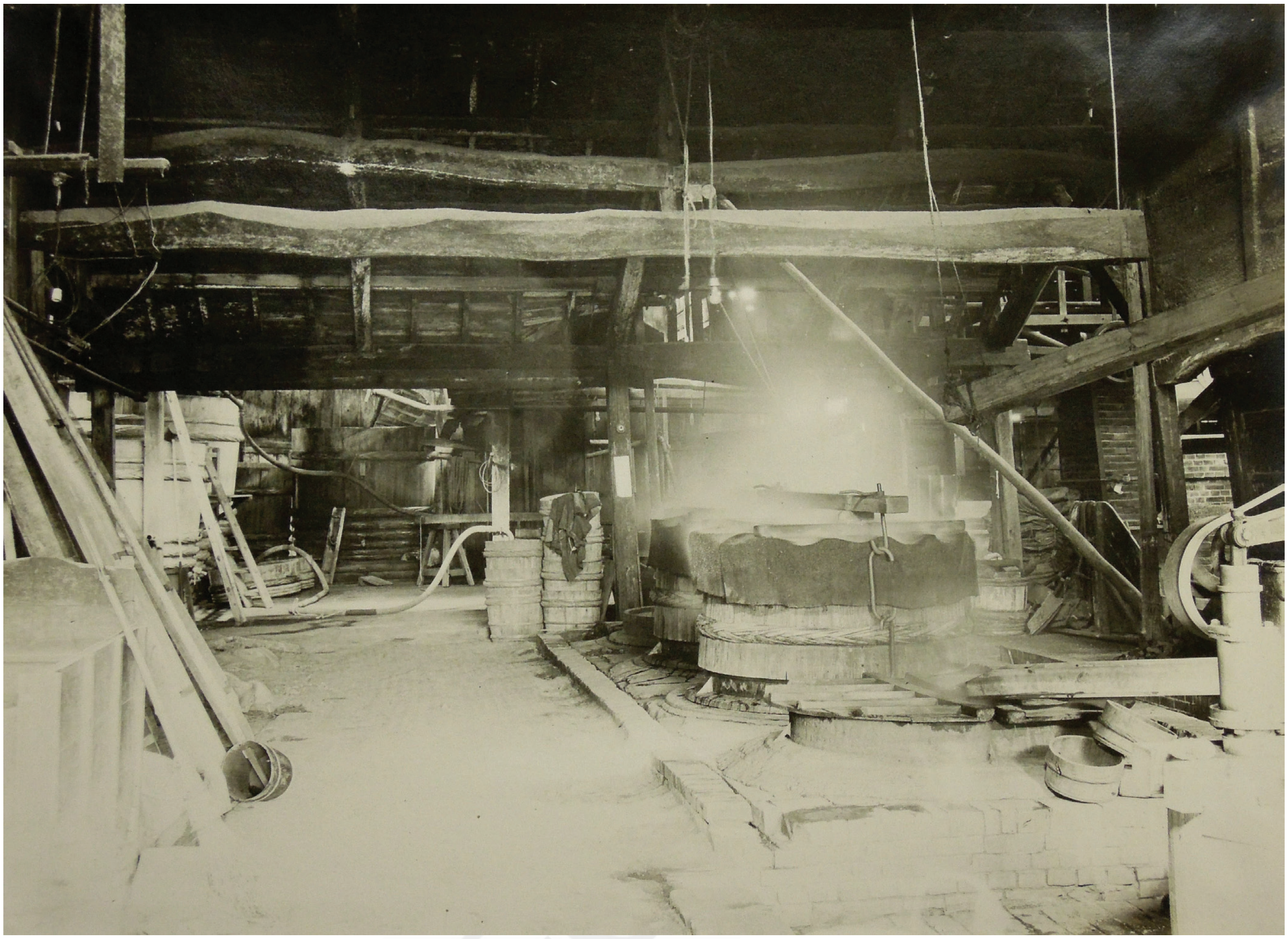
671. *Japan Advertiser.* 1929. Farm experts talk to Pan-Pacific Club: W.D. Morse and T.H. Dorset [sic, P.H. Dorsett] are here to study agricultural conditions. April. 13. [Eng]
• ***Summary:*** At this talk in Tokyo, Morse notes that has been working at the USDA on the soybean and other Oriental crops for 22 years. He is interested in their utilization and adaptation. Soybean cultivation in the United States has increased tremendously during the last ten years. One of Morse's principal tasks in the Orient is to find soybean varieties with a low oil content, which will not produce soft pork.

"I doubt if we will ever use the soy bean as you use it here. We are using the soy sauce; we have a Japanese who has established a factory, and his shoyu sauce is becoming quite popular all over our country. He is also canning little bean sprouts, as we can peas and beans."

Note 1. Reprinted in the Log of the Dorsett Morse expedition to East Asia, p. 628-29. The Japanese date on this article is Taisho 13, first month, 9th day.

Note 2. The Japanese man to whom Morse is referring is probably Mr. Shinzo Ohki of Oriental Show-You Company in Columbia City, Indiana. The "bean sprouts" he made were mung bean sprouts.

672. 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:*** "1929-70839a.JPG/1929-70839a-b, d-k" 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 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 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 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.

673. Morse, W.J. 1929. Re: Travels in Japan. Letter to Dr. A.J. Pieters, USDA, April 17. 4 p. Typed, without signature.
• ***Summary:*** "Dear Dr. Pieters; No doubt you will recall that on the Sunday night Mrs. Pieters and you called to see us on our last Sunday night in Washington, you advised me when I was in the Orient to forget soybeans at times and learn something regarding the people, customs, country, etc. I finally resolved to do just that thing and since I have been here I take time once in a while to jot down little articles in a note-book I have named "Travels in Japan."

"One of the things that has interested me very much here is Buddhism. Just why I do not know but the shrines, temples, ceremonies on the various occasions, such as Buddhist rites in laying corner stones of new buildings, funerals, etc., etc., are very fascinating. On a card recently sent you and Mrs. Pieters I told of attending the ceremonies in connection with the celebration of Buddha's birthday, which was April 8. I had read in the papers much about the coming ceremonies and festivals connected with it. As I had had no experience with the De Vry Motion Picture Camera, I thought it might be a fitting occasion to try it on the flower festival part and different events which would give me a little experience in taking motion pictures.

"The principal ceremonies were to be conducted in the stadium of Hibiya Park, which is directly across the street from our hotel.

"The exact year of Buddha's birth is not known, but it is quite generally agreed that he was born in the 6th century, B.C. and the birthday is known as Hanamatsuri or Floral Festival. The celebration was begun at 7.00 a.m. when the bronze image of the baby Buddha in a beautifully decorated ark or shrine was started on its way from the Dendo-Kan, a Buddhist institution about 7 miles from Hibiya Park. The parade was scheduled to arrive at Hibiya Park at 11 a.m. The ark with the image was borne by 20 carriers dressed in white robes and black caps of Shinto origin. The ark was about 4 feet square with an ornate roof and was lacquered in black. The openings on the four sides were draped with gold brocade curtains. It was certainly very beautiful and quite oriental.

"In the procession also were the Buddhist priests in gorgeous robes, the Celestial flower girls, and the students of various Buddhist schools. On the way the procession stopped in front of the large department stores and other large institutions. At these times the curtains on the four sides were raised so that pedestrians might worship the image of Buddha. Hundreds of people along the way stopped and offered prayer to the image for the well being of their families..."

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.

674. Morse, W.J. 1929. Re: Soybeans and Japan. Letter to R.A. Oakley, USDA, Washington, DC, April 27. 3 p. Handwritten, with signature on hotel letterhead.
• ***Summary:*** "Have been thinking about writing you for more than two weeks but just couldn't get around to it. Sure do keep busy night and day... As we are sending our first lots of seed, bulbs, etc. in which are many soybeans, adsuki, etc., thought I had better write about the planting.

"Before leaving Washington, I explained to Mrs. Donavan about taking small samples of each number as it came for our sample cases. All of the soybeans can be grown at Arlington Farm [Virginia] even if they are not planted before June 20." He gives planting instructions for the adsuki beans, mung beans, cowpeas, hyacinth beans (*Dolichos lablab*), jack beans and sword beans; they "can be planted at the Sandhill in Columbia, South Carolina, and also at McNeill, Mississippi."

"This trip has more than opened my eyes on the soybean plan. Soy sauce, the green vegetable bean, and possibly miso are the only products now used extensively in the Orient that have possibilities in the United States as foods. The oil industry, of course, will be our great development... I just saw an article in one of the daily papers here where soybean oil meal led all fertilizers used in the Japanese Empire and is the largest imported one... The main object in the Orient as I see it is to obtain as many varieties as possible to fit in our diversified conditions and then work out the other problems so they fit in with the sections.

"I have taken about 500 feet of motion picture films with the DeVry which Dr. Pieters bought for me and have had very good results."

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: The Imperial Hotel, Tokyo, Japan.

675. 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 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, 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.

676. Morse, W.J. 1929. Re: Impressions of Tokyo, Japan. Letter to Lena and John Morse (his parents), Washington, DC, May 10. 10 p. Typed, without signature (carbon copy).
• ***Summary:*** "Dear Folks, Well things have been going so fast since I last wrote that I hardly know where to begin and so much that to tell it all would take a book, seems to us that there is always some festival going on, a holiday or something.

"On May 5 was the boy's festival and one sees fish, paper or cloth, flying from houses where there is a boy." Describes a visit to an experiment station to see the manufacture of soy sauce (experiments carried on in a small factory size) and many journeys in the Japanese countryside. Morse is struck by the beauty of the countryside, temples, gardens, and flowers, and by the strong smells in villages from the "manure pits" containing well-rotted night soil (human excrement). Signed: Will, Edna and Margaret–Morse, is wife and daughter. Address: Imperial Hotel, Tokyo, Japan.

677. Dorsett, P.H. 1929. Soybeans 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 1105 (13 May 1929, Tokyo). "Worked on getting plant material for shipment to Washington and got

our three packages by parcel post.

“We sent two over, did not think to weigh them and one had to be returned so we opened it up and took out a box and made it into a third package, We also wrote Mr. Ryerson in detail concerning this shipment.

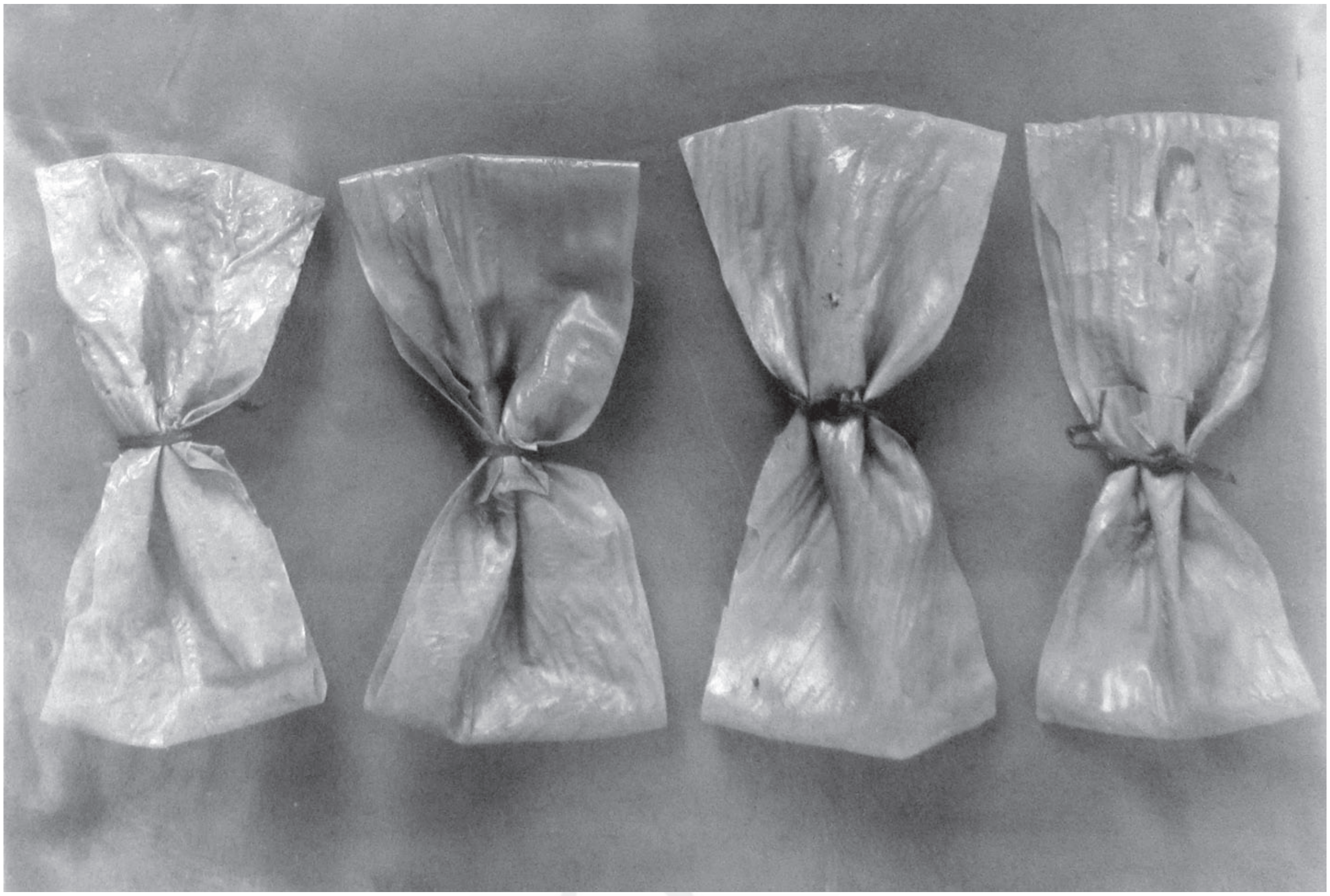
“About 2:00 p.m. Mr. Beattie came into the laboratory and said that while over near the consulate he met the Consul General near the Consulate and he told him there was a cablegram for P.H. Dorsett with charges of Yen 30.24, collect and that they sent it over to the Imperial Hotel not having sufficient funds to pay the charges. A cable coming in with as heavy charges as the above makes a rather complicated situation and we cannot understand why they should not come prepaid.

“We acknowledged the receipt of the cable in our letter noted above. A copy of the letter which is self-explanatory follows.

“Morse and I had about completed our plans for a weeks trip into the Izu Peninsula when it occurred that perhaps Mr. Morse would prefer to make a trip into Hokkaido, the principal soybean region of Japan, to look the field over and see what the conditions are for making temporary headquarters there for a time, and to find out the season best suited for getting the information and pictures desired concerning the planting, cultivation, harvesting, and handling of this crop in Japan.” Address: Agricultural Explorers, USDA, Washington, DC.

678. Dorsett, P.H.; Morse, W.J. 1929. Yuba 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 1009-10 (14 May 1929, Tokyo). “Copied from Mr. Morse’s diary... We were also quite surprised to find a bean vermicelli made from soybean flour, as we did not know soy flour could be used for this on account of the small starch content. The number of adsuki [azuki] bean



products seemed unlimited and we plan to collect these later. We were also able to collect three kinds of yuba, a thin skin-like product (very rich in protein) obtained in the boiling of soybean milk."

Page 1061. "One-half natural size picture [photo] of a package of yuba rolls. Beside the picture are some of the rolls showing character of the bean-curd skin (Yuba). This form of yuba is known as 'Maki-yuba' [as written on the label]. Meaning yuba rolls and is used in making soups and in other dishes" (neg. #43666).

Page 1066. "Between ½ and ¼ natural size picture [photo] of a package of yuba sheets, rich creamy yellow in color. Beside the package is a tied small bundle of the yuba sheets which after being moistened are used to wrap rice in for lunches. Yuba is very rich in protein" (neg. #43671).

Page 1069. "Natural size picture [photo] of a package of yuba in ribbon-like rolls. Beside the package are rolls showing the manner of rolling the thin narrow sheets of yuba. This form is used in soups" (neg. #43674).

Page 3480. "Small dried sheets of soybean 'Yuba' arranged in the shape of bow ties. Purchased at small grocery store in Tokyo, Jan. 6, 1930. Native name is 'Yuba.' Yuba is the film obtained when boiling soybean milk. Used most commonly in soups. This is a natural size picture" (neg. #44740).

Pages 3555 to 3560. (15 Jan. 1930). "Today we visited a yuba factory for the purpose of getting information as to how this soybean product is made, and also to try and get still and motion pictures of the equipment and processes... Details as to the method of making yuba will be found in the special report on soybeans and soybean products." A boiler was used in this yuba factory. Bamboo trays placed over a heater were used to dry the yuba. Photos taken in Tokyo show:

Page 3557. "An interior view of a yuba factory showing at the left the mill surrounded by a hopper and an extending small pipe to supply a small stream of water for grinding to the right in the cooker, also tube and long handle knife" (neg. #44771).

Page 3558. "An interior view of the portion of the factory where the bean milk is evaporated. A part of the furnace is shown in the foreground; across this lays two bamboo trays with bits of broken yuba on them. Back of these can be seen four evaporating trays or pans" (neg. #44772).

Page 3559. "A nearby view of two half-sheets of yuba hanging across a small bamboo strip. The sheets before being cut are just the size of the evaporating pan (neg. #47773).

Page 3560. "A nearby view of broken pieces of yuba on a bamboo tray. This is a little nearer than [neg.] #44772, otherwise the same (neg. #47774).

Page 3585. "Two packages of yuba and two rolls and sections of a roll which is sold commercially in this manner. Length of packages: 9 inches. D & M. #3292.

Page 3590. "The sheets of Yuba as they come from the pan measure about 16 x 20 inches and are put up in various forms for the market. This view shows folded and sectional views of Yuba (neg. #44782).

Pages 3595-97 (17 Jan. 1930, Tokyo). "Went out to the Yuba making plant this morning to try and get some still and motion pictures... We found the owner and his wife were busily occupied. He was taking up the sheets (17 x 21 inches) of Yuba from the evaporating pans and hanging them up to dry. The pans are of copper, about 3 inches deep by 17 inches wide and 21 inches long. The evaporating pans are filled from ½ to 2/3 full of soybean milk, and evaporated over a slow fire. As the Yuba or layer of scum forms over the surface of the heated milk, it is loosened at the edges by running a small bamboo knife around the sides. A small split stick of bamboo is then run under the film the long way, and the scum or sheet of Yuba, which laps down over the stick like a wet sheet of paper, is lifted and the stick stuck into a crack so that the sheets hang over the evaporating pans to dry.

"Do understand that as many as 25 or 30 sheets of Yuba may be taken from one pan of milk. However, from 10 to 15 is the usual amount taken. Those taken in excess of these amounts are not considered to be of very good quality." Photos show:

Page 3597. Tokyo. These sheets of Yuba have just recently been lifted from the evaporating pan and hung up to dry. They are about 17 by 21 inches" (neg. #46786). The sheets shown from a different angle (neg. #44787).

Page 3639. Tokyo. "A nearby view of a tray of broken pieces of Yuba. Not quite so close a view as #44744 (neg. #44803).

Pages 6924-25. Notes by Mr. W.J. Morse, Tokyo, Japan. Today was set aside for studying miso. However, in the process: "At several stores we found Yuba in abundance, more so than last season. A number of different forms of miso [?] Yuba were found at one store, among which was one we had not observed before." Address: Agricultural Explorers, USDA, Washington, DC.

679. Dorsett, P.H.; Morse, W.J. 1929. 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:*** Pages 1009-10 (14 May 1929, Tokyo). "Copied from Mr. Morse's diary. In the afternoon we went to Matsuzakaya store to look over bean products and as a result we secured seventeen different soybean products. We found that they had 20 different forms of miso, a product which we think may have possible value at home."

Page 1053 (16 May 1929, Tokyo, Japan). A photo shows a natural sized picture of a small wooden box of miso. The Japanese name is given but is illegible.

Page 1054. "Natural sized picture of a small wooden box of miso. Native name: "Kansai miso." It is made in the Kansai district [the Kyoto-Osaka area] and is used in making miso soups (neg. #43659).

Page 1068. Photo of a "small wooden box of 'Edomiso' [Edo miso] which is made in the Tokyo District. Miso which is quite salty is used in making soups. In the city, miso soup is used for breakfast, which in the country miso soup is used for lunch and supper."

Page 1070. Photo of a small wooden box of "Shiromiso" [shiro miso], meaning white miso. "This form contains rice and is used in making miso soup."

Page 1202 (26 May 1929, Sapporo, Japan). Mr. Morse visited the Hokkaido Agricultural Experiment Station at Kotoni. Mr. Takatsugo Abiko explained that "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 2004 (29 July 1929). Morse visited the Saitama Experiment Station at Urawa, Saitama prefecture. Met Mr. Tadashi Hashigawa, who is in charge of the soybean work of this prefecture, which is third in soybean acreage in the Japanese Empire. His main work is developing varieties to be used for making soy sauce, tofu, miso, and natto. This station grows about 50 varieties, nearly all yellow-seeded and medium in size.

Page 2445-46 (19 Sept. 1929). Visited the Tokachi Branch Experiment Station in Hokkaido. Met Mr. Seiji Kawase and Yoshio Fujine. 60% of the crops grown in Hokkaido are legumes; of these, field beans are first, followed by soybeans, then field peas. The Tokachi district is very well adapted to soybean culture. There are five grades of soybeans plus a special grade for beans that will be used for soy sauce, miso, etc. Of the 1,837,325 bushels of soybeans produced in Hokkaido, 58% is exported [to outside of Hokkaido] and 42% is consumed in Hokkaido as follows: Miso 9%, soy sauce 9%, seeding 6%, tofu and other products 18%. In 1923 Hokkaido was Japan's leading soybean producing region with 17% of the nation's production, followed by Ibaragi [Ibaraki] 5%, Saitama 5%, Nagano 4%, Kumamoto 4%, Aomori 4%, Niigata 4%, etc. Address: Agricultural Explorers, USDA, Washington, DC.

680. Dorsett, P.H.; Morse, W.J. 1929. Roasted soybeans 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 1051, 1059 (16 May 1929). "Slightly larger than natural size picture [photo, taken in Tokyo] of a package of roasted soybeans imbedded in very small rice flour cakes... This article of food is known as *mame tarô.* The skin of the bean is dyed green. These are eaten as confections and may be had at all confectionery stores.

Page 1060. "Natural sized picture of rice flour cakes in which are imbedded small black seeded soybeans (roasted). Native name is *Mameiri abura age kaki mochi."*

Page 1065. "Natural sized picture of a sample of sugared soybeans (native name *Sato Daidzu*) and of a sample of roasted soybeans (native name *Nori-mame* or *daidzu*) over which, during the last stage of roasting finely cut seaweed [nori] is scattered. Both products are used as confections and are had at all confectionery stores.

Page 1067. "Natural size picture of roasted soybeans imbedded in very small rice flour cakes. The skins of the beans are dyed green."

Page 3469, 3485 (8 Jan. 1930). Photo: "Box of sugar coated roasted soybeans purchased at a small confectionery store, Tokyo, Japan, December 24, 1929. The beans are first soaked for 12 hours, partially dried, roasted and then covered with sugar syrup of various colors. Box [with decorative cover] measures 3½ inches long, 5½ inches wide."

Page 3515. Photo of a bag of "Candied soybeans. Soaked and roasted soybeans sugared. The bag measures 5 inches across. This is a pretty good product which might take pretty well in the States."

Note: This is the earliest English-language document seen (Dec. 2012) that contains the term "Candied soybeans" or the term "roasted soybeans sugared" or the term "sugar coated roasted soybeans."

Page 3529. Photo: "Roasted soybeans imbedded in small round rice cake balls used as a confection." Packages 10½ inches long, 2½ inches diameter.

Page 3538. Photo: "Soybean candy. Small cylindrical pieces of candy in which are imbedded medium small roasted soybeans."

Page 3583 (16 Jan. 1930). "Soybeans in candy. Photo of box 7 by 9¼ inches. Small white sugar cakes in which there are roasted soybeans and also small rice flour cakes with roasted soybeans. These forms of confections are generally mixed with other forms with rice, sorghum, and peanuts."

Page 3584. "Iri-mame. Ama-natto. The coated beans are brown and red.

Note: This is the earliest English-language document seen (Dec. 2012) that uses the term "Iri-mame" to refer to Japanese dry-roasted soybeans.

Page 3589. Photo of 9-inch box. "Small oblong pieces of soybean candy, made of sugar syrup and roasted soybeans. Some pieces are of small round black soybeans (green or yellow germ) and others with medium small greenish yellow soybeans. Soybean candy is generally mixed with other kinds, rice, sorghum, peanut and white beans."

Page 3591. Photo: "Sugar coated roasted soybeans, some of which are covered with finely ground seaweed. This product can be found at nearly all confectionery stores and stands. Length of paper bag: 9 inches."

Page 3592. Photo: "Mame-cha." Roasted and cracked soybeans mixed with tea leaves and stems. Before using the material is generally heated slightly so as to bring out the full flavor. Size of tin box: 3½ by 7½ inches. Also sold in paper bags."

Page 3593. Photo of same product sold in 10-inch paper bags.

Page 3634. Photo: A decorative bag of "soybeans roasted and cooked with dough, the beans are also covered with seaweed."

Page 3638. Photo of an open 8-inch-long paper bag. "These are roasted and puffed soybeans on which are pieces of seaweed."

Page 3711 (28 Jan. 1930). Photo: "Kasutera." "Roasted soybeans made into patties with sugar syrup."

Page 3713. Photo of "Soybean and puffed rice candy."

Page 3716. Photo of bag (7 by 11 inches) of Tajimaya "Roasted soybeans, sugar covered. They are pink and green colored."

Page 3723 (29 Jan. 1930). Photo: "Rice cookies in which roasted soybeans (black variety) have been baked. Soy sauce is brushed over the cakes immediately after they are taken from the oven."

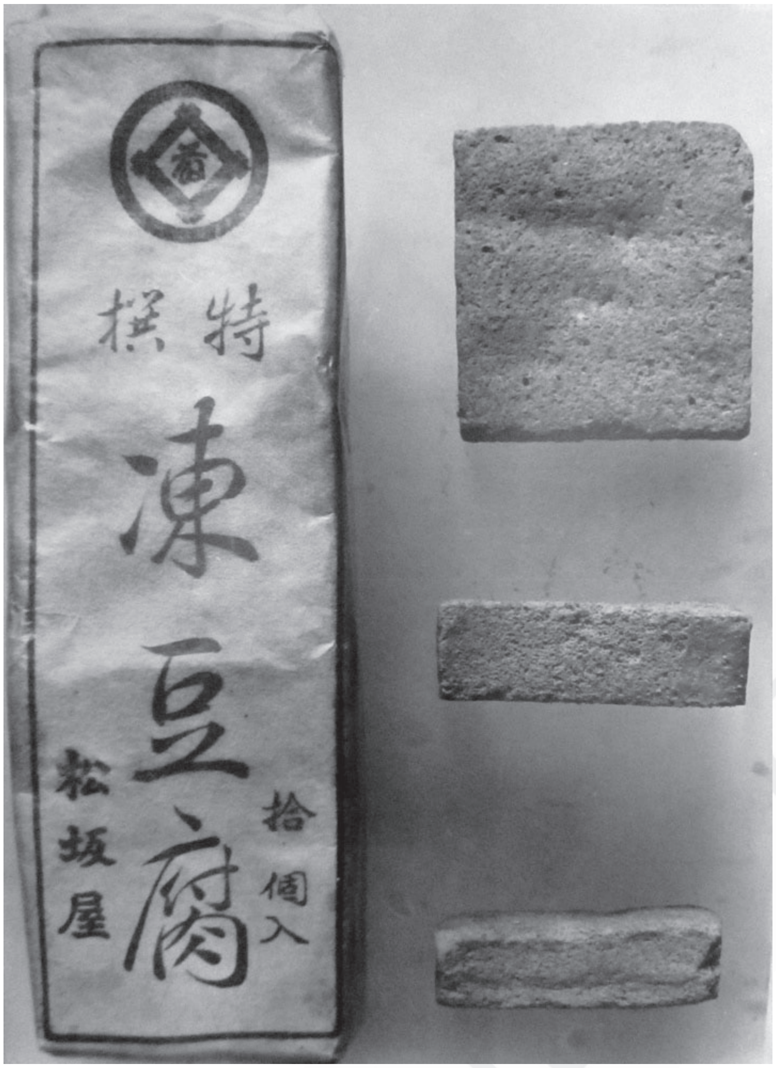
Page 3724. Photo: "Small balls of puffed rice and also millet, in which are mixed roasted black soybeans."

Page 3742. Photo: "Soybean stems and small twigs of holly with thorny leaves. Sardines are impaled on a couple of the soybean branches, and near the base of the plants are some roasted soybeans. This combination is supposed to keep away evil spirits and also to bring good luck to the family. 'Devil chasers.'" Address: Agricultural Explorers, USDA, Washington, DC.

681. Dorsett, P.H.; Morse, W.J. 1929. Tofu and other soybean products 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 1051, 1056 (16 May 1929). Tokyo, Japan. A photo shows: "Nearly natural sized picture of a package of dried bean curd or tofu. Native name is 'Koya tofu.' The fresh bean curd is first frozen and then dried. This dried form of curd is used in general cooking with vegetables and meats." The front label on the rectangular package is attractive (neg. #43661).

Page 1057. A photo shows: "Section of a large bamboo culm [the round, hollow stem] which has been transformed



into a package for holding (for sale commercially) vegetable pickles. The handle is of kudzu vine. The stopper is of cedar [*hinoki*], *Cryptomeria japonica* (neg. #43662).

Page 1059. "Slightly larger than natural sized picture [photo] of a package of roasted soybeans imbedded in very small rice flour cakes. Beside the package are some of the beans in the rice cakes. This article of food is known as "Mame taro" [as written on the label]. The skin of the bean is dyed green. These are eaten as confections and may be had at all confectionary stores" (neg. #43664).

Page 1060. "Natural sized picture of rice flour cakes in which are imbedded small black seeded soybeans. Native name is 'Mameiri abura age kaki mochi.' Meaning roasted beans on fried rice cakes" (neg. #43665).

Page 1064. Two packages of mungbean noodles or vermicelli obtained from the Matsuzakaya Department Store. The vermicelli is known in Japanese as 'Tomen'" [sic, Harusame] (neg. #43669).

Page 1065. "Natural sized picture [photo] of a sample of sugared soybeans (native name 'Sato Daidzu') and of a sample of roasted soybeans (native name 'Nori-mame' or daidzu) over which, during the last stage of roasting, finely cut [nori] seaweed is scattered. Both products are used as confections and are to be had at all confectionary stores" (neg. #43670).

Page 1067. "Natural sized picture of roasted soy beans imbedded in very small rice flour cakes. The skins of the beans are dyed green" (neg. #43672).

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." Address: Agricultural Explorers, USDA, Washington, DC.

682. Dorsett, P.H.; Morse, W.J. 1929. Roasted soy flour 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 1058 (16 May 1929, Tokyo, Japan). "Nearly natural size picture [photo] of a package of soybean flour [kinako] purchased at the Matsuzakaya Department Store. Beside the package is a small sample of the flour which is known in Japanese as 'Kinako' meaning yellow flour. Before being made into flour the beans are roasted which gives an excellent nutty flavor. The flour is used extensively as a covering for rice cakes" [confections] (neg. #43663)."

Page 2669 to 2670 (16 Oct. 1929, Tokyo). "We were advised of a special soybean flour and confection made in Kumagaya [in Saitama prefecture, northeast of Tokyo]. We took time on our return to visit a factory making and selling the confection. The flour made from a special variety of soybean, 'Gokushin,' is roasted and is used to cover a small roll of puffed steamed rice. This product is called 'Gokabo' and is made in large quantities by two factories in Kumagaya. A sample of the roasted flour (D. & M. #1602) and two boxes of 'Gokabo' were obtained for the soybean exhibit."

Page 3514 (11 Jan. 1930). "Soja max. Soybean flour and rice confection. Cover and box of puffed sugared glutinous rice covered with a greenish roasted soybean flour paste, short cylinders, and rolled in the roasted soybean flour. Size of box top over all 7½ x 9 by 2½ inches deep (neg. #44749)."

Note 1. This is the earliest document seen (Nov. 2012)

which contains the term "roasted soybean flour paste," or which states that roasted soybean flour is made into a paste.

Page 3517. "Soybean flour. These small paper packages covered with thin waxed paper, retail at about 10 sen each. These packages measured, tied 9 inches, untied 9½ inches in length. The flour is of a dull golden yellow color (neg. #44752)."

Page 3518. "Soybean flour and rice confection. Rolls of puffed sugared glutinous rice covered with roasted soybean flour paste or dough and then rolled in roasted soybean flour. Only made in Kusagaya. The round cylindrical packages measure 7½ inches in length. D. & M. #3094 (neg. #44753).

Page 3691, 3702A (25 Jan. 1930, Shizuoka). "Soybean product #3741, Rice paste balls, white, sprinkled with brown roasted soybean flour. Package of sugar at left in which the balls are dipped... Native name 'Abekawa mochi.' Purchased at a confectionary store in Shizuoka, Japan, Jan. 24. (neg. #44848)."

Page 3702B. A package of "'Abekawa," commonly called 'rice dumplings" or soft rice paste. This is one of Shizuoka's noted products. Purchased in Shizuoka, Japan, Jan. 24, 1930 (neg. #44849)."

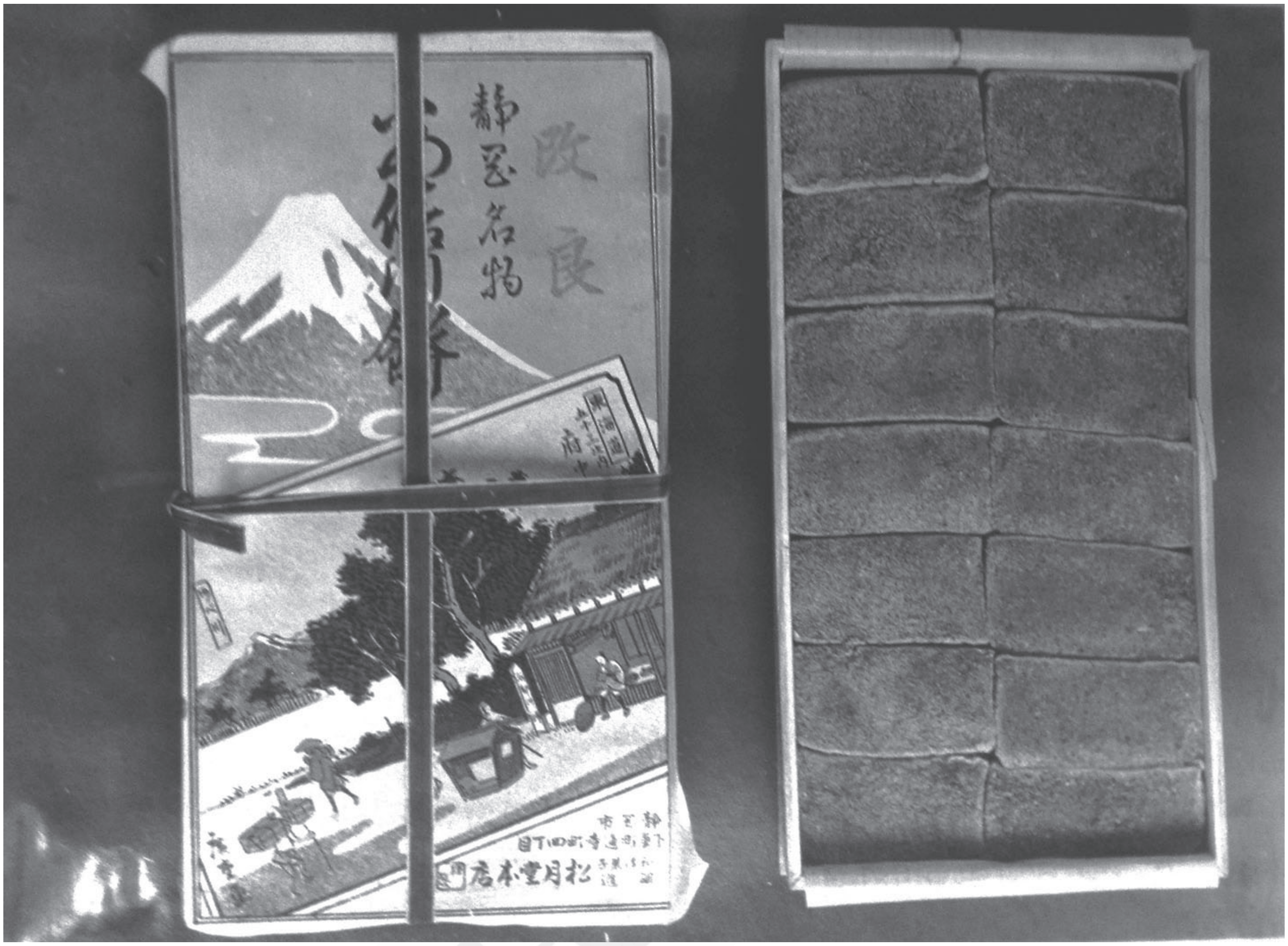
Page 3732 (31 Jan. 1930, Tokyo). "Adzuki bean cakes covered with green colored soybean flour. The box measured 4 by 7 inches. D. & M. #3760 (neg. #44864)."

Page 3821 (8 Feb. 1930). "Soybean flour purchased in a store in Yokohama, Japan, Feb. 7th, 1930. The native name is 'kinako.' It is used in sprinkling over adzuki bean paste. The size of the bags is 3½ inches by 5¼ inches. D. & M. #3789 (neg. #44897)."

Page 3870 (13 Feb. 1930). "Green soybean flour made from the 'Sakochin' variety of soybean. This variety is grown in the northern section and is used especially for making this flour. The flour is used in making soybean confections. Native name 'Kinnaki' [sic, kinako]. Purchased at Kumagaya, Japan. D. & M. #3811 (neg. #44904)."

Page 3876 and 3877 (13 Feb. 1930). "Round pieces of curled, roasted soybean flour paste separated by rice paste, also oblong pieces twisted. Also soybean and soybean flour. Purchased in Omiya, Japan. Native name is 'shigatami' D. & M. #3817-18 (neg. #44910). Page 3877 is a different of the objects on page 3876 (neg. #44911)."

Page 3889. "Small blocks of red adzuki bean sweet paste between thin layers of sweetened roasted soybean flour paste. Purchased in Tokyo, Japan, February 13, 1930. Native name is 'Ita mame.' D. & M. #3824 and 3825 are the same



but with different sugar designs on them (neg. #44919).”

Note 2. This is the earliest document seen (Nov. 2012) that contains the term “Sweetened roasted soybean flour.”

Page 3891. “Triangular pieces of red adzuki bean sweet paste between two layers of sweetened roasted soybean flour. Purchased at Tokyo, Japan, February 13, 1930. Native name is ‘Wakamatsu.’ They sell at 60 sen a pound. D. & M. #3831 (neg. #44920).”

Page 3891. “Small cylindrical pieces of rice dough covered with sesame seed. Within the rice dough is sweetened roasted soybean flour. The native name is ‘Tomoshirama.’ Purchased at Tokyo, Japan, February 13, 1930. They sell at 80 sen a pound. D. & M. #3832 (neg. #44921).”

Page 3892. “Small balls of sweetened roasted soybean flour paste pierced with small sticks [wooden skewers]. The balls are brown, tan and green. Purchased at Tokyo, Japan, February 13, 1930. Sell at 10 sen each. D. & M. #3847 (neg. #44922).”

Page 3893. “Soybean wafers (14 Feb. 1930). Sweet roasted soybean flour paste between thin layers of baked rice dough. Different designs burned on one side. Purchased at Tokyo, Japan, February 13, 1930. Sell at 70 sen a pound. D. & M. #3846 (neg. #44923).”

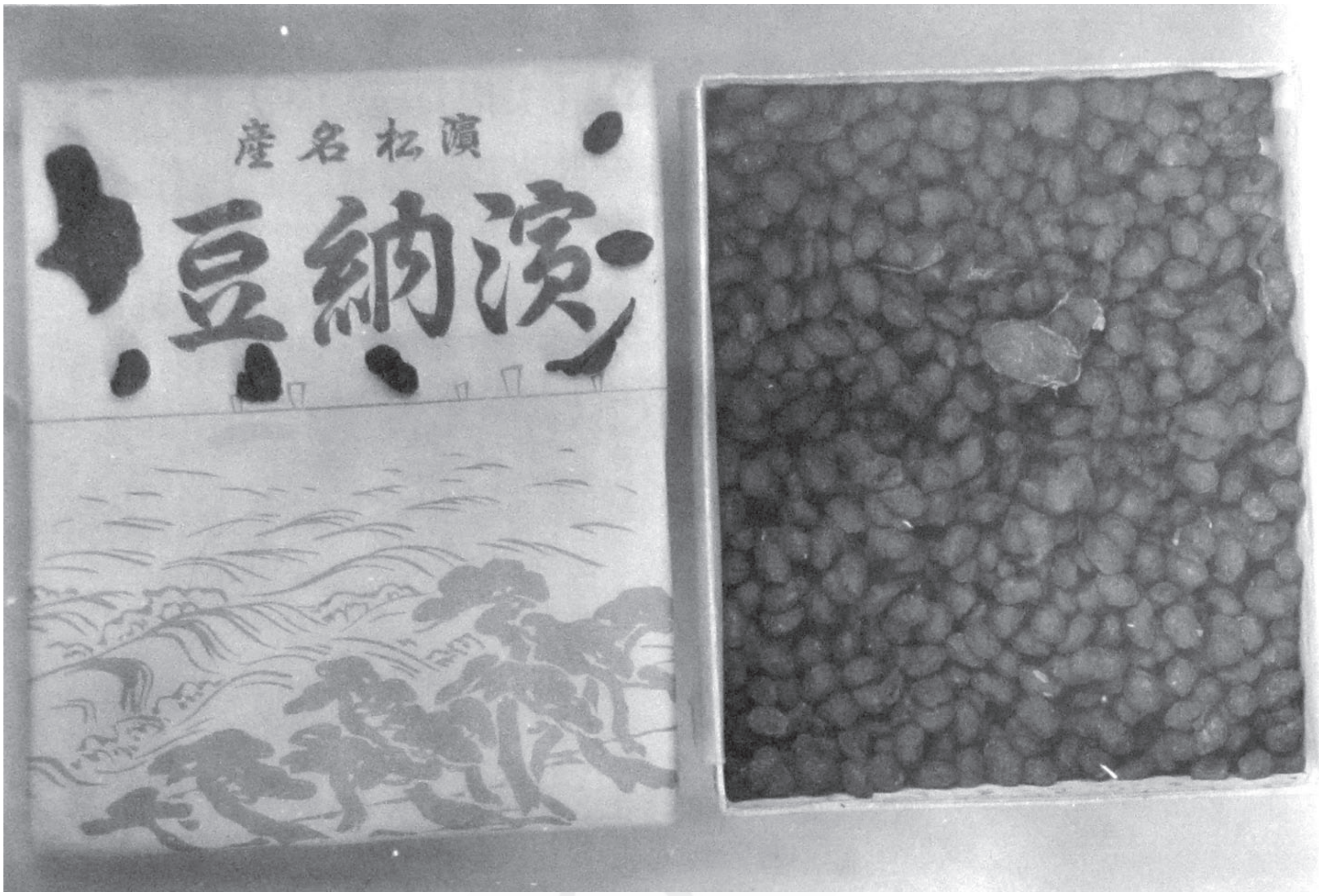
Note 3. This is the earliest document seen (Nov. 2012) that contains the term “Sweet roasted soybean flour.”

Page 3894. “Soybean wafers. Sweet roasted soybean flour paste between thin layers of baked rice dough. Different designs burned on one side. Purchased at Tokyo, Japan, February 13, 1930. Sell at 70 sen a pound. D. & M. #3843 is ‘Shikishi suwama’ (neg. #44924).”

Page 3898. “Three bamboo sheath packages, each containing a slab of sweet roasted soybean flour paste. The native name of this is ‘Suwama.’ These packages sell for 15 sen each. Purchased at Tokyo, Japan, February 13, 1930. D. & M. #3830 (neg. #44928).”

Page 3946. “Thin wafers (similar to Nabisco) with layers of sweetened roasted soybean flour between two layers of rice flour. Purchased in a confectionary store in Tokyo, Japan, February 18, 1930. Price 8 for 10 sen. Native name ‘Suwama.’ The dish of soybeans measured 3 inches across (neg. #44945).”

Page 4036. “A nearby picture of small paste confection made of sweetened roasted green soybean flour, coated on sides with sugar frosting (white). Purchased at Tokyo, Japan, February 22, 1930. Native name “Hisago.” Price two sen



each (neg. #44981).

Note 4. This is the earliest document seen (Nov. 2012) that contains the term "roasted green soybean flour," or that describes "roasted soybean flour" which is green in color.

Page 4038. "Nearby picture of small confections made of sweetened roasted soybean flour (brown) between two thin layers of roasted rice flour (paste, white). Purchased at Tokyo, Japan, February 22, 1930. Native name 'Shiro zennai.' Price one sen each. Dishes measure 3 inches across (neg. #44983).

Pages 4039 and 4040. Very similar to the previous page but with a different arrangement (neg. #44984 and #44985).

Page 4041. "A nearby view of small cylindrical rolls of sweetened roasted green soybean flour, inside of which is a small core of red adzuki paste. Purchased in Tokyo, Japan, February 22, 1930. Native name 'Tamasudare.' Price 2 sen each (neg. #44986).

Page 4042. "A nearby picture of small cakes of rice flour, sugar and coarsely ground roasted soybeans. molded in forms of various masks. Purchased in Tokyo, Japan, February 22, 1930. Native name 'O-mea Rakugan.' Price 20 sen a pound. (neg. #44987).

Note 6. This is the earliest document seen (Aug. 2011) that contains the term "ground roasted soybeans" or the term "coarsely ground roasted soybeans." Thus there is a continuum in Japan from "roasted soybeans" (*irimame*) through "coarsely ground roasted soybeans" to "roasted soy flour" (*kinako*).

Page 4043 is very similar to the previous page but with a different arrangement of the items (neg. #44988). Address: Agricultural Explorers, USDA, Washington, DC.

683. Dorsett, P.H.; Morse, W.J. 1929. Hama Natto and Daitokuji Natto in Japan and salted soybeans 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 1053 and 1055 (16 May 1929). Tokyo, Japan. A photo shows: "A little more than one-half sized picture of a box of Natto–native name 'Hama Natto.' It is made in the Hamamatsu District [Shizuoka Prefecture, central Japan]. It is known as dry natto. The beans are soft and of a flavor like dill pickles. The beans are eaten as a relish. D. & M. #246" (neg. #43660).

Note 1. This is the earliest English-language document seen (Nov. 2011) that contains the term "Hama Natto" (unhyphenated, regardless of capitalization); it refers to a

type of traditional Japanese fermented black soybeans.

Pages 3229, 3230, and 3231 (10 Dec. 1929, Kyoto). Contains long lists of the vegetables and fruits seen in the Kyoto morning market. "We got two nice soybeans, one a fine large black one, the other as nice a yellow one as we've seen."

"We then went to a Natto manufacturing place near an old temple known as Daitokuji. Here we tried out a kind of natto [Daitokuji natto = fermented black soybeans] which we think might take with the American people, also miso, both are different from any we have previously seen. A detailed account of the manufacture of these products is to be found in our special report concerning the soybean and its products."

Note 2. This is the earliest document seen and the earliest English-language document seen (Nov. 2011) that mentions Daitokuji as a place that manufactures fermented black soybeans in Kyoto, Japan, near the old temple named Daitokuji. Daitokuji is a Rinzai Zen Buddhist temple in northern Kyoto. Here "Daitokuji natto" have long been made as both a seasoning in the vegan diet of the monks and as a well-known souvenir for tourists.

Page 3231. "We left Kyoto on the 10:14 p.m. train and are due to arrive in Tokyo about 9:00 a.m. tomorrow morning, Wednesday, December 11, 1929." Pages 3469 and 3483 (8 Jan. 1930). Tokyo, Japan. A photo shows: "Box of dried form of Natto sold under the name of 'Hama-natto.' Purchased at the railway station of Hamamatsu, Japan, December 11, 1929. This form is only made in the Hamamatsu district. Eaten as it is, when one drinks tea. Box 7½ inches long and 4¼ inches wide. D. & M. #3442" (neg. #44743).

Page 3484. "Box of soybean 'Natto' purchased from a Natto factory in Kyoto, Japan, December 10, 1929. Native name 'Tsubunatto' [Tsubu-natto; slightly crushed natto] or 'Daitokuji' Natto. This is a dried form of Natto, commonly known as 'Hamanatto,' and is only made in Kyoto and Hamamatsu, Japan. The name 'Daitokuji' Natto is taken from the Daitokuji Temple, of which a priest first made this product. Generally eaten when drinking tea. Box is 7 inches long and 4 inches wide D. & M. #3071" (neg. #44744).

Page 3486. Box of Natto, known as 'Hamanatto,' purchased at a small store in Tokyo, Japan, December 24, 1929. This is a dried form of Natto and is made in Hamamatsu, Japan. Hamanatto is eaten when one drinks tea. Box 6 inches wide; 7½ inches long. D. & M. #3073" (neg. #44746).

Page 6264 and 6274 (24 Oct. 1930). Peiping, China. P.H. Dorsett. A photo shows: "Soja max. Salted soybeans... Life sized pictures. Dry form, D. & M. #47531; moist form D. & M. #47530. Dry form consists of small flat black beans cured like string natto and then dried. Moist form, soybeans cured like string natto" (neg. #46124). Note 3. Natto (stringy natto) is unknown in modern China. The salted black soybeans may well be fermented black soybeans (fermented, salted black soybeans).

Page 6945-6946 (13 Jan. 1931). Kyoto, Japan. "Notes by Mr. W.J. Morse... We were taken to the Chemical Laboratory where Mr. Katagiri is doing some work on soybean products, especially soy sauce. Concentrated soy sauce is shipped to the United States in rather large amounts and then diluted and bottled. We were shown a sample of soyamint which is a practical soysauce product and made in about three months. It is said that the soybeans are treated with an acid solution, then neutralized and rice Koji added. After three months of curing, the soy sauce is ready for use.

Note 4. This is the earliest English-language document seen (April 2012) that contains the word "soysauce" (spelled as one word).

"After lunch we went to the Taitokuji [sic, Daitokuji] Temple where the famous Taitokuji Natto [sic, Daitokuji Natto] is said to have been originated by one of the Temple priests more than 400 years ago.

"Mr. Sekkai Ota, one of the temple priests, very kindly explained the history of the dried form of Natto as well as the whole process of its manufacture. This form of Natto will keep indefinitely and is eaten when sprinkled with a mustard sauce or sweet liqueur. The Hamamatsu Natto is made in the same manner but is allowed to dry more."

Page 6947 (13 Jan. 1931). Soybean Natto. Photo shows: "Group at the Kyoto Imperial College of Agriculture: Prof. Matsumoto, Prof. Kamikawa, W.J. Morse, U.S. Department of Agriculture, Washington, D.C. and Mr. Sekkai Ota, Priest of the Taitokuji [sic, Daitokuji] Temple at Mr. Morse's right, who explained the method of manufacture of Taitokuji [sic] Natto. A dried form of Natto originated at the Temple more than 400 years ago" (neg. #46446). Address: Agricultural Explorers, USDA, Washington, DC.

684. Dorsett, P.H.; Morse, W.J. 1929. Soybean cultivation 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 1147-1148 (22 May 1929, Tokyo). "Copied from Mr. Morse's diary:... At Ichinoseki we purchased from a lunch boy, some soybean products. This place is said to be a center of production of a large number of soybean food products. It is in the Iwate-ken prefecture which is second in soybean acreage and production in the Japanese Empire."

"This mountainous section soon gave way to a general farming region, more or less hilly, but extensively cultivated in soybeans, adsuki beans, rice, barley... The beans were planted in rows on ridges about 18 inches apart and after planting the ridges were packed by tramping as indicated by

the close foot prints the entire length of the rows."

Pages 1201-1202 (Sunday, 26 May 1929). "Copied from Mr. Morse's diary: Sapporo, Japan. In the morning we went to the Hokkaido Agricultural Experiment Station at Kotoni, where we met Dr. Takatsugu Abiko, chief of the Agronomy and Horticultural Sections. He explained to us in detail, by maps, the different sections of Hokkaido where soybeans are grown extensively. He advised that most of the soybean experimental work is carried on at the Tokachi Branch Station, one of the northern stations.

"We were shown the exhibit of various crop products grown in Hokkaido, and also the seed of new varieties of crops developed by the Kotoni station. This station is working with about 50 varieties of soybeans, and has developed two large very fine looking yellow varieties. We were also shown samples of about 275 varieties being grown at the station. Dr. Abiko informed us that we can obtain seed of all these varieties after harvest this fall.

The principal insect enemy of the soybean, and one which does much damage to the mature seed in the field is the 'Mame shinkui ga' (moth into bean), a moth *Laspeyresia* (*grapholitha*) *glycinivorella.* It is a small moth, the larva of which cut into the mature bean. In general it causes about 10% loss to the Hokkaido soybean crop. The early plantings are injured about 40% while the late plantings are only injured about 10%.

"The principal soybean diseases which cause much damage to the crops, are a leafspot, *Peronospora manshurica* and a mosaic [sic, nematode] *Heterodera schachtii.*

"The soybeans grown in Hokkaido are used entirely for food purposes such as Natto, bean curd [tofu], green vegetable bean, soy sauce, miso, bean paste and roasted beans."

Pages 1236-1237 (28 May 1929). "After breakfast we made two rounds of seed stores and small grocery stores, and succeeded in obtaining several varieties of soybeans, garden beans, and more flower seed."

"We visited Sapporo's large department store seeking food products. Tokyo's large stores to us seem to have about everything under the sun, but today's store has everything. We found some new soybean products and quite a variety of other bean products."

Page 1692. A photo shows (negative #43941): "Inspecting soybeans which are about to be plowed or dug."

Page 1759 (30 June 1929). A photo shows (neg. #44008 and #44009) "In the vicinity of Shojiko. Turning under soybeans which are 10 to 12 inches in height in preparation for planting rice, the men and horse approaching the camera."

Page 1760. A photo shows (neg. #44010) "In the vicinity of Kofu, Japan. Cutting out the ripe barley and leaving the soybeans to be plowed under. Neg. #44011. "In the vicinity of Kofu, Japan. A nearby view of a Japanese woman harvesting barley and leaving the soybeans to be turned under in the preparation of the land for planting rice.

Page 1761 (neg. #44012). "In the vicinity of Kofu, Japan. Two Japanese women cutting barley and leaving soybeans to be plowed under in the preparation of the land for the planting of rice. Neg. #44013. "In the vicinity of Kofu, Japan. Two Japanese women planting soybeans on rice paddy ridges.

Page 1762 (neg. #44014). "In the vicinity of Kofu, Japan. A somewhat different view of the two Japanese girls planting soybeans. See picture #44013. Neg. #44015. "In the vicinity of Kofu, Japan. A farmer turning under wheat or barley straw and soybeans in preparation of the land for planting rice.

Page 1763 (neg. #44016). "In the vicinity of Kofu, Japan. A Japanese farmer hoeing in soybeans and wheat or barley straw preparatory to planting to rice in the near future.

Neg. #44017. "In the vicinity of Kofu, Japan. A Japanese farmer and helper, perhaps his wife, threshing grain with a foot power machine. See #44018.

Page 2183 (22 Aug. 1929) We "left for the Hokkaido Agricultural Experiment Station." We arrived at Kotoni, The Station is located within about 5 minutes walk of the train station. On arriving at the experiment station we met Mr. Tambo, the specialist in soybean investigations, who with the soybean expert and another man went with us over the station" which covers 108 acres. They are conducting a "very large varietal test of soybeans. The time spent thus from about 9:30 to after 2:00 p.m. was most interesting and instructive.

Page 2215 (26 Aug. 1929). "Went to the office this a.m. between 7 and 8 and attended to work there. At 10:00 a.m. we went over to the Hokkaido Imperial University to call on Dr. Ito relative to conditions at the various Hokkaido Experiment Stations and the best time for us to visit them to inspect the soybean planting to best advantage. We also submitted a list of plants in the Botanical Garden of which we would like to get seed or other plant propagating material.

Page 2417 (14 Sept. 1929). At 8:30 they "met Mr. Yutaka Tamayama, of the Hokkaido Agricultural Experiment Station, chief Director of the Kamikawa Branch Agricultural Experiment Station, and spent several hours talking with him about soybeans and other crops."

"We were much interested in the soybean work at the Station, but especially in the two non-hairy late forms growing there. Of one of these we secured a motion picture. We also got motion pictures and still picture shots showing soybeans growing on paddy ridges and of harvesting and racking rice for curing.

"We left Asahigawa at 5:39 p.m. and arrived at Sapporo at 10:27 p.m."

Page 2425 (neg. #44263). "Soybeans as they appear on the ridges of rice paddies in this region. This is a common practice of growing soybeans throughout many regions of Japan. Nagoya-mura, Japan."

Page 2433 (17 Sept. 1929). "Dorsett went to the laboratory early this morning and worked on jacketing and labeling up the pictures made on our last trip. Morse and Suyetake went to Kotoni Agricultural Experiment Station and made notes on the conditions of the soybeans. Morse saw a small threshing machine invented at the station which looks awfully good. We will try to get details of its construction later.

"We changed herbarium specimens and packed our supplies and equipment so as to get away at 8:00 tomorrow morning for a week exploration at Obihiro and vicinity. This is the largest soybean growing region in Hokkaido. If conditions justify we may get into other sections also."

Page 2441 (18 Sept. 1929). "Left Sapporo at 8:00 a.m. this morning for Obihiro, where we arrived at 3:56 p.m. We stopped at the Obihiro Shinyokan Hotel Inn, near the station."

"On descending the mountain after running through quite a long tunnel near the top of the ridge we saw some soybeans, but more adsuki beans and field beans than soya. We also saw quite a lot of buckwheat... The soybeans as well as the adsuki beans and even the rice look to us from the train window to be pretty short.

"Tomorrow we expect to visit the Tokachi Branch Agricultural Experiment Station, located at Obihiro-machi, Kosai county, Tokachi Province. Mr. Seiji Kawase is the director."

Pages 2445, 2446, 2447 (19 Sept. 1929). "Between 8 and 9 this morning we walked out to the Tokachi Branch Agricultural Experiment Station. We met Mr. Seiji Kawase, the director, and Mr. Yoshio Fujine, the soybean expert, and spent a very pleasant forenoon with them in the reception room at the laboratory.

"We were informed that in Hokkaido there are about 1,000,000 cho of land suitable for cultivation and that of this amount 130,250 acres are actually under cultivation. Of the important agricultural crops grown, legumes are rated as 60%; grain (except rice) 17%; rice (paddy) 7%, root crops 6%; miscellaneous farm crops 11%. Of the legumes, field beans stand first, soybeans second and field peas third.

"The climatic and soil conditions of the Tokachi district or region are better adapted to soybean culture than other parts of Japan.

"Here a family of four handle by hand 38 acres of soybeans and other crops.

"The soybeans of the Tokachi region and elsewhere in Hokkaido are utilized almost entirely for export" [since Japan has huge soybean imports from Manchuria].

"Soybeans are of five grades and those which fall without the fifth grade are what is known as waste grade, and are used locally for stock feed. These five grades are for commercial handling. Beans for special purposes such as for soy sauce, miso, etc., are of special grades and not necessarily of the ones noted.

"After the beans are cut they are permitted to lay on the ground for about ten days before being taken in to be threshed. Soybeans are, as a rule, flailed or beaten out. The beans are cut when fully ripe but just before the seed shatters. Harvesting usually begins about September 15th and may continue until about October 15th.

"Beans are planted in shallow furrows, 17 to 18 inches apart in the rows and covered with the feet.

"There are two cultivations during the season, the first about June 2nd, and the second about the middle of July. Hand hoeing and horse cultivation are employed, depending upon conditions.

"Acid phosphate is used (when used) at the rate of about 30 to 40 pounds per quarter of an acre once every three or four years.

"Farmers receive six yen per hundred pounds for their soybean seed.

"The beans are sold to merchants or are handled through agricultural societies and of the 1,837,325 bushels of soybeans produced in Hokkaido 58% is exported and 42% consumed at home [in Japan].

"The domestic use of the non-export beans is as follows: for Miso 9%; soy sauce 9%; seeding 6%; tofu and other products 18%." "Soybean production of Japan in 1923 amounted to 3,433,908 koku, which is equivalent to about 17,000,000 bushels.

"The following table gives the percent of this production within the noted regions: Hokkaido 17%; Miyagi 9%; Ibaragi 5%; Saitama 5%; Nagano 4%; Kumamoto 4%; Aomori 4%; Niigata 4%; Chiba 4%; Fukushima 3%; Nagasaki 3%; all others 28%.

"Soybeans are stored in bags in storage ware houses. Nine varieties are grown commercially in the Obihiro region [of Hokkaido]. These are in two colors, black and yellow. Of the black varieties, they have the Early black, Midseason black (cheese [tofu]) and Black. Of the yellow they have, Ayachi, Ishikarishiro, white; small white bean; Akazaya, red pod; Yoshioka, large; Kanro, sweet dew.

"Soybeans in Hokkaido are troubled more or less with several leaf diseases and at least one insect, the pod borer moth. Sometimes the pod moth injury amounts to 40%.

"The Experiment Station has a collection of 240 varieties on which they are working" (Continued). Address: Agricultural Explorers, USDA, Washington, DC.

685. Dorsett, P.H.; Morse, W.J. 1929. Natto, and soybean cultivation 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 1179 and 1180 (25 May 1929). Sapporo, Japan. "Copied from Mr. Morse's diary:..." "After our visit

with Dr. Ito we went to the Natto Laboratory of which Dr. [Jun] Hanzawa is in charge. We were given bulletins regarding the history, making and varieties of Natto, and served bottles of different sizes of Nattokin [Natto bacteria] (liquid pure culture) for the making of different kinds of Natto. We were then shown the various forms of Natto and taken through the various rooms and given detailed information on the various steps involved in the production of natto."

Page 1202 (26 May 1929). Sapporo, Japan. Mr. Morse visited the Hokkaido Agricultural Experiment Station at Kotoni. Mr. Takatsugo Abiko explained that "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."

Pages 2003 and 2004 (29 July 1929). "I (Dorsett) worked at the office changing herbarium specimen, packing plant material and writing official letters. Mr. Suyetake and Mr. Morse went to look over the section near Tokyo where soybeans are quite extensively grown as a grain crop."

A letter from Mr. Ryerson dated 3 June 1929 noted that at least some of the colored motion pictures were good. "He wrote as follows: 'The last material received from Vitacolor was a great improvement. The azalea scenes were gorgeous.'"

"We were deeply grieved to note in the same letter the following paragraph concerning Dr. Galloway: 'Dr. Galloway has had to give up and go home. He will be leaving for a cooler section within a week. His nerves have gone back on him and he is facing the same siege that he had 10 years ago, much to the regret of all of us.'"

Mr. Morse added: "A visit was first made to the Saitama Experiment Station located at Urawa, Saitama Prefecture. We met here Mr. Tadashi Hashigawa, Agricultural Engineer, who is in charge of the soybean work of the Saitama Prefecture, which is the third in acreage of soybeans in the Japanese Empire. The work with soybeans consists mainly of developing varieties for seed to be used in making soy sauce, tofu, miso, and natto. This station is growing about 50 varieties nearly all yellow-seeded sorts with seed of medium size. In looking over these varieties in the trial grounds we found some very excellent varieties that no doubt will have value in the United States from southern Virginia southward. Especially North Carolina, Tennessee, and the upper delta of Mississippi. Mr. Hashigawa promised to send us samples of seed of all the varieties being grown at the station."

"We were told by Mr. Hashigawa that soybeans were grown very extensively about Kumagaya to which place we went. We found, however, that soybeans were not grown very extensively about Kumagaya. Soybeans had given way to mulberry plantings. The reason given by the farmers was that the continuous growing of soy beans made the soil too rich. About half way between Kumagaya and Fukiage [in Saitama Prefecture] soybean plantings were very extensive and extended well past Fukiage. This will be an excellent place to come a get [film] harvesting scenes in the fall. By getting off at Fukiage the best observations can be made. At the present time the plants are just in bloom and it will be at least October before the beans are ready for harvest." At the Imperial Government rice station at Kokosu they are "doing some work with soybean varieties for green manure, and it will be possible to obtain varieties."

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."

Page 3479 (8 Jan. 1930). Tokyo, Japan. *Soja max.* soybean. Photo of: "Three specimens of 'String Natto' [itohiki natto], one package (made of rice straw) unopened; one opened; and the natto without the package. These were purchased at a Natto factory, Tokyo, Jan. 6, 1930. The [rice-straw] packages are 15 inches long and 2½ inches wide. String natto is eaten after having mixed it with a mustard paste" (neg. #44739).

Note: This is the earliest English-language document seen (Jan. 2012) that uses the term "String Natto" to refer to natto or *itohiki natto,* or that uses the word "string" in connection with natto.

Pages 3925, 3929 (18 Feb. 1930). "It is one year ago today since we left Washington for Japan... We have found much of interest in connection with our special line of work, much more even than we expected, and therefore the time has passed all too quickly..."

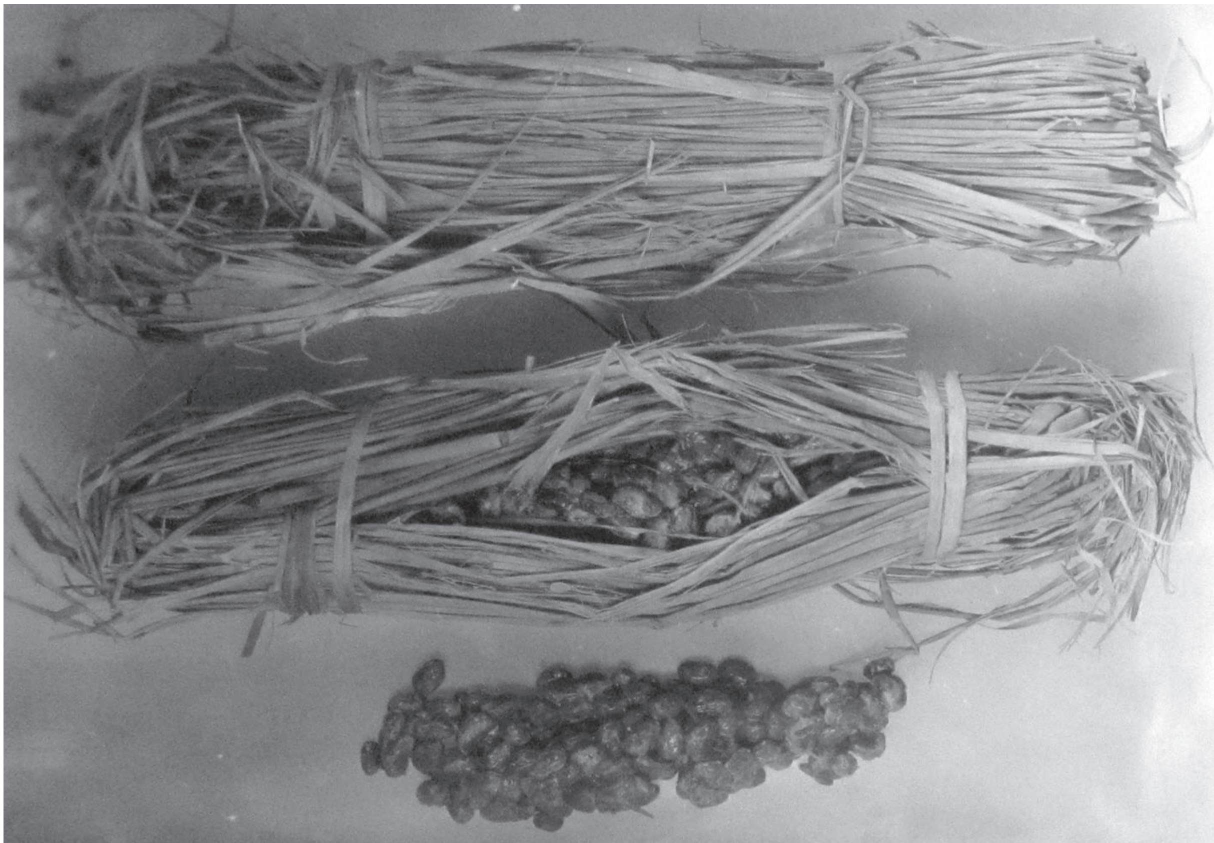
"Morse and Suyetake searched for soybean products today, and were successful in bringing in a collection of two dozen things slightly or entirely different from those previously secured."

Page 3929. Photo shows: "Small triangular packages, one as purchased, the other unwrapped. They contain string Natto. The native name is 'Hygienic Miyako Natto.' There is at one side a small triangular paper containing dried mustard; this is inclosed [enclosed] with the Natto. Purchased in Tokyo, Feb. 16, 1930. Soybean dish measures 3 inches across" (neg. #44937).

Pages 6822-23 (22 Dec. 1930). Kyoto, Japan. 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.

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." Address: Agricultural Explorers, USDA, Washington, DC.

686. Morse, W.J. 1929. Japan travel notes, April 5 to May 17. Handwritten manuscript. 27 p. Unpublished manuscript.




衛生
みやぎ納豆

Summary: Morse wrote these notes by hand in ink, early in the trip to East Asia, in a personal unlined notebook that was about 9 cm (3.62 inches) wide and 14.5 cm (5.75 inches) high. Most of the pages are unnumbered, no date or place is given for many of the entries, and the handwriting is occasionally faded or hard to read.

The purpose of this notebook and how Morse used it is unclear. These may have been his field notes that he used each evening as the basis for his official typewritten USDA trip report. Or was this a personal diary in which he kept personal observations that would not become part of the official report? This seems less likely.

This is apparently the first notebook in a series of many that Morse wrote. He kept the notebook after the trip and in April 1986 his daughter, Mrs. Walter A. Thalman (22 Interlaken Dr., Eastchester, New York 10709), kindly photocopied it for Soyfoods Center.

Here are some quotations: "After a few minutes, we were served tea and cigarettes. Dr. Anda told us where the soybean work is being conducted. The soybeans are grown mostly in northeastern Japan, and specially on the island of Hokkaido where considerable breeding work is being done. At the Imperial Station in Tokyo, much chemical work is being done in the study of the manufacture of shoyu sauce and miso.

"After a visit to the Exper. Station we went to Ueno Park to visit and look over the cherry trees. The trees are in bud and should be in full bloom in about one week. Many of the trees are very large and quite old."

Food show: The International Food Show was being held in the large building in the park [Ueno]. A small admission fee was charged. The show lasts from April...

"Soybean products: The manufacture of shoyu or soy sauce was shown in several different booths. In one booth, samples of soy sauce made by the various soy manufacturers was shown in various sized bottles and kegs. In another booth, the ingredients used and the method of manufacture were shown. Large yellow soybeans were shown, a bottle of wheat, a bottle or jar of the rice ferment [sic, wheat ferment, koji], the product consisting of roasted wheat, cooked soybeans, after addition of the ferment. Then a jar of the product after the addition of salt and water, and curing for a certain length of time [shoyu moromi]. Then a jar of the sauce was shown which was pressed out of the preceding jar. The cake or ___ which was left after pressing out the liquid was shown.

"Tofu or bean curd: The different materials used in the manufacture of bean curd were shown. 1st were shown a bushel tub of large yellow soybeans (sample sent to Washington as coming from the national food show). 2nd was shown the beans soaking in water. 3rd was shown the bean milk. 4th was shown a jar of magnesium sulfate water used in precipitating the protein of the tofu milk (as it is called in Japan)... salts in precipitating the protein. Then were shown the blocks of tofu or bean curd. Many kinds of bean curd are made, depending on the amount of pressing. The soaking of beans in warm water or longer soaking in cold water. The amount of the water added in making the bean milk. Tofu is not made in large factories, but in small factories or stores scattered throughout the city. Small dealers or hucksters with the two tubs one at each end of a pole slung over their shoulder. Tofu (blocks) are in these tubs and the huckster has his route passing along blowing a horn which has a peculiar sound. He also passes back in alleys to his customers, leaving his tubs on the street. He cuts off from the slabs of bean curd whatever amount his customer desires."

"Buddha's Birthday. Hibiya Park, Tokyo. April 8, 1929." "... it is quite generally agreed that the Buddha was born in the sixth century B.C. The birthday is known as Hanamatsuri or Floral Festival..." Address: USDA, Washington, DC.

687. Pieters, A.J. 1929. Re: Ryerson, money for fiscal year running low, Dorsett a big spender. Letter to Mr. W.J. Morse, c/o American Consulate, Tokyo, Japan, June 8. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** "Mr. Ryerson as just been up to see me in the matter of your needs for the balance of this fiscal year. We didn't expect to be called on for any more funds but, fortunately, we are able to help Mr. Ryerson out to some extent." "... to the extent of three or four hundred dollars, which I hope will enable you folks to get along until the end of the fiscal year. I gather from Mr. Dorsett's letter than you need $500 and could use $800... it is imperative that we provide against the very likely event of your authorization's being overdrawn at the end of the fiscal year."

"... Dorsett is notoriously a heavy spender. It's hard to hold him down."

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.

688. Dorsett, P.H.; Morse, W.J. 1929. Soybean oil and cake 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 1899-1900 (17 July 1929). At a fertilizer exhibit the authors see: "Herring fish bone meal, German phosphate, ammonium sulfate, soybean oil cake, mustard seed oil cake, flaxseed cake. The oil cakes ground into meal

are used almost entirely for fertilizing rice. For soybeans liquid night soil and raw ammonium phosphate are used" [as fertilizer].

They also see perilla spikes (small bundles which are used for garnishing), perilla plants with purple foliage (10 bundles, which are used for dyeing pickled plums [umeboshi], ginger, etc.) and perilla plants (white; which are used for pickling and as greens).

Pages 2278 to 2280 (31 Aug. 1929). The authors visit the Otoguro Oil Company in Garugawa, Japan. This small oil mill makes Brassica oil (from *Brassica japonica*), mustard seed oil and sesame oil. They pack and sell soybean oil from a supply secured in Manchuria. It "is apparent that Japanese grown soybeans are much too valuable as human food and green manure to be used for oil production. Soybean oil is considered more or less a by-product with the oil cake the more important product. The oil is imported from Manchuria by Japanese firms having oil mills in the leased territory or by oil firms distributing various kinds of oils. The oil is refined, put up in different types of glass or tin containers, branded with the firm's trade mark, and distributed to various parts of the Japanese empire. The Nisshin Oil Company, Tokyo, Japan, has branches throughout Japan, and even a branch in Seattle, Washington, U.S.A. This firm places on the market a pure soybean salad oil." Address: Agricultural Explorers, USDA, Washington, DC.

689. Dorsett, P.H.; Morse, W.J. 1929. Tofu 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 1929 (19 July 1929). Tokyo, Japan. A photo shows: "A soybean curd man with his two wooden tubs of soybean curd, which he is peddling from house to house in the rural district of Tokyo." He is walking along a road with a row of tall trees to the left (neg. #44094).

Page 1929. "The same man shown in picture #44094 placing a piece of bean curd which he has just sold, into a vessel of water. We have a motion picture of this" (neg. #44095).

Pages 2335, 2336, 2337 (4 Sept. 1929). Tokyo. "We were out this morning at 4:00 a.m. and visited a tofu and soybean curd factory. We spent a most interesting 2½ hours observing the various operations. The soybeans are put to soak about 5:00 p.m. the day before they are to be used, and about 4:00 a.m. the" next day "they are ground. This is accomplished by means of a special apparatus which grinds the beans very fine while a small stream of water is running on the beans in the chopper.

"It looks as though they grind about half a bushel of beans for each batch of curd. After grinding it is put into a large open kettle and brought to a foaming boil. The foaming mass is stirred down several times. In one of the foaming processes a small amount of mustard [rapeseed] oil and some kind of flour (we were unable to learn what kind) is sprinkled over the foaming mass and while foaming, about two gallons of water (cold) is added to the mixture. It is then strained through a bolting cloth sack into another receptacle in which there is two bolting cloth bags. A rather light pressure is applied to the first bag of solid matter and after it is drained for a time, 15 or 20 minutes, the solid portion is put back into the kettle, a little water is added, and it is again put into the bolting cloth bag and the liquid portion pressed out into the other two bolting cloth bags.

"The solid portion is then put to one side and later utilized in other food products or for cattle feeding period."

Page 2336. "To the white liquid bean milk, which by the way is pretty good, about a gallon and a half of water, to which has been added a solution–we could not learn the proportions because of its being a trade secret–three cups, we should say (guessing) about a quart of a solution of sulphate of magnesia [sic, magnesium, i.e., magnesium sulphate] is added to the soybean milk. The solution is added slowly and well distributed through the hot bean milk. By rule of thumb the operator tests with his ladle the coagulation of the milk and just before it is finished he adds about a teacup of the sulphate of magnesia solution to the mixture. He then places a bamboo or wicker basket in the tub and dips off all the liquid (whey) that he can.

"Nearby, which has been previously fixed, is a false bottom box about 12 inches wide, 24 inches long, and 6 inches deep. There is an addition [wooden frame] of about 2 inches added to [the height of] the first box and over the whole a piece of bolting cloth is placed. The curd in the large tub is carefully transferred by means of a ladle from the tub to the box, which is large enough to hold the batch. The liquid is gradually pressed out by rather light weight and in a short time the 2 inches added height to the box is taken away. The bolting cloth is then laid back and with a flat broad knife the rough edge around the sides and ends are sliced off and placed in a row along the center. The cloth is then folded back smoothly and a board and weights are placed on the box of curd. In about half an hour this box of curd is cut through into squares something like 6 inch bricks. The box and contents is lifted off and placed upside down in cool water. It is readily slipped out of the box and the bolting cloth is removed. These blocks of curd [tofu] can then be disposed of as is or can be cut into still smaller squares.

"Another operation in this establishment is the frying of the curd.

"We watched them cut 1- by 6- by 6-inch blocks up for frying in deep fat (Mustard oil). Some of the 1 by 6 by 6 inches were cut into three pieces each about 1 by 2 by 6 inches and these in turn were split in two to make two pieces each about ¼-inch by 2 by 6 inches. Other 1 by 6 by 6-inch

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pieces were cut into squares about 1 by 2 by 2 inches and these were split. They used two frying kettles and transferred the curd from the first to the second, cooking it about half done in the first and completing the cooking in the second.

We tried some of this hot tofu (curd) with a little soy sauce and found it quite good.

"This concern works up five bushels of soybeans daily into curd and tofu.

"About 6:30 a.m. we went out to 23rd street and walked through the farmers open market."

Page 2371 (8 Sept. 1929). Tokyo. "Soybean harvest in Hokkaido is supposed to begin about September 15th so from now on we plan to spend the greater part of our remaining time in this region, in the field..." We leave tomorrow morning and "expect to be away about a week."

Page 2693, 2694, 2695 (18 Oct. 1929). Left Ueno station in Tokyo en route to Kagemori in the mountains, where we hope to see soybeans and get motion and still pictures of their harvesting in that region. We arrived at Kagemori at 10:45 and conferred with the village committee who advised that we were about two weeks too early to see the harvesting of soybeans."

Page 2695. Two photos show: "Mr. Masoi, a Japanese bean curd man, slicing and laying bean curd on a bamboo rack for pressing." Kagemori (neg. #44392 and #44393).

Page 2696. Photos: (1) A Japanese farmer bending over in a field, pulling up soybean plants. "This is the way they are harvested in this region, and putting them in small piles, roots up." (2) The same man "has just finished setting up a small shock of soybeans and is on his way to pull up more" (Negs. #44394 and 44395). Address: Agricultural Explorers, USDA, Washington, DC.

690. 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. 1928-1932. 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.

691. *Unknown American Newspaper.* 1929. More Manchurian soys. Aug. 5.

692. Pieters, A.J. 1929. Re: Finances. Kudzu. Letter to Mr. W.J. Morse, c/o American Consulate, Tokyo, Japan, Aug. 14. 3 p. Typed, without signature (carbon copy).
• ***Summary:*** The money for this trip is coming from Foreign Plant Introduction. It is very important to stay within budget. If the occasion comes up, you might suggest to Dorsett "that some of things he sent in are absolutely useless to us and have been had a number of times before."

"I have just had a call from Dr. L.W. Fort, Great Falls, South Carolina. Dr. Fort is enthusiastic about Kudzu and he wants to find some seed in quantity. He advises me that last year a Eugene Ashcraft of Monroe, South Carolina, imported about fourteen hundred pounds and sold it out at about four dollars a pound." Please "advise us what firms handle Kudzu seed and how much they charge" for several hundred pounds.

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.

693. 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 or 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 green manure and cover crop work..." Address: Agricultural Explorers, USDA, Washington, DC.

694. Meharry, Chas. L. 1929. Minutes of the business meeting of the American Soybean Association: August 16, 1928–Purdue University. *Proceedings of the American Soybean Association* 2:53.
• ***Summary:*** "The meeting was called to order by Mr. Taylor Fouts who presided. Mr. Fouts made a few remarks concerning the history of the organization. He called upon Mr. C.W. Tabaka to make a report upon the meeting in North Carolina the year before. Mr. Tabaka told briefly of his trip to the southern state and reported that he had had a very profitable and enjoyable trip. Mr. Keller E. Beeson of Purdue also gave a brief account of the Carolina meeting.

"An amendment to the constitution providing for a change in the time and place of the annual business meeting of the Association was carefully considered. After considerable discussion it was moved and seconded that the annual business meeting of the American Soybean Association be held at the same time and place as the annual field meeting. The motion was placed upon its passage and was unanimously adopted.

"Letters from Arkansas, Washington, D.C., and Toronto, Canada, asking that the 1929 field meeting be held at these places, were read and discussed. Director G.I. Christie, who had but recently accepted appointment to the presidency of the Ontario Agricultural College at Guelph, was recognized and extended a very cordial invitation to the Association to meet in Ontario.

"Mr. W.E. Riegel moved that Dr. Christie's invitation be accepted. The motion was seconded by Prof. Delwiche [of Wisconsin] and by Mr. Noah Fouts. The motion was unanimously carried.

"President Fouts announced that nominations for president of the Association for 1929 were in order. Mr. Riegel nominated Dr. G.I. Christie. Some one moved that nominations be closed and that the secretary cast the unanimous ballot for Dr. Christie. The motion carried.

"Inasmuch as there was some doubt regarding the interpretation of the period to be served by the old officers of the Association, Mr. J.B. Edmondson moved that it be the sense of the meeting that the officers for 1928 should serve until the end of the calendar year.

"Prof. C.K. McClelland was nominated for the office of vice-president. It was moved that the nominations be closed and that the secretary cast the unanimous ballot for Prof. McClelland. Motion carried.

"Mr. J.B. Edmondson was nominated for secretary-treasurer. It was moved that nominations be closed and that the secretary cast the unanimous ballot for Mr. Edmondson. Motion prevailed.

"Prof. Buchanan of Guelph, Ontario, and Harvey S. Clapp, Accotink, Virginia, were nominated for directors. Motion was made that nominations be closed and that the secretary cast the unanimous ballot for Prof. Buchanan and Mr. Clapp. Motion carried.

"Mr. W.J. Morse was again made editor by acclamation. It was moved by Prof. Willard of Ohio that all matters relating to the publication of bulletins be referred to the directors with power to act.

"Inasmuch as Editor Morse was contemplating a visit of two years to the Orient to study soybeans, it was considered advisable to appoint an editorial committee to serve with him or in his stead during his absence. Secretary J.B. Edmondson and Director W.E. Ayres were appointed on this committee.

"Mr. Parkhurst, manager of the International Grain and Hay Show at Chicago, asked for the co-operation of the Association in making the show of Soybean seed and hay more successful and satisfactory to the soybean growers. This matter was referred to the committee on exhibitions.

"Mr. Fouts called for the report of the resolution committee, which proposed the following resolution and moved its adoption:"

Note: The meaning of the last paragraph is unclear. Address: Acting Secretary.

695. Morse, W.J. 1929. Letter from Dr. [sic] Morse. Tokyo, Japan, July 20, 1929. *Proceedings of the American Soybean Association* 2:50-52. Tenth annual field meeting. Held 22-23 Aug. at Guelph, Ontario, Canada.
• ***Summary:*** This letter from W.J. Morse was read before the 1929 convention of the American Soybean Association at Guelph, Ontario, Canada. This is the first annual ASA meeting he has missed. He begins with a brief description of the "Oriental Agricultural Exploration Expedition" headed by Mr. P.H. Dorsett and himself. They plan to study soybeans in Japan first. "The largest soybean section is the Island

of Hokkaido which has an acreage of 215,212 [planted to soybeans] and produces 3,184,245 bushels of beans" [yield = 14.8 bushels/acre].

"On our arrival and after establishing headquarters in Tokyo, we first began to look up varieties which we might send back to the United States for the 1929 planting. We succeeded in packing up about 100 lots which are now growing in the variety plots at Arlington Farm [Virginia]. In hunting out this seed, we were very much surprised to find the soybeans listed with the garden beans and as garden beans. For the most part these are grown as green vegetable beans. These sorts are black, brown, greenish yellow, and yellow seeded varieties of early, medium, and late types. Some of the yellow seeded varieties are listed as most suitable for bean curd, soy sauce, miso, natto, and confectionery purposes, such as sweet bean paste, candied beans, roasted beans (like our peanuts), and sugared beans."

Note 1. Azuki beans, rather than soybeans, are usually used to make "sweet bean paste" in Japan.

"It is amazing, the extent to which the soybean is used for food in Japan. Whether or not it can be used in the United States in all of the ways used here is extremely doubtful, that is for human food." There is no doubt that American soybeans will be used mostly to produce oil and oil meal. "It may interest you to know that the beans produced in Japan are used entirely for human food, green manure, and planting purposes. The grain varieties have seed of higher quality than those produced in Manchuria and are not used for oil and oil meal production as [are] the beans of Manchuria. The great soybean oil and meal production of the Orient is confined almost entirely to Manchuria.

"Another thing which surprised us greatly was the extent to which soybeans are used for green manure purposes in the rice paddies." The plants are turned under in the mud after water has been run into the paddies.

"Another extensive use of the soybean is for bean curd, or tofu, which is manufactured only... in small shops scattered about the cities and country villages. This curd is used in many ways, being the meat of the poorer classes. It is used, however, quite generally in making bean-curd soup [miso soup with tofu] which is sometimes served at breakfast and nearly always at supper. The bean curd is peddled about from house to house by men with two tubs suspended from a bamboo pole over their shoulders. The sound of the little horn of the bean curd man as he announces his coming has become quite a familiar sound to our ears as we go along the streets or hear him pass under our office windows.

"Soy sauce is manufactured on a very large scale and is universally used by the Japanese, rich and poor. We have had the pleasure of visiting the large experimental laboratory of an experiment station given wholly to soy sauce and saké experiments. In Hokkaido we visited a soy sauce factory, the buildings of which covered several acres. In one of the curing vat buildings where the mash is allowed to cure for about 18 months, we counted ninety large vats.

"Soybeans are used to a very considerable extent for confectionery purposes. The large black, brown, and green seeded varieties are used in making sweet bean paste which is put up in small thin slabs and then done up in very attractive packages. Roasted beans, similar to our roasted peanuts, may be found at nearly all confectionery stores. Roasted beans are also sugar coated and others are sprinkled with small pieces of sea-weed during the roasting, which gives an appearance of mottled beans (rather a familiar sight to our mid-west farmers). Then, there are the candied beans, that is, beans which have been boiled in syrup.

"Miso and natto are two forms of bean foods in which the beans are first cooked and then treated with certain bacteria [sic, microorganisms]. Miso is used largely in soups which are consumed at breakfast. Both of these foods are quite largely used.

"Other products used for food are roasted soybean flour, soybean vermicelli, pickled green beans in the pod, yuba–the film produced by boiling soybean milk, and dried frozen bean curd."

Note 2. This is the earliest English-language document seen (April 2013) that uses the term "dried frozen bean curd" to refer to dried-frozen tofu.

Note 3. This is the earliest English-language document seen (Nov. 2012) that contains the term "roasted soybean flour."

"Another surprising thing is the very extensive use of the soybean as a green vegetable bean. As early as May, small bundles of plants with full grown pods were seen on the market. At the present time the market is virtually flooded with bundles of plants with full grown pods, the seeds of which are also full grown. The pods are boiled in salt water and the beans eaten from the pods.

"During the past two weeks we have visited large sections near Tokyo where soybeans are grown for green vegetable purposes. The beans are grown in rows 2 feet apart and in 95 per cent of the cases there are other crops planted between the bean rows, such as early cabbage, onions, lilies (for the edible bulbs), late varieties of soybeans, late plantings of soybeans, and other early truck crops." Address: USDA, Washington, DC.

696. William Morse (Photograph). 1929.
• ***Summary:*** This digital photo was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004). It first appears in a newspaper article by the Associated Press titled "More Manchurian Soys," with the dateline "Mukden, Manchuria, Aug. 5, 1929." It also appeared in an article as late as Aug. 1933.

697. Dorsett, P.H.; Morse, W.J. 1929. Soybean cultivation in Japan. Homemade soybean wine or juice (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): Page 2449 (19 Sept. 1929) (negative #44272). "A nearby view of the early and late non-hairy soybeans. The late variety is to the left of the stake, the early variety, now ready to harvest is to the right. Obihiro, Japan." Neg. #44273. "Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. A nearby view of the ends of two rows of Oyachi soybeans, now ripe enough to harvest."

Page 2450 (neg. #44274). "Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. A nearby view of late and early non-hairy varieties of soybeans, The late variety is to the left, early to the right."

Neg. #44275. "Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. View showing to the left medium early, in the center early, and to the right late non-hairy varieties of soybeans. Morse has been trying to get the mid-season and late varieties for a number of years and is only now succeeding. Plants to the left are 31 inches high, center about 12 inches, and right about 28 inches."

Page 2451 (neg. #44276). "Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. Looking across selections of non-frost variety of soybeans. At the left Mr. [?], center Mr. Suyetake, and Right Mr. W.J. Morse, the latter making notes on the variety."

Neg. #44277. "Nearby view of the end plants of three rows of Oyachi soybeans of selected strains. 70% of the soybeans grown in the Obihiro section are of this variety."

Page 2452 (neg. #44278). "Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. Looking across plots of 6-7 rows of selected Oyachi variety of soybeans, now ready to harvest."

Page 2453 (20 Sept. 1929). "Set out to the Experiment Station between eight and nine o'clock this morning and spent the entire day there making notes, motion and still pictures."

"The director of the Station and his assistant arranged for a complete planting scene. Laying off soybean rows with a four tooth marker, distributing fertilizer, dropping the beans, and covering as dropped with the feet, also covering with the weeding harrow, all of which we made black and white motion pictures. We also secured motion pictures of cutting and shocking soybeans as well as special scenes." A line drawing at bottom of page, with dimensions in inches, shows a "horse" soybean market. See also photo #44285.

Page 2454. "The rows when finished for soybean seeding are 21 inches in center and about 3 inches deep, beans are dropped in hills three or four beans in each hill,

about 12 inchees apart in the rows.

"Looking over the various experiments our attention was attracted to an open air cooking demonstration near the main building of the station. As this was the first demonstration of this kind we had seen since coming to Japan, curiosity impelled us to see just what sort of foods were being prepared. Noticing a large bamboo basket of black soybeans (very large seeds), we asked the use to be made of them. We were told that wine or soybean juice was being made. This is a product not made commercially but made only in the homes.

"Generally a bushel (or smaller quantity if desired) of black soybeans and twice the amount of water are used. The beans are boiled for about an hour. The juice, a blackish purple liquid, is drained off. A small amount of citric acid is added and sufficient sugar is added (sufficient sugar to suit the taste of the individual). When soybean wine is desired, more sugar is added, and the juice is placed in a warm room to ferment. The fermented juice is then treated as that of other fermented juices.

"This is the first instance we have come across of soybeans being used to make a home brew. The juice is very generally used without fermentation. Taking it all in all we spent a most interesting and valuable day.

"Dr. Seiji Kawase, the director, and Mr. Fujine joined us at a restaurant in the city at 7:00 p.m. for dinner."

Page 2455 (neg. #44279). Small shocks of "non-frost" soybeans. "(Non-frost does not mean resistance to frost, but that the variety matures before frost). The beans are cured in these small shocks before being threshed." Neg. #44280. "Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. Harrowing land preparatory to the sowing of soybeans."

Page 2456 (neg. #44281; photo is missing). "A rear view of a soybean power thresher used at the Tokachi Branch Agricultural Experiment Station, Obihiro, Japan."

Page 2457 (neg. #44283). "Man and horse approaching the camera marking off rows in which soybeans are to be planted. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan." Neg. #44284. "Man and horse leaving the camera marking off rows in which soybeans are to be planted."

Page 2458 (neg. #44285). "A nearby view of the marker and horse shown in the previous two pictures. Obihiro, Japan. Tokachi Branch Agricultural Experiment Station. Neg. #44286. Three Japanese women distributing fertilizer in rows where soybeans are to be planted.

Page 2450 (neg. #44288). "A Japanese woman setting up a small shock of non-frost variety of soybeans being harvested on this date. Obihiro, Japan. Tokachi Branch Agricultural Experiment Station."

Page 2460 (neg. #44289). "A nearby view of a woman harvesting non-frost soybeans at the Tokachi Branch Agricultural Experiment Station, Obihiro, Japan." Neg. #44290. "A rather distant view of two Japanese women harvesting non-frost soybeans."

Page 2461 (neg. #44291). "A nearby view of two women harvesting non-frost soybeans at the Tokachi Branch Agricultural Experiment Station, Obihiro, Japan." Neg. #44292. "A nearby view of a woman setting up a small shock of non-frost soybeans. Obihiro, Japan."

Page 2462 (neg. #44293). "Three Japanese women and the man who helped prepare land for soybean planting and the actual planting of the beans for still and motion pictures. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan." Neg. #44294. "Mr. [?] and Mr. Suyetake examining Oyachi soybeans in one of the experimental plots at the Obihiro Station."

Page 2463 (neg. #44295). "Mr. Suyetake examining the early variety of non-hairy soybeans and Mr. [?] examining plants of the mid-season non-hairy soybean." Neg. #44296 (photo is missing). "Mr. W.J. Morse getting a close up black and white motion picture of non-hairy varieties of soybeans. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan."

Page 2464 (neg. #44297). "Small shocks of non-frost soybeans protected by rice straw rope from being blown down by the wind. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan." Neg. #44298. "Threshing scene by flailing soybeans. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan."

Page 2465 (neg. #44299). "A nearby view showing two types of flails, one with the fingers of the flail close together, the other with them spread. With the exception of the hub, the flails are of bamboo. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan."

Page 2471 (neg. #44304). "Threshing scene. Three men and four women flailing our soybeans. Tokachi Branch Agricultural Experiment Station, Obihiro, Japan."

Page 2477 (22 Sept. 1929). "We rode northward about 12 miles to the Tokachi Table-Land Experimental Farm. "There are 15 cho, a cho is equal to about two and a half acres American measurement."

"The principal crop in the region passed through today is by far field beans. We were surprised at the small amount of soybeans seen in the twelve mile bus trip through the valley to the Table-land Experiment Farm." Note: That is because most of the soybeans used in Japan are now imported from Manchuria.

Page 2483 (23 Sept. 1929). "We left Obihiro by train at 7:50 a.m., arrived at Ikeda at 8:41 a.m.," changed cars "and arrived at Nokkeushi [Hokkaido], our destination, at 3:38 p.m. Went to the Kurobe Hotel."

"From Takashima until about two hours before arriving at Nokkeushi we saw very many more soybeans than we have previously seen on this trip. The last one and a half or two hours was spent in running through rice paddies."

Page 2505 (27 Sept. 1929). "Morse with the interpreter

went to the Kotoni Agricultural Experiment Station to make observations and take notes as to the progress of soybeans and other crops. Dorsett got the Vitacolor motion picture camera and his 3¼ x 4¼."

Page 2605 (9 Oct. 1929). "We left the Yamagataya Hotel about 7:00 a.m. among many 'sayonaras' from the management and nesans ["older sisters" in Japanese], and 'goodbyes' from us. We found... in the six weeks or more we have been here that we have become very much attached to the place and to the nesans."

"We really felt keenly the leaving of our friends, but also hated to leave Sapporo and especially Hokkaido, because we have only pretty well completed but one feature of agricultural activity 'That of soybean Culture.' The other branches of agricultural activity and the field of general agricultural explorations, we have scarcely had time to do more than touch." Address: Agricultural Explorers, USDA, Washington, DC.

698. Morse, W.J. 1929. Re: Kudzu. Travels in Hokkaido. Letter to Dr. A.J. Pieters, Office of Forage Crops, USDA, Oct. 6. 2 p. Typed, with signature on USDA letterhead.
• ***Summary:*** T. Sakata Seed Co. in Yokohama, Japan, sells Kudzu seed in quantity. So does the Yokohama Nursery Co. "We have now finished up our work in Hokkaido and expect to leave here Tuesday for Akita, the soybean section of northwestern Japan."

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: Sapporo, Hokkaido, Japan.

699. Dorsett, P.H.; Morse, W.J. 1929. Soybean cultivation 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 2621-2622 (10 Oct. 1929). On Oct. 9 they arrived in Akita City, Akita Prefecture, Japan, in northeastern Japan. "We got out to the Agricultural Experiment Station between 9 and 10 o'clock, and met the director, Mr. K. Adachi. He is an expert on soybeans as well as director of the Station [at Akita]. He spent something like 8 years in Manchuria studying the soybean there and has published a volume of 1000 pages or so on the results of his work. The title of the book is 'Soybean: Its Cultivation and Industry,' by K. Adachi.

"Mr. Adachi advised that we were in time for the harvesting of soybeans, but that the crop is not yet an extensive one here and that it will be necessary to go out some distance to see farmers harvesting and even then it will not be possible to see the harvesting on as extensive a scale as could be done in a region where soybean growing is more important than it is here.

"Much of the detailed information acquired today in regard to soybean varieties and soybean growing and harvesting is omitted from this report because it will be incorporated in a special soybean report which is in the course of preparation.

"Mr. Adachi is of the opinion that Japan, as in the past, will of necessity have to obtain her proteins from vegetable sources and especially the soybean, for the reason that she does not have the space to produce animals enough to produce animal protein for her population. We are wondering if this to a very large extent is not false reasoning.

"From our observations, during our limited stay and travels in northern Japan, Main Island, and in the Island of Hokkaido, there appears to be immense areas, in the hill and mountain districts, apparently not well or not at all adapted to the cultivation of farm products, but from appearances most admirably suited to animal husbandry.

"We are also wondering if a mixed vegetable and animal protein diet might not be most advantageous to the Japanese nation."

"Mr. Shimade gave us considerable detailed information concerning their trials with soybeans as a green manure in orchard plantings. This information in considerable detail will be incorporated in the special soybean report" [which, so far as we can determine, was never completed].

Page 2629 (11 Oct. 1929). In "Mr. Adachi's room, after the accustomed bowing and greeting, we preceded to get the information on soybeans for which the interview was granted." Previously soybeans were planted after the planting of rice, which normally was the second week in June. This date, however, "proved to be too late as the beans require a longer season for maturing... Largely through the efforts of this experiment station, the farmers growing soybeans have been prevailed upon to plant their beans before they do their rice.

"By planting the first or second week in May the growing season has been sufficiently lengthened to enable the beans to fully mature before frost, which frequently was not the case when the planting of the beans was delayed until after the rice was planted.

"When the old method of planting was in vogue, the yield of beans was from 2½ to 3 bushels to the quarter of an acre. Under the new practice of planting before the rice is planted, the increase in the crop frequently amounts to as much as 30%.

"Planting: Formerly beans were planted thickly in rows about 25 inches apart. The rows now are about the same distance but the beans are dropped so as to stand 4 or 5 inches apart in the row. As a usual practice the rows are

opened with a hoe, the beans dropped by hand and covered with a hoe to depth of about one inch.

"Cultivating and weeding: The first cultivation and weeding is when the beans are from two to three inches in height. The second weeding and hoeing is when the plants are 6 to 8 inches in height. The third and final weeding and hoeing is in late June to the first of July. All the weedings and cultivation are by hand.

"Fertilizing: Cow and horse manure are the only fertilizers used in this region in connection with the planting of soybeans. This is used at the rate of 40 to 50 kan (1 kan = 8.27 lbs.) per quarter of an acre. The manure is spread in the rows by hand before the beans are dropped and covered.

"Condition of the beans at time of harvest: In this region, the beans are fully ripe when harvested. The time for harvesting may be determined by the [?]anking of the plants. If the beans rattle in the pod when the plants are shaken, they are in condition to harvest. In the Akita district, soybeans are pulled and laid in small piles on the ground where they are allowed to remain for two or three days depending on the condition of the weather.

"When sufficiently dried, the pile of beans are taken in and stored in a building or under temporary cover, where they remain until after the rice is harvested, threshed, and cleaned. The beans are then threshed. The practice followed in threshing soybeans in the Akita district is primarily that of flailing or beating them out. The farmers do not use rollers in connection with threshing their beans. All litter from the threshing of soybeans, except the pods, which are fed to stock, is burned.

"Diseases and insect pests: Thus far, there is little or no injury resulting to soybeans in the Akita district either by insect pests or fungus diseases.

Storage (p. 2631-2632): Soybeans, in the Akita district, are stored in rice straw bags the same as are used for rice. The weight of a bag of beans is 17 kan [140.6 lb], about 2 to 2½ bushels. Farmers sell their beans direct to merchants and receive for them about Yen 17.00 to 18.00 for 5 bushel. This price, however, depends on the quality, season, and the prevailing price of rice.

Page 2669 (16 Oct. 1929). "This morning Mr. Morse and Mr. Suyetake went to the soybean district outside of Tokyo to get a line on conditions. Dorsett worked at the laboratory with plant material, herbarium specimen and in writing legends and numbering the still pictures made while in Hokkaido, Japan.

"Copied from Mr. Morse's diary: At the Saitama Prefecture Experiment Station located at Urawa, it was found that the soybeans had been harvested. About forth [?] varieties or middle season types are grown at this station and Mr. Hasegawa, in charge of soybean and sweet potato investigations, promised us seed of these varieties.

"It was thought that possibly we might obtain soybean harvesting and threshing scenes in the vicinity of the Tamai Branch Experiment Station which is a breeding station. We went by train to Kumagaya and then by bus to Tamai; along the way no soybeans were noted. In August during a trip numerous fields of soybeans were noted." They were told by Mr. Morihara Nomura that all the soybeans had been harvested. "The farmers in this region get the soybeans out of the way before rice harvest. This is quite different from Akita region" where the soybeans are harvest after the rice. "Mr. Nomura is quite an expert on soybeans and adsuki beans." Address: Agricultural Explorers, USDA, Washington, DC.

700. Dorsett, P.H.; Morse, W.J. 1929. Whole dry soybeans used as beans 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 2640 (11 Oct. 1929, Yotsugaya, northeast Japan). "One of the principal forages used on the farm is soybean hay and bush clover (*Lespedeza bicolor*). We also learned from the director that soybeans are largely used by the farmers of this prefecture for the feeding of horses in place of oats. For this purpose the beans are soaked over night and 4 or 5 pounds fed to each animal during the day; in addition the horses are also given a ration of [soy] bean hay or some other forage."

Page 3478 (8 Jan. 1930, Tokyo). "This soybean product is sold in tubs in Tokyo small stores. It is named 'Gomoku Mame.' It consists of a mixture of five cooked products, namely: soybeans, lotus root, fish sausage, seaweed and burdock roots. Purchased at a small grocery stand in Tokyo, Jan. 6, 1930. It is eaten just as it is. Product is on bamboo leaf which measures 8 inches long and 5 inches wide" (Negative #44738).

Page 3516 (11 Jan. 1930, Tokyo). "Glass jars of soybean and other vegetable mixture. The jars are 5 inches deep overall" (Neg. #44751).

Page 3530 (11 Jan. 1930, Japan). "Cooked, sugared and canned yellow soybeans. Yellow soybeans canned in a sweet syrup. Can 4½ inches high and 3 inches in diameter" (Neg. #44756).

Page 3531 (11 Jan. 1930, Tokyo). "Black soybeans cooked and canned in a sweet sauce. Can 4½ inches high and 3 inches in diameter. This variety (black) is also sold in bulk form and is more generally used than the yellow variety for this purpose" (Neg. #44757).

Page 3535. "Candied soybeans and other products. Sticks of candy in which are imbedded black soybeans (green germ), yellow soybeans, peanuts, peas and sorghum seed. Box 8 inches long and 6 7/8 inches wide" [Native name 'Kawayanagi'] (Neg. #44761).

Page 3586 (16 Jan. 1930, Tokyo, Japan). "A nearby view of whole and sectioned cakes which are made of rice flour

and have soybeans imbedded in them. The two outside ones measure 2¼ inches, the other 2 3/4 inches across" (Neg. #44778).

Page 3712 (28 Jan. 1930, Tokyo). "Life size picture of rice flour cakes in which there is a liberal supply of cooked soybeans. Immediately after baking, soy sauce is brushed over the cakes" (Neg. #44851).

Note. This is the earliest English-language document seen (June 2013) that uses the term "cooked soybeans" to refer to whole soybeans that have been cooked and ground.

Page 3713. "Soy bean and puffed rice candy. Size of package is 7½ by 10 inches" (Neg. #44852).

Page 3715. "Small rice flour cookies thickly covered with yellow and black soybeans" (Neg. #44854).

Page 3730 (30 Jan. 1930). "Two classes of pickled soybeans and perilla. The glasses are 2½ inches across the top and 4 inches long" (Neg. #44863).

Page 3731 (Jan. 31, 1930, Tokyo). "Worked at the office today making pictures of soybean products and in getting material ready and in shape for packing for a shipment to Washington at the first opportunity. Morse and Suyetake rounded up about a dozen samples of soybean made products in their hunt of yesterday, and we secured [?] some very good close-up pictures of these products today.

"The finding of soybean made products is by no means as simple as one may think.

"They are more or less localized and not to be had from any one store in a city or village. We are finding products in villages outside of Tokyo which we have not been able to pick up anywhere in the city.

"Last week when at Shizuoka, we found several products which we have not seen elsewhere.

"We expect to avail ourselves of every opportunity from now until we leave for Dairen, Manchuria, to clean [?] up pretty completely on soybean products in Japan."

Page 3734 (Jan. 30, 1930, Tokyo). "Mame Senbei. Small rice cakes with black soybeans imbedded and cooked in them. The size of the bag is 7 inches across and 11 inches deep" (Neg. #44866).

Page 3736. "Sugar coated soybeans." The resulting product is white and brown in color. "The bag measures 7 inches by 11 inches long" (Neg. #44868).

Page 3741. "Soybeans uncooked and imbedded in rice flour dough and sliced thin, ready for frying. The bag measures 5¼ inches across and 6¼ inches long" (Neg. #44873).

Page 3797 (Feb. 5, 1930, Tokyo). "Today we spent some little time getting pictures of feeding soaked soybeans, sometimes mixed with rice, at Asakusa Park [Koen] and Temple. Here there are a half dozen or so women sitting behind small tables, selling the soaked soybeans.

"A nearby view of Japanese woman and her stand with its tin plates of soaked soybeans, which are sold to individuals for feeding to the pigeons. Many bushels of soybeans are disposed of in this way during the year" (Neg. #44885).

Two photos each, taken at Asakusa Park, showing Japanese women at their tables and people feeding the pigeons are found on pages 3798, 3799, and 3800 (Negs. #44886-44890).

Page 3939 (19 Feb. 1930, Tokyo). "Wheat flour cakes in the form of a child's face with black soybean for eyes. Purchased in wholesale confectionary store in Tokyo, Japan, February 18, 1930. Native name is 'O-Menkoshi' [honorable face candy]. Wholesale price is 8 for 5 sen. Actual measurement of face 4 inches long" (Neg. #44938).

Page 3941 (19 Feb. 1930, Tokyo). "Wheat flour cakes in the form of fish with black soybean for eyes. Purchased in a wholesale confectionary store in Tokyo, Japan, February 18, 1930. Native name is 'Taikoshi' [seabream candy]. Wholesale price is 8 for 5 sen, Dish of soybeans measures 3 inches across" (Neg. #44940).

Page 3942 (19 Feb. 1930, Tokyo). "Wheat flour cakes in the form of rabbits with black soybeans for eyes. Purchased in wholesale confectionary store in Tokyo, Japan, February 18, 1930. Native name is 'Usagikoshi' [rabbit candy]. Wholesale price is 8 for 5 sen. The dish of soybeans measures 3 inches across" (Neg. #44941).

Page 4028 (23 Feb. 1930, Tokyo). "Soaked soybeans flattened and covered with dough and baked. Small pieces of [nori] seaweed distributed over the surface. Native name 'Noritsuke mame.' Purchased in confectionary store in Tokyo, Japan, Feb. 22, 1930. Sell for 20 sen per pound" (Neg. #44973).

Page 4037 (25 Feb. 1930, Tokyo). "Soybean product #3878. A life sized picture of soaked soybeans flattened, covered with rice dough and baked. Covered with ground seaweed. Purchased in Tokyo, Japan, Feb. 24, 1930. Native name 'Noritsuke mame.' Price 28 sen a pound" (Neg. #44982).

Page 4342 (15 March 1930, Tokyo). "A nearby view of soybean products left to right bottom row; #4242, pink color; #4243, white color; #4244, brown color. Images made of millet in the colors noted. The millet is sugared and the eyes are of black soy beans. The images measure 3 inches across and 3½ inches high. The upper row (back view) is of pink and white colored images. Purchased at a stand in the Tamelike Temple grounds. Native name 'Daruma Okashi.'" (Neg. #45027). Note: Daruma is the Japanese name for Bodhidharma, the Buddhist monk who lived during the 5th/6th century CE and is traditionally credited as the transmitter of Ch'an (Sanskrit: Dhyana, Japanese Zen) to China.

Page 4343. "Life sized picture of small and large images made of sugared millet with soybean eyes... Native name 'Daruma okoshi'" (Neg. #45028).

Page 6826 (24 Dec. 1930). Tokyo, Japan. "W.J. Morse's notes: During the day we visited different sections to see

if there are any special soybean products put out for the Christmas and New Year celebrations. We found no new special products but did learn that large quantities of the black soybeans which are soaked in syrup are used by the Japanese on New Year's day. This product is eaten at the first meal and is supposed to bring good health during the coming year." Address: Agricultural Explorers, USDA, Washington, DC.

701. Hollowell, E.A. 1929. Re: Meeting with Dr. Burlison in Urbana, Illinois. Interest in soy bean utilization. Letter to Mr. W.J. Morse, c/o American Consul, Tokyo, Japan, Oct. 23. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "On a recent trip to the Middle West I had occasion to stop at Urbana, and while there I had some discussion with Doctor Burlison about soy beans. Next year the National Soy Bean Association [ASA] is going to meet at Urbana, and it appears that utilization of the soy bean is the phase of the industry which should be stressed.

"Doctor Burlison is asking our cooperation in assisting him to secure as complete an exhibit as possible of soy bean products. I told him I should be glad to send him the names of all the different manufacturers of the different products we have on file here, and in addition write you asking that you send him as many of the soy bean products as you can secure in Japan. Doctor Burlison is anxious to secure a permanent museum of soy bean products and told me that he would be glad to pay for them, if it is possible to secure them. Of course, we are willing to loan him any of the products which we now have here at the office. However, Doctor Burlison is anxious to secure products which might remain their property."

"With best personal regards, I remain, Very truly yours,..."

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: Associate Agronomist, USDA, Washington, DC.

702. 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 2732 (22 Oct. 1929) "... at 8:50 [a.m., Oc6t. 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... 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 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.

703. 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 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, 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.

704. 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.

705. William J. Morse and P.H. Dorsett (Photograph). 1929. Oct. 29

• ***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.

706. Morse, W.J. 1929. Soybean hay and seed production. *Farmers' Bulletin* (*USDA*) No. 1605. 12 p. Oct. Supersedes USDA Farmers' Bulletin 886, Harvesting soy-bean seed. [4 ref]

• ***Summary:*** Contents: Introduction. Soybean hay production: Time of cutting, method of cutting, curing soybeans for hay, baling the hay, yields of hay, soybean hay grades. Soybean seed production: Time of harvesting, methods of harvesting, methods of curing and handling, methods of threshing, special harvesting and threshing machines, proportion of straw to seed, yields of soybeans, storage of soybeans, grading and marketing soybeans.

Photos show: (1) Soybean hay after curing in the swath or windrow may be taken up with the mechanical drum hay loader. Two men are standing atop the huge pile of hay. (2) A wooden curing frame standing next to six piles of soybean hay in front of a barn. "The use of curing frames is very generally practiced in the Southern States."

(3) Two horses standing still, hitched to a self-rake reaper; this machine has given very satisfactory results in

cutting soybeans for seed. (4) A man wearing a coat and tie standing in a field next to a shock of soybeans. "When cut with a binder, the bundles of soybeans should be shocked and allowed to remain in the field until thoroughly dried."

(5) The ordinary grain separator, which can be adjusted to thresh soybeans successfully. (6) A special soybean harvester, a machine used to gather soybean seed from the standing mature plants.

(7) A man standing on a large combine, working in a field of soybeans. Soybeans have been harvested and threshed successfully with combines. Address: Senior Agronomist, Office of Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

707. 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.

708. 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 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.

709. 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 (July 2011) 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 2012) 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 2012) 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]. * "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 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

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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.

710. 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 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.

711. 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.

712. 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..."

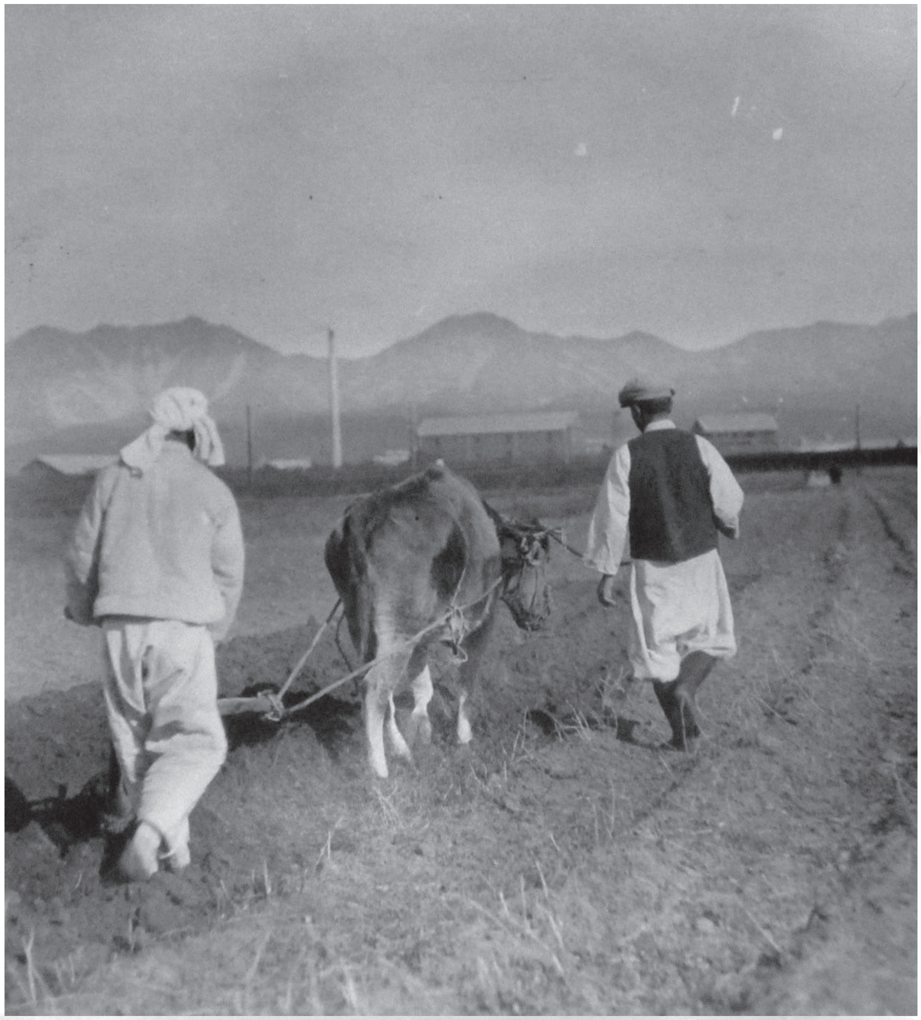
Pages 3002-3005 (same day, in a small open-air market). Photos show: (1) "Crocks of soybean curd and jars of bean sprouts" (neg. #44595).

(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. #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) "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.

713. Dorsett, P.H.; Morse, W.J. 1929. Natto and soybeans in Chosen [Korea] (Document part). In: P.H. Dorsett and



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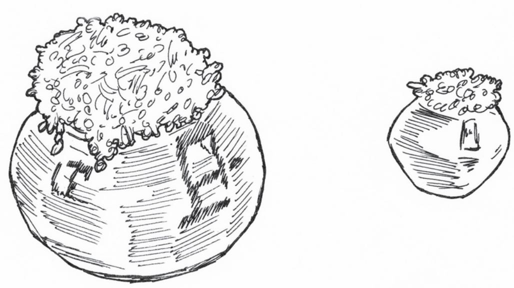


W.J. Morse. 1928-1932. Agricultural Explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. 8,818 p. Unpublished log.
• ***Summary:*** Page 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.

"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).

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 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.

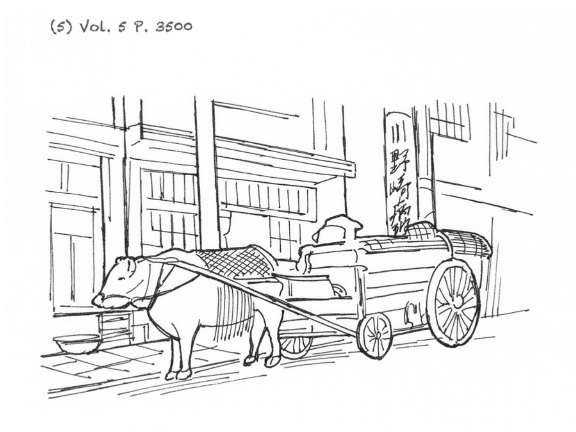
Page 3130. In Genzan [today's Wônsan, North Korea], Chosen. Photo of "Grading and cleaning soybeans" (neg. #44649).

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.

714. 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.

715. Morse, W.J. 1929. Re: Collection of soybean 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.

716. 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 exploration work thus far." Address: Agricultural Explorers, USDA, Washington, DC.

717. *Gazette* (*Indiana, Pennsylvania*). 1929. Soybeans.
• ***Summary:*** This article seems to be based on a USDA press report of early 1929: "W.J. Morse, forage-crop specialist, Bureau of Plant Industry, U.S. Department of Agriculture, who has been in Japan for several months collecting new varieties of soybeans, reports that to date he has collected more than 5,000 lots, representing every type of soybeans grown in Japan."

"Samples from every lot of seed collected by Mr. Morse will be planted at the United States experiment farm at Arlington, Va. [Virginia], this spring, and when the seed is harvested tests will be made for oil content. In this way it is hoped that selections may be made which will ultimately develop into varieties with a wide range of oil content.

"Mr. Morse writes that the Japanese use the soybean in a number of ways in their diet. They grind the beans and make flour, they serve the green beans as we would green lima beans, and they cook the dried beans in a manner similar to navy beans. Besides this, they make soy sauce, soybean curd [tofu], beverages, and bean sprouts from the soybean. He believes that the use of soybeans as a human food in this country will increase steadily.

"Mr. Morse is now spending the winter in Tokio [sic], studying the Japanese methods of utilizing soybeans. While he expects soybeans to grow in favor as a feed for livestock and food for people, he feels that the largest future development of the crop in the United States will be in the utilization of the oil and meal in industry.

"Samples of the seed collected in Japan will be sent to some of the State experiment stations for trial, but will not be available for distribution to individuals."

718. Liu, Peter. 1929-1931. Chinese characters and English equivalent, Dorsett and Morse Agricultural Expedition, 1929-31. Washington, DC: Foreign Plant Introduction and Forage Crop Investigations, Bureau of Plant Industry, USDA. *
• ***Summary:*** 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." Roll 27, volume 103. This microfilm roll may also be available for viewing or duplication at one of the various regional branches of the National Archives (e.g. San Bruno, California).

719. 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 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.

720. Dorsett, P.H.; Morse, W.J. 1930. Visit to the Noda Shoyu Company, Ltd. in Chiba, 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 3465-67 (7 Jan. 1930). "Today we really got started on our work of looking up and getting information about soybean products. In accordance with plans made yesterday, we left Tokyo this morning (Ueno Station) at 8:15 for Noda-Machi, Japan, where we arrived at 9:45. We went direct to the office of The Noda Shoyu Company, Ltd., of Noda-Machi, Prefecture of Chiba, Japan, makers of the famed Kikkoman Shoyu.

"This company embracing 19 plants, is one of, if not the largest plants in the world brewing shoyu sauce. According to their literature, Kikkoman Shoyu was first brewed by Mr. Saheiji Mogi, in the second year of Meiwa [sic, Hoei?] (corresponding to the year 1704) in Noda-Machi, Japan.

"We met Mr. Ota, one of the assistant directors, we also met Mr. Hichizaemon [Shichizaemon] Mogi, President and Director, also a Mr. Jutaro Namiki. We spent about 1½ hours with these gentlemen in the office. Then Mr. Ota and Mr. Namiki showed us over one of their large plants. It impressed us as an up-to-date modern institution. We were in the grading and mixing room. They have 30 incubating chambers or curing rooms where the germ on the 50-50 mixture of soybean and wheat mash is grown.

"The cement vats, or aging vats, of which there are 1,500 under one roof, are made of cement and are 12 feet square and about 8 feet in depth.

"In the manufacture of shoyu sauce, this concern uses annually about 20,000 bushels of soybeans, primarily from Manchuria, and also 20,000 bushels of wheat, Japanese grown when available. They import from Australia. This year, however, they are getting their supply of wheat from Canada.

"They have 200 square (about 4 ft. by 4 ft.) hydraulic presses and 200 oblong ones about 4 ft. by 6 ft. They age their shoyu sauce 1½ years in the curing vats."

Page 3466-68. Photos show: (1) Racks of small trays, outdoors, each about 2 inches deep, 18 inches long, and 10-12 inches wide, used to cure soybean and wheat mash [koji] for making shoyu sauce (neg. #44709). (2) A nearby view of the interior of one of the small trays (neg. #44710). (3) Many round bundles of cask stock of spruce, stored outdoors. The wood will be used to make kegs for storing shoyu sauce. A part of one warehouse of the Noda Shoyu Co. is in the background (neg. #44711). (4) A horse pulling a cart on a railroad track. On the cart are bundles of spruce stock that will be used to make soy sauce casks (neg. #44712). (5) A nearby view of portions of ricks or bundles of short pieces of spruce for staves, tops and bottoms of small casks for shoyu sauce (neg. #44713).

Page 3474. A 5 by 7-inch photo (taken Jan. 9) shows: 1. Small bottle (with label) of soy sauce made by Noda Shoyu Co., and materials used in its manufacture. 2. Salt from Formosa. 3. Mixture of boiled beans and crushed roasted wheat with white mold [shoyu koji]. 4. Mixture of boiled soybeans and cracked wheat after one day in fermentation room. 5. Cracked roasted wheat. 6. Roasted wheat. 7. Wheat (Canadian). 8. Soybeans (Manchurian variety). (neg. #44734).

Page 3475. Photo of *Pueraria Thunbergiana.* Kudzu. Five "small packages of kudzu flour purchased in a store in Tokyo, Japan, December 24, 1929. This flour is made from kudzu roots and is used in making soups." Each package is 7/8 inches wide; 3½ inches tall.

Page 3482. A photo shows three identical bottles of Kikkoman brand soy sauce, each from a different angle so that all parts of the label are visible. Each bottle is 7½ inches tall and 2 inches in diameter, and holds one-fifth liter of sauce. Obtained on Jan. 7 from the Nodashoyu Co. [Noda Shoyu Co.]. D&M item #3074. This company is the largest in the Orient (neg. #44742).

Page 7010 (21 Jan. 1931). Tokyo, Japan. "Negative #46453. *Pueraria thunbergiana,* Kudzu for shade. Chiba, Japan, Jan. 22. 1931. Kudzu vines used for shade for hog yards at the Chiba Zootechnical Agricultural Experiment Station." Address: Agricultural Explorers, USDA, Washington, DC.

721. 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:*** * = After description of best photos. Page 3487 (8 Jan. 1930). Photos of the side and top of a small wooden tub (6 inches diameter, 4 inches high) of *Kairyo Hishio,* made by the Takagawa Co., Noda, Japan. "This form of miso is mixed with rice and eaten." The tub is bound with strips of bamboo and tied with three strands of rice straw rope. Note: Hishio is a seasoning with a consistency somewhat like that of applesauce–much softer than that of miso. Page 3488. Photos shows the same product in small jars 2½ inches in

diameter and 3½ inches high.

Page 3596 (17 Jan. 1930, Tokyo). "Went to the Chikuma Miso Factory, one of the largest concerns of this kind we have seen. They use 200 bushels of dry soybeans and an equal amount of rice per day."

Pages 3598-3601. Photos show: Catties or casks of miso in front of Chikuma Miso Factory. Same view showing paper covering cask. Loading casks of miso onto truck in front of factory. "Ricks of just recently returned empty catties in front of Chikuma Miso Factory ready for cleaning and refilling." Two Japanese men standing by empty and filled catties of miso. Inside Chikuma Miso Factory, two men standing by a tall vat of miso with four casks on the floor in front of them. One man is holding a long pole.*

Pages 3633-3636 (21 Jan. 1930, Tokyo). Photos show: Miso ingredients on a bamboo sheathe/culm. Five different kinds of miso on a bamboo sheathe. Miso as sold wrapped in a bamboo sheathe plus the Japanese label measuring 4.6 by 7 inches.

Pages 3733, 3735, 3738-3739 (31 Jan. 1930, Tokyo). Photos show: (1) A cylinder of commercial miso (3 inches diameter, 8 inches long) with labels, side and top views. (2) Miso (which contains turtle blood) in a small eight-sided wooden box (3¼ inches across), with label. (3) Two glass jars containing miso, with labels; side and top views. (4) Two small square boxes (4 by 4 inches) containing miso, one closed the other with top off to show miso.

Page 3818. Photo of miso wafers with package, purchased in a confectionary shop in Yokohama, Feb. 7. "These wafers are very good." Page 3820. Photo of two packages of Okazaki Miso [Hatcho Miso], "said to be a famous brand." One is wrapped (apparently in bamboo sheath, showing label), one unwrapped. Package is 3½ inches wide and 8 inches long.

Page 3895. Photo of glass jar of Rikyu miso with label, purchased in Tokyo Feb. 13 for 50 sen a jar.

Page 3897. Photo of small jar of Kinzanji Miso (3 views with label). Sells in Tokyo for 30 sen each.

Page 3902. Photo of small wooden box of "Tori [chicken] Miso." Sells in Tokyo for 35 sen each.

Page 3974-3975 (Feb. 21). Visit Sendai Miso Jozo Jo, Sendaitenai, Oimachi, Tokyo. "Learned that much of their miso for local consumption is only aged for a week or ten days to two weeks, but that Miso for export trade to Canada, the United States and other countries is aged much longer, a year or more. This concern uses annually about 50,000 bushels of soybeans and an equal amount of rice for making Miso–plus 25,000 pounds of salt. Their yearly output is about 12,000,000 pounds. The wooden casks used to pack the Miso contain 200 pounds net weight and sell wholesale at Yen 10.00 to 13.00 per cask. For shipment abroad they use the standard 4½ gallon soy sauce wooden cask. It has a capacity of about 40 pounds and sells delivered at San Francisco at Yen 2.50 to 3.00 per cask."

Pages 3978-3979. Photos taken at Sendai Miso Jozo in Tokyo show: (1) Steamed rice spread on out rice straw mats in a wave pattern covering the entire floor of a large room.* After cooling, rice bacteria (Koji [sic, koji starter]) is added, and after three days the malted rice is mixed with boiled or steamed soybeans in the making of soybean miso. (2) Miso mashing tubs (*usu*) used for mashing boiled soybeans when making miso.* Each tub is made from a hollowed tree trunk and first used by Lord Governor Date in the "Year of Kaiei" about 300 years before the start of the Meiji Period (in 1868). Note: Daté Masamune (DAH-tay Mah-sah-MU-nay; lived 1567-1636) of Sendai was the first Japanese to make miso in a factory, starting in the early 1600s.

Page 4022, 4024 (Feb. 23). Photos: A slice of large white Japanese radish (*daikon*) which has been preserved in soybean miso. Thin sugared cookies [rice crackers] named *Satou Miso Senbei,* in which soybean miso has been mixed.

Pages 4082-4086. Photos of handsome boxes of miso with labels each purchased in the food department of a large department store in Tokyo. (1) Box (4½ by 6 inches) of Kinzanji Miso. "Kinzanji is the name of a temple in Kyoto and this miso was first concocted by a priest in this temple." (2) Box (4½ by 6 inches) of Saikyo Miso. "A form of white miso sweetened, and containing a large amount of rice." (3) Box of *Wasabi miso,* Japanese horseradish mixed with miso. (4) Box of *Tori miso,* which has chicken meat in it. (5) Box of *Goma miso,* which has sesame seeds mixed in.

Page 4140. Photo of rice bacteria (koji [sic, koji starter]) from T. Aseda Miso Factory, Tokyo, Feb. 28. Name: *Kuroban Moyashi.* Used in the production of miso malt [rice koji]. The contents of this package will inoculate 5 koku (25 bushels) of rice. Price: 0.35.

Pages 4313-4322 (12 March 1930). Went to Shimbashi Station and took the electric tram for Oimachi, Tokyo, to visit the Sendai Miso Jozojo Miso factory. Photos: (1) Interior of miso mixing room. Bean crusher and mixer were invented by this company. (2) Shipping room, where casks of miso are weighed and loaded into trucks for delivery.* (3) Large soybean steamer with live steam. (4) 300 year old *usu* for crushing soybeans. (5) View of a room full of wooden miso tanks/casks [vats] curing from above the top of the vats.* The top of each vat is weighted with rocks. Each room contains more than 80 vats. Each cask is about 7 feet high and 8-10 feet in diameter. The miso is aged here for a year or more. The company has several such rooms. (6) Soybean steamer in operation. (7) A large pile of rice koji ready to mix with an equal amount of cooked soybeans. To the right is a portion of a small wooden mixing tub with bamboo hoops. (7a) "A boy using stilts made of bamboo. This picture was made just as we were leaving the Sendai Miso factory. (8) Two wooden casks [kegs] of miso, packed and ready to ship to San Francisco, California.* "They have considerable trade there for this product." (9) A cooper at the Sendai Miso Factory seated on the ground and making bamboo hoops for

hooping miso casks.*

Page 4344-4345 (March 10). Photos: (1) Small box and label of white miso (*Shiro miso*) made from polished rice and soybeans. Purchased from Mikonaya Miso Co., Tokyo. The three characters are written horizontally from right to left. White miso is not used as extensively as red miso. It is "used on special occasions in soups and eaten as cheese with other foods. White miso is much more expensive than red and has more rice in it." (2) Small circular box of rice koji from Mikawaya Miso Co. Can be used to make white miso or sake–rice wine.

Page 4390-4391 (20 March 1930, Tokyo). Photos: (1) Boxes of the various ingredients used in making Sendai Miso. From left to right: Dry soybeans, soaked soybeans, polished rice, steamed rice, steamed rice with koji and salt, rice mould (koji), salt mixed with steamed soybeans and moulded rice, finely ground soybeans, coarse miso one week old, coarse miso one year old. "These were received from the Sendai Miso Factory, Tokyo, Japan, March 20, 1930." (2) Vegetables preserved in red soybean miso. The vegetables are Japanese white radish (*daikon*), cucumber, burdock root, small vegetable melon [*uri*] and egg plant [eggplant].

Page 4444-4445 (23 March 1930). Photos at the Sendai Miso Factory, Tokyo: (1) Steamed soybeans cooling on a floor in a wave pattern. "After the beans are cooled, they are mixed thoroughly with molded rice [koji] and salt (shown in the background in a mixing machine). The mixture is placed in large curing vats and allowed to cure for about three months." (2) A second view of the same room from a different angle. Address: Agricultural Explorers, USDA, Washington, DC.

722. Dorsett, P.H.; Morse, W.J. 1930. Tofu 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 3469 (8 Jan. 1930). Tokyo, Japan. "Worked at the office until about 10 or 10:30 then took our camera and went out to get pictures and information about Tofu, soybean curd.

"We visited a place not more than half a dozen blocks from the Sankaido Building and got a nice lot of information about making tofu. Also secured a few pretty good pictures.

An elderly Japanese lady fried (or seared as we would say) the cakes about 3 by 9 by ½ to ¼ of an inch in thickness, over a charcoal fire [to make grilled tofu or *yakidofu*] on the street or side walk in front of their house.

"Detailed information about the making of this tofu will be found in the special report on soybeans and soybean products, which will be a special report added at the end of our exploration work.

"We saw for the first time fried Tofu which had had chopped carrots added to it [ganmodoki]. We had not prior to this known of vegetables of any kind being added to or mixed with the bean curd or Tofu before frying.

Pages 3470 to 3471. Photos show: (1) "Soja max. Tofu, bean curd. Tokyo, Japan. A nearby view of an elderly Japanese lady frying Tofu on the street. Children and Mr. W.J. Morse are looking on." (2) An elderly Japanese lady frying or searing Tofu. To the right, children are watching the operation, and so are Mr. Morse and Suyetake, in the background. (3) "A fairly nearby view of an old Japanese lady fanning a charcoal fire over which she is frying or searing tofu." (4) "Cakes of soybean curd piled upon bamboo strip supporters [arranged on bamboo mats] and weighted to express the surplus moisture before frying. A metal two prong piece [skewer] is run through each to handle them with" (negatives #44714 to #44717).

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Pages 3472 to 3473. Tofu in Tokyo. Photos show: (1) "A fairly nearby of an old Japanese lady turning the cakes of Tofu she is frying [sic, grilling] over a charcoal fire." Note 1. The rectangular charcoal brazier appears to be about 14 inches long, 8 inches wide, and 8 inches deep. This is the same old Japanese lady described on pages 3470-3471. (2-3) "An old Japanese lady fanning a charcoal fire and frying [grilling] Tofu on the street, not far from the Sankaido Building.

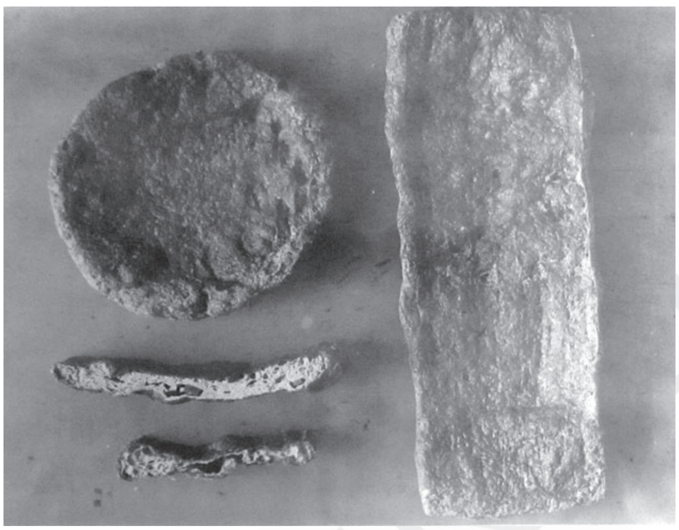
(4) A nearby view of five large cakes of skewered tofu being grilled on a brazier over a charcoal fire. (Negs. #44718 to #44721).

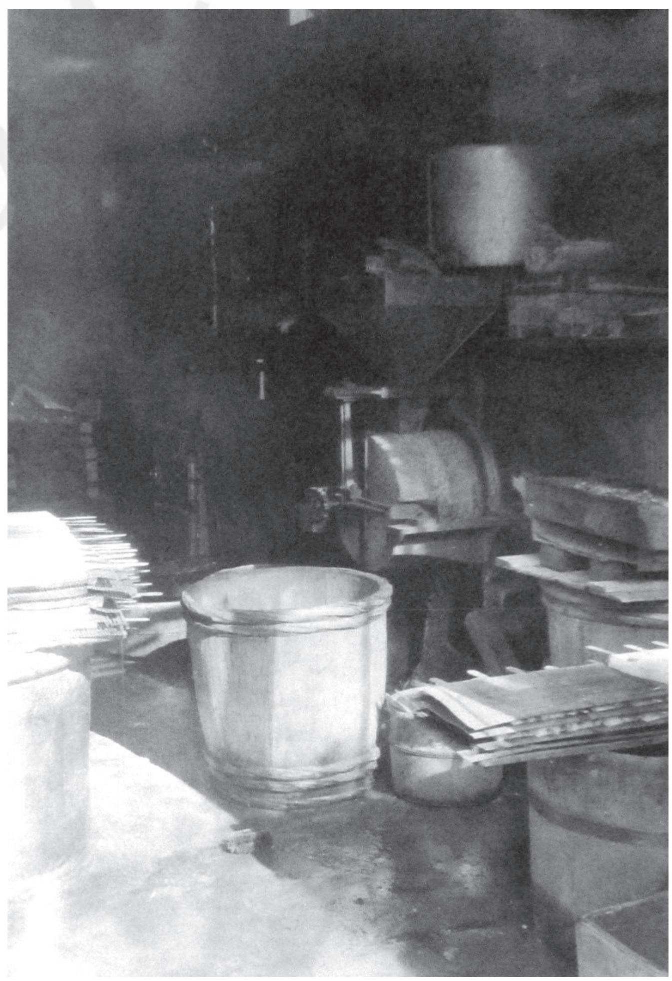
Page 3476. "Oblong piece of fresh soybean curd which had been toasted over a charcoal fire... This is used in soups

are fried in mustard [rapeseed] oil until brown and sell for three sen each. Each cake is 4½ inches in diameter and 3/8 inch thick. The oblong cake (D. & M. #3097) is known as 'Aburage.' It is a fresh bean curd mixed with chopped carrots and fried in mustard oil until brown. The cake is 8½ inches long, 3 inches wide, and 3/8 of an inch thick. Sell for three sen. These forms of fried bean curd are eaten when dipped in soy sauce and also in soups" (Neg. #44741).

Note 2. This is the earliest English-language document seen (April 2013) that contains the term "Fried soybean curd" or the term "Fried soybean curd cakes."

Page 3532 (11 Jan. 1930). "A soybean preparation used as a health drink, 'Almen: The Health Food Drink.'" Sold in a can whose front and back are shown. "Manufactured from soybeans by the Nippon Almen Shokuryo Co., Ltd., near Kobe, Japan. This form of flour is also used in making confections. Packages of 3 1/8 inches high and 2 1/8 inches wide" (Neg. #44758). Note 3. Soy flour is apparently used to make the canned health drink.





and also cooked with vegetable mixtures. Purchased from a bean curd factory, Tokyo, Jan. 8. The piece is 7½ inches long and 2½ inches wide" (Neg. #44736).

Page 3477. *"Phaseolus angularis.* Adsuki bean. Packages of adsuki bean flour purchased in a store, Tokyo, December 24, 1929. This is a sweet flour used in making sweet bean soup. Package 3 1/8 inches long; 1½ inches wide. D. & M. #3100 (Neg. #44737).

Page 3478. Soybean. This soybean product is sold in tubs from Tokyo small stores, and is known as 'Gomoku Mame.' It consists of a mixture of five cooked products, namely: soybeans, lotus root, fish sausage, seaweed and burdock roots." Purchased at a small grocery stand in Tokyo, Jan. 6. "It is eaten just as it is. Product is on bamboo leaf which measures 8 inches long and 5 inches wide" (Neg. #44738).

Page 3481 (8 Jan. 1930). "Fried soybean curd cakes. The round cake (D. & M. #3096) is known as 'Ganmodoki,' and is fresh bean curd mixed with chopped carrots. The cakes

Page 3533. "Dried and frozen bean curd. The fresh bean curd is cut into small blocks, frozen and then dried. Used commonly in soups. Packages 2 5/8 inches high and 2 1/8 inches across" (Neg. #44759).

Note 4. This is the earliest English-language document seen (April 2013) that uses the term "Dried and frozen bean curd" to refer to dried-frozen tofu.

Page 3534. Photo of a package of cooked and sugared adsuki beans, 7½ inches long and 3¼ inches wide (Neg. #44760).

Page 3535. "Candied soybeans and other products. Sticks of candy in which are imbedded black soybeans (green germ), yellow soybeans, peanuts, peas and sorghum seed. Box 8½ inches long and 6 7/8 inches wide" (Neg. #44761).

Page 3537 (13 Jan. 1930). "Got down to the office pretty early and got the pictures made yesterday jacketed and the legends written.

"About 10 a.m. went to the American Consulate with 8 packages to go forward today in the diplomatic pouch to the office. Six of these 100 to 106, contain seed, 107 contains pamphlets and other publications.

"About noon we went down the street and made a few pictures at a soybean curd factory. A little later we developed those, they were only fair, but are about as good as we can get in view of the conditions.

"In the afternoon we packed and sewed up two parcels of soybean products to go forward to Washington [DC] at the first opportunity. We are having really wonderful weather, not very cold and sunshiny and bright."

Page 3538. "Soybean candy. Small cylindrical pieces of candy in which are imbedded medium small roasted soybeans. This picture is natural size" (Neg. #44762).

Page 3539. Adsuki bean flour. Box containing 24 small papers of sweetened adsuki bean flour which is used in making sweet soup" (Neg. #44763).

Page 3540. "Bean curd factory (soy). "View showing furnace and boiler where ground soybeans are being boiled for making soybean milk. To the left of the furnace is a tub, into which the milk is strained and made into curd. Tokyo" (Neg. #44764).

Page 3541. "Bean curd factory. View showing a stack of oblong blocks of fresh bean curd which are to be slightly roasted over a charcoal fire [to make grilled tofu / *yakidofu*] (Neg. #44765).

Page 3542. Bean curd factory. View showing stone mill for grinding soaked soybeans into a mash for making soybean milk and bean curd. Above the hopper is a small round tank of water from which flows into the hopper of beans, a small stream of water while the beans are being ground" (Neg. #44766).

Page 3543. Soybean curd factory. View showing the furnace and boiler where the ground bean mash [*gô*] is boiled in making soybean milk. To the left of the furnace is the wooden tub into which the milk is strained, and where the magnesium sulphate solution is added to form the bean curd. To the extreme left is the partitioned rectangular box into which the bean curd is dipped and pressed into blocks" (Neg. #44767).

Page 3544. "View inside soybean curd factory showing in background stone mill for grinding the beans; on the right the oblong charcoal fire box for roasting blocks of the fresh bean curd; and in the foreground and on the left stacks of blocks of bean curd ready to be roasted. The tub in the center is where the blocks of bean curd are placed" (Neg. #44768).

Page 3545. "Inside the bean curd factory showing a stack of oblong blocks of fresh bean curd with long handled forks [skewers with several prongs] in one end. These blocks are ready to slightly roast over a charcoal fire" (Neg. #44769). Address: Agricultural Explorers, USDA, Washington, DC.

723. Morse, W.J. 1930. Re: Soybean products collected. Trip to Manchuria and China. Letter to Dr. E.A. Hollowell, Office of Forage Crops, USDA, Washington, DC, Jan. 12. 2 p. Typed, with signature on USDA letterhead.

• ***Summary:*** "Dear Holly: I have your letter of December 16 with reference to the soybean products and the more I collect over here the less inclined I am to loan them out... In my last such experience, I fitted up a soybean product exhibit for some sort of health food show in New York City and I never did get it back although we had considerable correspondence about it. As I recall I even took it up with the Secretary [of Agriculture] because they wanted it for a permanent exhibit and so I was out a nice exhibit which it took me considerable time to get up. After that I would not let anything go out unless I had several products of the same kind but it cured me of fixing up exhibits for any one or letting out products or pictures that I could not easily duplicate.

"Therefore, even with Dr. Burlison I do not know of any of the products we have in the office that I care to let out..."

"Last week we visited a large soy sauce factory [almost certainly Kikkoman] at Noda-Machi, about a three hours' run from Tokio... They use twenty thousands of bushels of soybeans annually and the same amount of wheat."

"I was rather anxious about the work but as you state if the Arlington [Farm in Virginia] work can be arranged, you and Lee can hold things until I return. I think that this can be arranged so that Lee will not be over-loaded with the work now on hand and the new introductions we are sending in...

"Dorsett is making pictures of the various [soybean] products as they are collected and making pictures that can not be beat.

"The beancurd, miso and natto factories are mighty interesting and we are getting lots of good data and pictures as well as samples of the varieties of beans used. The beancurd factories are only small places but they are very numerous and each has its own way of making the curd."

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: Tokio, Japan.

724. 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.

725. Dorsett, P.H.; Morse, W.J. 1930. Soybean oil and cake 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 3270 (28 Jan. 1930). A photo (neg. #44859) shows the front of a half-gallon can of Nisshin Salad and Frying Soybean Oil, sold by Nisshin Oil Mills Ltd. of Tokyo.

Pages 3555 and 3556 (15 Jan. 1930). The authors visited the Office of the Nisshin Oil Mills Ltd. of Tokyo and met the Director, Mr. L. Sera. "The output of their small mills in Japan are used at home, and all the bulk of that made by their 19 mills in Manchuria. Mr. Sera admitted that they are very much interested and concerned about what the American Congress will finally do about putting a tariff on soybean oil and cake. He told us that their company sends considerable oil cake to America. Japan proper imports from Manchuria upwards to 15,000,000 tons of oil and cake. He also told us that Manchurian oil cake brings $40.00 per ton f.o.b. Seattle." Address: Agricultural Explorers, USDA, Washington, DC.

726. 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 3617 (20 Jan. 1930, Tokyo). "Got parcels 118, 119, 120 and 121 over to the post office early this morning so as to be sure that they would be there when the truck called about noon for the packages to go on the commercial steamer sailing Tuesday 21st from Yokohama."

"During the day, a bag containing 200 or 300 samples of soybeans came in from the Tokachi Agricultural Experiment Station, Obihiro, Hokkaido, so we went to work on writing them up and as soon as this has been accomplished we will get them packd for shipment.

"We also wrote Mr. Ryerson detailed letters concerning shipments made Saturday and today" [Monday]. Address: Agricultural Explorers, USDA, Washington, DC.

727. Dorsett, P.H.; Morse, W.J. 1930. Tofu 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 3717 (28 Jan. 1930). Tokyo. "Long thin fried cakes of Tofu [aburage], also angular thick cakes. D. & M. #3751-52 (neg. #44856).

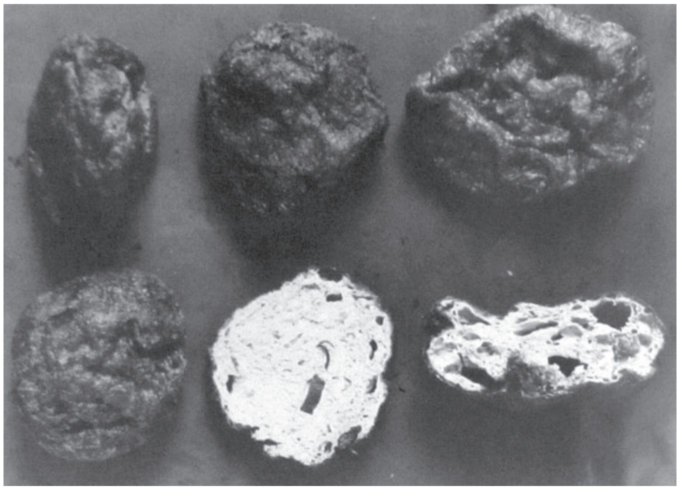
Page 3718. Fresh soybean curd in a block. The piece at the [left] end was cut off to show the thickness of the block (neg. #44857).

Page 3719. Soybean tofu in small fried cakes. Vegetables of several kinds have been added to and cooked with these tofu cakes" (neg. #44858).

Page 3786 (3 Feb. 1930). "Kudzu starch used for making thin gruel for invalids. It is also used as a covering for confections. The box measures, actually, 1¼ by 3 inches." On the front is written "Ryusuki Kuzu. Delicious and nourishing" (neg. #44877).

Page 3787. "Dried and frozen bean curd used in soups and mixed in vegetables when cooking. Box measures 2 3/8 inches by 6 7/8 inches" (neg. #44878).

Page 3823 (5 Feb. 1930). "Inarisushi" [Inarizushi]. "Pieces of fried rice-stuffed bean curd, (about life size)



the pieces of curd are about 4 inches over all. This was purchased at a food stand in Tokyo, Japan, Feb. 8th, 1930. D. & M. #3787 (neg. #44899).

Page 3868 (13 Feb. 1930). Tokyo, Japan. "This picture shows the ingredients used in making bean curd and a fresh piece of bean curd. Top row, from left to right: The by-product [okara] which makes a good stock feed; soybean milk; coagulator [coagulant]. Middle row: piece of fresh bean curd; ground soybeans thinned for boiling. Bottom row: dry soybeans; soaked soybeans; ground soybeans" (neg. #44902). Address: Agricultural Explorers, USDA, Washington, DC.

728. Morse, W.J. 1930. Soybean utilization. *Farmers' Bulletin* (*USDA*) No. 1617. 27 p. Jan. Revised 1932.
• ***Summary:*** Contents: Introduction. Soybeans for human food: Dried beans ("The Easycook and Hahto varieties, however, cook fully as soft as other beans." Also used as a substitute for coffee or for salted peanuts), green or vegetable beans ("The Hahto and Easycook varieties have been found especially valuable for use as green beans"), soybean flour, soybean oil, soy sauce, soybean sprouts, soybean vegetable milk ("used so extensively in China." Also mentions the residue [okara]), soybean curd. Soybeans for livestock: For swine, dairy cattle, beef cattle, sheep, poultry. Soybeans for oil: Methods of processing beans for oil, utilization of soybean oil. Soybean meal: Soybean meal for human food, soybean meal for stock feed, for swine, for dairy cattle, for beef cattle, for poultry. Soybean meal as a fertilizer. Miscellaneous uses of soybean meal. Soybeans for hay: Soybean hay for dairy cattle, for beef cattle, for horses and mules, for sheep, for swine, for poultry. Soybeans for pasturage: Swine, sheep, or poultry on soybean pasturage. Soybeans for silage. Soybeans for soilage [green crops for feeding confined animals; a term first used in 1928]. Soybeans for soil improvement. Soybean straw: Feeding value, and fertilizing value of soybean straw.

"Soybean milk in the form of a powder is a commercial product in some European countries, and in parts of the United States it has been used in special feeding cases" (p. 5). "In many cities in the United States having a large oriental population fresh bean curd may be found in the Chinese and Japanese markets" (p. 6).

Photos show: (1) Six men steaming soybeans while making miso in Japan. (2) Muffins made from wheat flour and soybean flour. (3) Making soy sauce in a Chinese courtyard. (4) Grinding soybeans with a stone mill to make soybean milk in China. (5) "Blocks of freshly made bean curd, 'tofu,' as sold in the markets of the Orient." (6) Loading soybean oil in tanks at a soybean oil mill, Harbin, Manchuria. (7) Soybean cakes awaiting shipment at a Manchurian port. (8) Hogs in a field of soybeans. (9) "Pasturing soybeans and corn with sheep is a common practice in the Corn Belt states." (10) Corn and soybean plants growing together for use as silage; a boy is standing by the plants. (11) "A fine growth of soybeans to be used for soiling." Address: Senior Agronomist, Office of Forage Crops and Diseases, Bureau of Plant Industry, Washington, DC.

729. *Unknown Tokyo newspaper.* 1930. Ancient bean-throwing rite will be observed tomorrow: Many who still believe in practice to take part in traditional ceremony in their homes and at shrines and temples. Feb. 2. p. 1-2.
• ***Summary:*** In his personal scrapbook, Morse included with this English-language article with no date or newspaper name: "All the streets in towns and cities of the Empire, will, according to tradition, be infested with devils tomorrow and many persons will attempt to drive them out of their houses with a time-honored ceremony of bean-throwing known as tsuina."

Note: Setsubun rituals include *tsuina* and *mame-maki* (bean-scattering), also known as *mame-uchi. Tsuina* (also referred to by other names like "oniyarai," is an exorcism rite. Introduced from Tang China, tsuina was originally held on the eve of the New Year. Mame-maki, the custom of scattering roasted beans to expel evil spirits, seems to have begun in the Muromachi Period {1392-1573}. Although members of the court and upper classes maintained a distinction between tsuina at the end of the year and bean-throwing at setsubun, commoners in many locations often blended the two customs. Source: *Encyclopedia of Shinto,* at Setsubun).

"Dried [soy] beans are roasted during the day and prepared for use in the evening.

"When dusk sets in the head of the family may be heard shouting 'Oni was soto, fuku wa uchi. Oni was soto, fuku wa uchi,' throwing beans as he shouts. This means 'Out with devils; come in good luck.' Then children are heard shouting and running about in an effort to gather the greatest possible amount of beans as their father throws them at the devils in each corner of the rooms in the house."

One of the most prominent Shinto shrines at which

the bean-throwing will take place is the Kompira Shrine (*Konpira Jinja*) in Toranomon, about one mile north of Shiba Park, Tokyo. "At this shrine more than 2 bales of [soy] beans are expected to be thrown at the crowds which will throng in front of the shrine. Several professional wrestlers, well known actors and musicians will act as *toshi-otoko* (bean throwers).

"The bean-throwing ceremony at the Gojo Tenjin Shrine in Kameido is extremely interesting. It preserves the most primitive form of the custom." The custom is said to date back to 706 A.D. when a deadly epidemic swept Japan.

On the same page as article, Morse included several photographs: (1) 1931–W.J. Morse feeding deer in Nara, Japan. (2) K. Murochi, W.J. Morse and K. Matsushima at a soybean seed fair in Kung Chuling, Manchuria. Note: Kungchuling, Chilin -> Gongzhuling, Jilin. (3) 1930 July–Suyetake, W.J. Morse, and P.H. Dorsett in Dairen, Manchuria.

730. Dorsett, P.H.; Morse, W.J. 1930. Setsubun and roasted soybeans 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 3785 (3 Feb. 1930–Tokyo). "Today is 'Setsubun' or 'Division of Seasons' and is to all Japanese a change of seasons according to the lunar calendar. Spring begins tomorrow and winter ends today. It is also known as 'Mame-Maki' or 'Bean Scattering Day.' In the evening, every Japanese home practices a traditional and peculiar ceremony called 'Mame-Maki' or 'Bean Scattering.'"

Note 1. This is the earliest English-language document seen (Dec. 2012) that uses the term "bean scattering" (or "bean-scattering ceremonies") to refer to the Japanese practice of *mame-maki.*

"The people in the house scatter parched soybeans in and out of the houses loudly shouting 'Fortune in, Devils out,' thus calling in the year's fortune and driving out any probable misfortune from the household. Bean-scattering ceremonies (it is considered a religious rite) were held in all temples and we understand a large temple in Shiba Park used twenty-five bushels of parched soybeans in the bean scattering ceremony. So we will have to score another use of the soybean as 'Devil Chasers!'"

All of the following describe photos unless otherwise stated: Page 3788. "Twisted oblong pieces of white sugar candy with greenish yellow roasted soybeans. This candy is made after the manner of peanut candy at home. Size of paper bag is 7 by 9½ inches."

Page 3789. "Twisted pieces of molasses candy [each about 3 inches long] with small roasted soybeans (yellow)."

Pages 3790-91. Small puffed rice and roasted soybeans." Bag is 6 by 9 inches.

Page 3792. Puffed and roasted soybeans which are used on Scattering Day, February 1st."

Page 3819. Bag of "candy made of sesame, puffed rice and black roasted soybeans. Purchased at a confectionery store.

Page 3822. Box of pine needle tea ("Matsunocha"). It consists of pine needles, roasted barley and soybeans, plus several herbs." Packages: 4.37 by 7.62 inches.

Page 3869 (12 Feb. 1930–Tokyo). Photo of "Mame hoito," soybean candy in large triangular pieces. Made of roasted soybeans and sugar.

Page 3871. "Oblong pieces of soybean candy. The soybeans have been roasted before using. Made after the manner of peanut candy [peanut brittle?]. Purchased at Kumagaya, Japan, Feb. 11, 1930."

Page 3873. Small cakes, on the top of which is a white sugar frosting and small pieces of roasted soybeans. Purchased in Akabane, Japan, a section of Tokyo, Feb. 11, 1930. Native name is 'Mame boro.'"

Page 3875. "Mixed sugared beans (seven kinds) of which some are soybeans... Local name is 'Shichi-fuku mame.'"

Page 3883. "Roasted soybeans incased [encased] in small balls of rice dough and baked. They are grayish-white in color. The native name is 'Karin mame.' Sell at .40 *sen* per pound."

Page 3885. "Paper bags of sugared puffed rice, sugared puffed rice balls, sugared roasted soybeans (black and greenish yellow varieties)... Used by little Japanese girls on *O-Hina Matsuri,* the Girls' Festival, March 3. Native name 'Hina arare.'"

Note 2. This is the earliest English-language document seen (Dec. 2012) that uses the term "sugared roasted soybeans" to refer to soynuts.

Page 3886-3887. "Roasted soybeans incased in slightly salted rice dough an baked. Color: Brownish-white. Native name: 'Iso-arare.'" They sell at 20 *sen* a pound."

Page 3888. Photo shows: "A general view of the soybean products collected in one day in suburbs of Tokyo, Japan, February 13, 1930 (neg. #44918).

Page 3896. Cans of powdered seaweed ("Ajitsuke Aonori") which is used on roasted soybeans.

Page 3899. "Wheat flour cakes or cookies with finely chopped peanuts and roasted soybeans with white sugar frosting spread over the top of each. Native name is 'Mame koshi.'"

Page 3900. "Wheat flour cookies in which are coarsely ground roasted soybeans. Native name is 'Kawara senbei.'"

Page 3901. "Clusters of candied roasted soybeans and small squares of baked rice dough. Native name: 'Sakura okoshi.' Sell at 18 *sen* a pound."

Pages 3925-28 (18 Feb. 1930). Morse and Suyetake searched for soybean products today." They brought back

more than 24 new items. Two small bamboo baskets containing a mixture of sugared puffed rice, square puffed rice balls, and sugared black, green and yellow soybeans. Named "Hina arare." Small squares of greenish candy with roasted green soybeans. Native name: "Amegashi."

Page 3940. Tea mixture named "Jiyo hoji cha" consisting of legume leaves, pods, and seeds, roasted black soybeans, seaweed and roasted barley.

Page 3941. Wheat flour cakes in the form of fish with black soybeans used for eyes. Native name: "Taikoshi."

Page 3943. Triangular pieces of black sugar candy with roasted yellow soybeans. Native name: "Kuro sankaku mame ita."

Page 3944. "Slightly twisted oblong pieces of sweetened rice paste with sesame seed and roasted green soybeans. Native name: 'Gomaneji.'"

Page 3945. "Small cakes of sweetened rice flour and coarsely ground roasted soybeans in the form of the face of Ebisu. Price: 15 for 15 *sen."*

Page 3947. "Oblong rice flour cakes in which are imbedded roasted black soybeans. Native name is 'Kuro-mame karinto.'"

Page 3948. "Thin oblong pieces of candied roasted green soybeans. Each piece is wrapped in oblate (gelatinous paper). Native name is 'Aomame.'"

Page 3949. "Thin triangular pieces of candid roasted soybeans. Each piece is wrapped in oblate. Native name is 'Sankaku mame ita.'"

Page 3950. "Round green sugar candy cakes with roasted yellow soybeans. Native name is 'Aomame ita.'"

Page 3951. "Salted roasted soybeans purchased in wholesale bean store, Tokyo, Feb. 18. Native name is 'Shio daizu' [literally salt + soybeans]. Round medium sized yellow soybeans are soaked in water for two hours and then roasted." The beans are then dipped in strong brine and dried. Wholesale price: 9 *sen* for 1 lb. (Note 3. Most of the roasted soybeans in Japan are sweetened rather than salted).

Note 4. This is the earliest English-language document seen (Dec. 2012) that uses the term "Salted roasted soybeans" or the term *Shio daizu* to refer to soynuts.

Page 3952. "Roasted green soybeans incased in balls of wheat flour and baked. The color is bright red. Pieces of seaweed on the outside. Native name: 'Takura mame.'"

Page 3953. "Small cookies of wheat flour with roasted black soybeans imbedded on top." Purchased in confectionery store in Tokyo. Native name: "Chin myoto." 20 *sen* per pound.

Page 3954. Karu mame." Used when sugared in a mixture of confections for the Dolls Festival Day, March 3.

Page 3955. "Round cakes of black sugar candy with roasted yellow soybeans. Native name: Mametaroshi."

Page 3956. "Twisted oblong pieces of sweetened rice paste (pink) in which are imbedded roasted black soybeans. Native name is 'Akamedama.'"

Page 3957. "Shiro medama."

Page 3958. "Sugared roasted black and yellowish-green varieties of soybeans. Native name is Satô mame."

Page 3959. "Neji mame."

Page 3960. "Sankaku mame."

Page 3961. "Small cakes of sweetened rice flour and coarsely ground roasted soybeans in the form of the face of Okame-san (Goddess of Happiness). Native name is 'O-kame mame rakugan.'"

Page 3962. "Kuronegimame." Address: Agricultural Explorers, USDA, Washington, DC.

731. 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 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.

732. Dorsett, P.H.; Morse, W.J. 1930. Re: Zoyzia / zoysia. Collecting soybean products in Japan. Letter to Dr. A.J. Pieters, Office of Forage Crops, USDA, Feb. 15. 2 p. Typed, with signature on hotel letterhead.

• ***Summary:*** "Oftimes [Ofttimes] in the midst of our strenuous times in chasing down soybean products, we bear in mind *Zoyzia pungens.* We came across a clue today." Dr. Nakai, Botanist of the Imperial Botanic Gardens, Tokyo, knows Zoysia grass well. Being tender, this "grass does not even survive the winter at Tokyo and is found only in the southern parts of the Japanese empire."

The species of Zoyzia that is hardy and grows well in Korea is *Zoyzia Japonica,* a native of Korea. The seed is not viable. The plant is propagated with the plant roots.

"Our efforts in collecting soybean products are yielding excellent results and by the time we return home we should be able to open a candy store, bakery, drug store, meat shop, feed store and voodoo shop. The voodoo shop needs a little explaining.

"'Setsubun' or 'Division of the Seasons' falls on February 3rd and spring commences according to the lunar calendar. In the evening of the 3rd a traditional and peculiar ceremony called 'Mame-Maki' or 'Bean Scattering' is practiced in every home. The people in the house scatter parched soybeans in and out of the house shouting loudly, 'Fortune in and Devils out...' While the person is scattering the beans he or she holds in one hand a small bundle of threshed soybean plants and holly branches. To the holly branches are attached small sardines or herring. After the devils are driven out of the house by the scattering of the beans, the bundle of straw and holly with the dried fish is placed over or at the side of the house door to keep the devils out. The devils are said to be quite fond of herring or sardines. When they are about to enter the house, they see the fish and quite naturally stop to get a bit of their favorite food. In trying to get the fish, however, the spines of the holly stick in their eyes and blind them. Thus blinded, the devils cannot find their way into the house, so there you are, a cheap and easy way of ridding your house of devils. We have, therefore, scored another use for the soybean.

"Rather elaborate bean-scattering ceremonies are held at all of the shrines and temples. One of the large temples in Shiba Park, not very far from the hotel, used twenty-five bushels of parched soybeans in their bean-scattering ceremony. We are told that each house uses about one pound of soybeans for devil-chasing. We obtained a package of the 'devil-chasing' beans and sent them in with our 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 Explorers, The Imperial Hotel, Tokyo, Japan.

733. Dorsett, P.H.; Morse, W.J. 1930. Re: Miso. Letter to Mr. Knowles A. Ryerson, Foreign Plant Introduction, Bureau of Plant Industry, USDA, Feb. 15. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** A detailed discussion of the importance of miso in Japan. 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: The Imperial Hotel, Tokyo, Japan.

734. Morse, W.J. 1930. Re: Exports of soybeans from Manchuria. Proposal of trip to Europe. Collecting soybean products in Japan. Letter to Mrs. Verna M. Donavan, Office of Forage Crops, B.P.I., USDA, Feb. 15. 2 p. Typed, with signature on hotel letterhead.

• ***Summary:*** "Dear Mrs. Donavan: At the head office of one of the large soybean oil companies in Tokyo we recently received considerable information concerning the export of soybeans from Manchuria to European countries, especially Germany, France, and England. It seems that these countries are taking so many soybeans that the Chinese government is considering the placing of an export duty on the seed in order to protect the soybean oil industry of Manchuria... we think it might pay us to return by way of Europe and look into the soybean industry.

"In our soybean files and also in our general letter files, I think we have the names of firms and people interested in soybeans in several European countries. I wish that you would look up the names and addresses of such firms and persons so that I can write them and obtain some detailed information about the soybean situation in Europe."

"There is a Dr. J.L. North in London, England, with whom I have had considerable correspondence during the past several years."

Morse thinks that his collection of soybean products from Japan will number about 200 products ore more.

"Received Mr. Lee's letter recently which you typed for him in the winter and I am glad to hear that everything is going along so nicely. I feel now that the work is going along so fine that I can at least stay over here three or four more years. The soybeans are calling in the U.S. and I suppose that a year from now we will be on our way home or getting packed up to go."

P.S. [handwritten]. It has occurred to me that the products being sent in should be placed in the large tin boxes in which we store seed to keep it away from the mice. If the mice are as bad as formerly, I am afraid that unless the products are stored in the tin boxes, the mice will play havoc with them..."

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: The Imperial Hotel, Tokyo, Japan.

735. Dorsett, P.H.; Morse, W.J. 1930. Roasted soybeans 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 3971 (20 Feb. 1930–Tokyo). "Packed such of the soybean products as it is believed will carry to Washington [DC] in small packages." All of the following describe photos unless otherwise stated:

Page 4023. "Thin sugared wafers or cookies with coarsely ground roasted soybeans mixed in." Purchased in confectionery store in Tokyo. Sell for 1 *sen* each.

Page 4025-4026. "Candied puffed rice in which are distributed roasted black soybeans, Native name 'Dagashi.'"

Page 4027. "Small balls of baked rice dough within which are roasted soybeans. Pieces of seaweed are distributed over the surface of the rice balls. Native name 'Noritsuke jiyo mame.'"

Page 4029. "Roasted soybeans, dyed green, and partially imbedded in small rice cakes. The soybeans represent 'Momotaro,' the son of a peach, and the rice ball, the peach. Native name 'Ko Momotaro.'"

Page 4033. "Small cookies in which are roasted flattened black soybeans. Native name 'Keitaku senbei.'"

Page 4034. "Mixture of various kinds of roasted soybean confection. Native name 'Okoshiki mame.'"

Page 4035. "Roasted soybeans covered with thin rice dough and then sugar coated in different colors (white, brown, and green). The green consists of ground tea leaves. Native name 'Mokari [Hokari?] mame.'"

Page 4044. Small yellow soybean roasted and coated with sugar. "Maru satômaze."

Page 4046 (25 Feb. 1930). "Sugared roasted soybeans. The sugar was of different colors, pink, white, green, and brown."

Page 4220. "White sugar candy coated roasted soybeans of different colors, white, brown (cinnamon), pink and green (tea). Native name 'Asahi mame.'"

Note 1. This is the earliest English-language document seen (Dec. 2012) that uses the term "candy coated" or the term "sugar candy coated" to describe dry-roasted soybeans or soynuts.

Page 4221. Brown cakes made of roasted yellow soybeans.

Page 4222. "Small round pieces of candy. Some contain raisins, others roasted soybeans (yellow), adsuki [azuki] beans and roasted peas or peanuts."

Page 4223. "Round pieces of soybean candy in which are embedded roasted greenish yellow soybeans. Native name 'Ita mame.'"

Page 4224-26. "Two small wooden tubs with bamboo hoops (or small Japanese lanterns, or a throne and steps), filled with sugared puffed rice and sugared roasted soybeans." Used at the Girls' Festival, March 3.

Page 4227. "Irregular pieces of clear brown syrup candy with roasted yellow soybeans mixed in."

Page 4417. "Rice flour bread with roasted soybeans scattered through it. Slices are brushed with soy sauce when the bread is nearly baked. Native name 'Fukuwa uchi.'"

Page 7071 (31 Jan. 1931). Tokyo. W.J. Morse's notes: "After our visit to the Botanic Gardens, we visited some market sections... At present there is a great abundance of puffed roasted soybeans in the various markets. These are used on bean-scattering day (Mame-Maki [sic, Setsubun]) which comes on February 4th this year. We found many posters announcing bean-scattering ceremonies at many shrines and temples in and around Tokyo."

Note 2. This is the earliest English-language document seen (Dec. 2012) that uses the term "puffed roasted soybeans" to refer to dry-roasted soybeans (*irimame*). Address: Agricultural Explorers, USDA, Washington, DC.

736. Dorsett, P.H.; Morse, W.J. 1930. Soybean cultivation

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 3973 (21 Feb. 1930). "Today we visited the Imperial Agricultural Experiment Station at Oji or Nishigahara [in northern Tokyo], Japan.

"We spent a couple of hours with Dr. Hiroshi Terao, the director, who is in charge of the plant breeding of all of Japan. He has visited the United States and studied at Harvard. He speaks very good English and is a fine fellow.

"The principal plant breeding work of the country relates to upland and paddy field rice, wheat, barley, and only recently rape, for oil production, has been added to the list."

"Relative to soybeans the Doctor said that their growth in the South and West are almost wholly limited to green manure types. He thinks, and quite probably it will prove to be true, that the soybean growing area in Japan will decrease in proportion to increased land values [and imports from Manchuria]. Farmers will be forced to grow crops which will return them on high price land more than is returned by the growing of soybeans."

Page 4419 (23 March 1930). Tokyo, Japan. "There is to be a big celebration tomorrow to celebrate the reconstruction of Tokyo after the great earthquake of 1923" [Sept. 1; in Japanese *Kantô daishinsai.* This was the deadliest earthquake in Japanese history]. Address: Agricultural Explorers, USDA, Washington, DC.

737. Dorsett, P.H.; Morse, W.J. 1930. Roasted soy flour 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 4077 (25 Feb. 1930, Tokyo, Japan). "A life sized picture of small rounded rectangular cakes made from roasted green soybean flour, they are browned on top. Purchased in Oji section, Tokyo, Japan, Feb. 24, 1930. Native name 'Murasame.' Price, 40 sen a pound" (neg. #44991).

Page 4078. "A life sized picture of small brown sugar coated macaroons made of wheat flour and coarsely ground roasted soybeans. Purchased at a confectionary store in Oji section, Tokyo, Japan, Feb. 24, 1930. Native name 'Daizu makoron.' Sell at 50 sen a pound" (neg. #44992).

Page 4079. "A life sized picture of a small dish of soybeans and soybean flour, also small round twisted cakes about 3 inches long made of sweetened roasted green soybean flour. Purchased at a confectionary store in Oji section, Tokyo, Japan. Native name 'Koborematsuda.' The sell for 20 sen a pound" (neg. #44993).

Page 4080. "A life sized picture of a small dish of soybeans and one of soybean flour, also irregular confections of sweetened roasted green soybean flour and shaped like large broad beans. Purchased in a confectionary store in Nipporo section, Tokyo, Japan, February 25, 1930. Native name 'Mame kinto.' The sell for one sen each" (neg. #44994).

Page 4081. "Sweetened puffed rice (pink and white) coated on sides with sweetened roasted green soybean flour. Native name 'Gokabo.' Purchased at a confectionary store in Konese, Japan, February 25, 1930. They sell for 20 sen a package. Package measures 3¼ x 7 3/8 inches. This picture also shows small dishes of soybeans and soybean flour" (neg. #44995).

Page 4218. "A life sized picture of a mixture of small thin cakes made of rice flour and chopped or coarsely ground roasted soybeans. Native name 'Wanairo sebei' [Wanairo senbei]. Purchased in a confectionary store Tokyo, Japan, March 1, 1930. Price 55 sen a pound" (neg. #45006).

Page 4219. "A life size view of small cookies made from roasted yellow soybean flour. Purchased at a confectionary store Tokyo, Japan, March 1, 1930. Native name 'Fukube.' Very light yellowish brown in color. Price 1½ sen each (neg. #45007).

Page 6874 (31 Dec. 1930, Tokyo, Japan). W.J. Morse's notes. "During the day we visited different sections of Tokyo looking up soybean products. Although we found a great variety of products in the forms of candies, cakes and candied beans, we found only one new product–powdered coffee. This is made from coffee beans, soybeans, corn, etc., by the Aihara Co. of Tokyo. It seems to be an excellent product but is ground too finely, giving it a form too much like coffee essence." Address: Agricultural Explorers, USDA, Washington, DC.

738. Potter, Paul. 1930. Soy beans find place in menus of Americans: Oriental countries know their worth. *Chicago Daily Tribune.* Feb. 28. p. 17.

• ***Summary:*** "Soy beans, utilized for ages in oriental countries in the preparation of numerous fresh, fermented, and dried food products, are gradually finding a place on the American table." Soy bean flour has long been used in diabetic diets and in a gruel for infants allergic to cow's milk. In recent months food manufacturers have begun to make soy sauce, breakfast foods, and edible oil from soy beans. W.J. Morse, who pioneered the soy bean's adaptation to the corn belt, says the 1929 crop is worth $70 million. Soy bean oil is becoming an important ingredient in the manufacture of soap, paints, linoleum, rubber substitutes, and glycerin.

739. 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,


TRADE MARK
銘物
開花
五家寳
武州熊谷筑波町
KUMAGAYATSUKUBA

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.

740. Dorsett, P.H.; Morse, W.J. 1930. Visit to the Nippon Jojo Kogyo & Co. Ltd. and Mr. Togano 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:*** Pages 4337-39 (15 March 1930, Tokyo, Japan). "In our study of soy sauce manufacture, we received information about a factory manufacturing an artificial soy sauce. A visit was made to this factory which is known as Nippon Jojo Kogyo & Co., Ltd., 102 Omoto-cho, Koishigawa-ku, Tokyo. We were taken to the office of the President, Mr. Togano, who was a student at the Nishigahara Agric. Experiment Station Soy Sauce Laboratory. Mr. Togano made a special study of soy sauce brewing under Dr. Kurono, Chief of the Soy Sauce Laboratory, and is recognized as an expert on the brewing of this sauce.

"It was learned through Mr. Togano that his method of manufacture is not an artificial one but merely a different method whereby only one-sixth of the time is required in the curing, and less wheat is required. Mr. Togano in his investigations found that by certain changes in the old method of making soy sauce, economy in time or curing and in amount of wheat used could be gained. In the old method, the cracked roasted wheat and steamed soybeans are mixed and treated with the rice culture. In the improved method the cracked roasted wheat and the steamed soybeans are treated separately with the culture, and then mixed. The treatment of the roasted wheat is a secret process and has been patented in Japan and the United States.

"After the mixing of the treated soybeans and roasted cracked wheat, salt and water are added. This mixture is then placed in the curing vats, and only 20 days of curing are required for a good quality of soy sauce. However, the mixture is left in the tubs for 60 days before being removed for pressing out the sauce. This time is one-sixth of that used by other soy sauce factories, as most of them cure the mash for at least one year and in some cases, a year and a half is allowed.

"Three grades of the ordinary sauce are manufactured by the Nippon Jojo Kogyo & Co. A special brand known as "Marujo Kanro Shoyu" [a brand of saishikomi] is also made. This sauce is much heavier than the common sauce and is made by adding to the soybean-roasted wheat mixture, the ordinary sauce instead of salt and water. Note: This is the earliest document seen (April 2012) that mentions "Kanro Shoyu" or "Marujo Kanro Shoyu" or any type of saishikomi shoyu. Yet the word "saishikomi" is not used.

"The Nippon Jojo Kogyo Co. soy sauce sells much cheaper than that of other factories. A two litre bottle sells for 45 sen, whereas the soy sauce of other companies sells for 60 sen for two litre bottle. This company has four factories in the Tokyo District, and has several more distributed about in different parts of the Japanese Empire. There is also a large factory near Hongkong, China. This company uses about 150,000 koku (750,000 bushels) of soybeans yearly in the manufacture of soy sauce at its four Tokyo factories.

"Mr. Togano asked much about the soy sauce and soybean situation in the United States. He advised that he sells considerable rice culture for soy sauce manufacture in Los Angeles, Chicago and San Francisco. From information gathered, he evidently has looked into the proposition of starting a soy sauce factory in the United States.

"The advertising of products by this firm is the most extensive of any of the firms putting out soybean products we have yet seen in Japan. Attached herewith is a folder used in advertising. The wrestler represents the health and strength of the Japanese people while the cask of soy sauce he is holding represents the health and strength of Japanese foods for the people."

A label of the company's Maru-Jo soy sauce (in a wooden keg) appears on p. 4339. A sumo wrestler is holding a large keg of the product over his head. On his right leg is written "miso" and on his left leg, "shoyu." Address:

Agricultural Explorers, USDA, Washington, DC.

741. *Franklin Evening Star* (*Franklin, Indiana*). 1930. Soybean becomes valuable crop in U.S. (Photos with caption). March 15. p. 1.
• ***Summary:*** This collection of three photos at the top of page 1 show: (1) Steaming soybeans being poured onto a pile by 3 Japanese miso makers. (2) An American standing in a field of soybeans which come almost to his waist. (3) A portrait photo of William J. Morse in a circle. The caption reads:

"Soybeans, introduced 20 [sic] years ago from the orient, have become a major forage crop in the United States. Last year's crop was in excess of $70,000,000. William J. Morse, U.S. Department of Agriculture specialist shown in the insert, has been collecting species of the bean in China. Japanese shown here are steaming soybeans for their dish, miso. At right is a growth of beans in the United States."

Note: There is no additional article.

742. *Santa Ana Register* (*Santa Ana, California*). 1930. 4000 varieties soybeans planted by U.S. on experiment farm. March 30. p. 18.
• ***Summary:*** "Washington, March 29–Twenty [sic] years ago the soybean was introduced into the United States as an experiment. Today it is one of the most important crops in the nation. The value of the harvest last year was $70,000,000.

"So important has this plant become in this country's agricultural industry that the U.S. department of agriculture has its specialist, W.J. Morse, now in Japan seeking for additional varieties of the bean and gathering information on its cultivation.

"Morse has already collected 4000 lots of seeds. These are to be planted at the department's Arlington farm near here, and from them a large selection of satisfactory varieties will be picked this year.

"More and more uses are being found for soy-beans. It has been discovered that they contain a valuable oil which is in wide use in the manufacture of soap, paints, linoleum and rubber substitutes. When refined this oil can be used in the manufacture of many foodstuffs where vegetable oils are desired. The demand for this oil has caused the construction of several crushing plants in the middle west and south.

"It is hoped, from this standpoint, that new varieties sent in by Morse will have a higher oil content."

A collection of three photos at the top of this page shows: (1) Steaming soybeans being poured onto a pile by 3 Japanese miso makers. (2) An American standing in a field of soybeans which come almost to his waist. (3) A portrait photo of William J. Morse in a circle. The caption reads:

"U.S. specialist studies soybeans. Japanese shown here are steaming soybeans for the dish, miso. At right is a growth of beans in the United States, and William J. Morse, U.S. specialist who is seeking more varieties, is shown in the inset."

743. Seattle Public Library, Technology Div. 1930. Bibliography on soy beans. Seattle, Washington: Seattle Public Library, Technology Div. 36 p. March 30. 28 cm. References from 1890-1930. 2nd ed. 1933? 12 p. [426 ref]
• ***Summary:*** "Includes material on the soybean and its products published from 1890 to date, with the exception of (1) patent literature; (2) material on the agricultural phases of the subject such as culture, varieties, use as a forage crop, etc. Entries starred* are not in the [Seattle Public] library: except as they are listed in abstracts." Contents: BIbliographies. General. Chemistry. Uses: General, fertilizer, food (studies in nutrition, human food, feed for livestock). Soy bean oil. General, analyses and tests, uses.

Note: This is the earliest American monographic bibliography seen on soy beans. However in *The Soybean,* by Piper & Morse (1923) included the most extensive bibliography available at that time (563 references). Address: Seattle, Washington.

744. *Dairen Manchuria Daily News.* 1930. Personal items: Mr. P.H. Dorsett & Mr. W. Morse. April 1.
• ***Summary:*** "Mr. P.H. Dorsett & Mr. W. Morse, both Agricultural Explorers of the U.S. Department of Agriculture, accompanied by Mrs. Dorsett & Mrs. Morse & child, came to Dairen this morning from Tokyo by the O.S.K. s.s. Ural Maru. The two experts are to take up the work of agricultural exploration in Manchuria for about a year."

745. 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.

"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. 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.

746. William Morse, P.H. Dorsett, and their families in Manchuria (Photograph). 1930. April.
• ***Summary:*** This photo (published in April 1930 in a Japanese-language newspaper in Japan or Manchuria) shows, from left to right: Ruth Dorsett (daughter-in-law of Mr. Dorsett), P.H. Dorsett, Mr. Suyatake (interpreter), Edna Morse (Mr. Morse's wife), Margaret Morse (their daughter), and William Morse.

747. Dorsett, P.H.; Morse, W.J. 1930. Soybean chiang and salted black beans in Manchuria and 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:*** * = Best photos. Page 4620 (2 May 1930, Hsiungyaocheng, Manchuria). The South Manchuria Railway agricultural experiment station here is testing about 60 soybean varieties under the direction of Mr. Kaneyasu Hisatake [Japanese name], agricultural engineer. "About 90% of the soybeans planted in this area consists of a greenish yellow variety called *Te-cha-chin* which is used for oil and is also utilized by the farmers for bean curd, miso, and other food purposes." Page 4641 to 6142 (May 8, Kungchuling, Manchuria). Mr. Kanda [Japanese name] is director of the Kungchuling experiment station. Kungchuling is the center of a very extensive soybean growing section and the experiment station is doing much work with the improvement of native [indigenous/domestic] soybean varieties. Over 500 varieties are under test yearly and more than 2,000 varieties have been experimented with. "The great range in size, color, and shape of the seed was very interesting." Visited "some Chinese stores where Chinese soybean miso and soy sauce were sold. The Chinese miso is more liquid (like a thin paste) than the Japanese and not ground, but both taste very much alike."

Pages 6252, 6253, 6254, 6255 (23 Oct. 1930, Peiping, China). Went to the "pickle factory of Chang Shun Kung,

where we got information about soybean jam [*chiang / jiang*], pickles, etc." Photos taken at the factory of Mr. Chuang Shun Kung: (1) "View across soybean jam and pickle jars covered with matting." Factory buildings in the background. (2) "Looking along a portion of a line of large earthen jars filled with soybean jam [chiang].* These jars hold about 800 catties of jam." (3) Same factory. Mr. W.J. Morse standing by the end jar in one of the rows of jars.* (4) "The end and half the length of a dry brick of wheat and soybeans, curing stock for Chinese jam made of soybeans." This product is used in making soy sauce and three forms of soybean jam or paste. Chinese name *Ton chih* [sic, *Tou chih*] meaning "salted beans" [fermented black soybeans]. Note: This is the earliest English-language document seen (Nov. 2011) that uses the word "jam" or "soybean jam" to refer to *chiang / jiang.*

Page 6300 (29 Oct. 1930). Peiping, China. "P.H. Dorsett's notes:... Before tiffin we visited two soybean jam and pickling establishments outside the city to the southwest. One of the establishments, that of Mr. Chang Shun Kung, is 300 years old and some of the large earthen jars now in use were among the first purchased and used.

This firm makes soy sauce. It is pressed from jam [jiang] seasoned or cured, usually, for one year. Their presses are the old type lever presses. They use soy sauce jam and also wheat jam in which to pickle radishes, string beans, and other vegetables. The jam jars and also those in which vegetables are being pickled, are in the open and sometimes uncovered, also covered with matting and with galvanized tops made especially for the purpose. The jars are about four feet tall, 18 or 20 inches at the bottom and 30 inches at the top. They are rather expensive, costing $40.00 Mes. [Mex.?] or such a matter each.

After tiffin we visited a bean sprouting establishment, also vermicelli making place.

Pages 6339, 6344, 6345 (3 Nov. 1930, Peiping, China. P.H. Dorsett's notes). "After tiffin we went to the soy sauce, soy jam and pickle establishment of a Mr. Wang in the outer city to the southwest. This establishment is some 300 years old and many of the large earthen glazed jars are of the age of the establishment." Photos of Mr. Wang's Lan Hsin Chai Soy Sauce Factory: (1) "View from the northeast corner of the compound just in front of the soy sauce pressing room, looking over the large earthen jars of jam [jiang], pickles, etc." Some jars are covered with reed grass matting or conical lids.* (2) Another view from the southwest corner of the compound.

Note: This is the earliest English-language document seen (July 2003) that uses the term "soybean

jam" or "soy jam." Address: Agricultural Explorers, USDA, Washington, DC.

748. Dorsett, P.H.; Morse, W.J. 1930. Tofu 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:*** Page 4620 (2 May 1930). Hsiungyaocheng, Manchuria. "Kaoliang, millet and corn are the principal crops grown in this region with soybeans planted between the hills of corn. At this time most of the crops have been planted with the exception of the soybeans. This crop is planted between the hills of corn (which are about 42 inches apart) when the corn plants are 5-6 inches high, about the first week in June. Peanuts are grown quite extensively in the lowlands where sandy soil predominates.

"This station is testing about sixty (60) varieties of soybeans under the direction of Mr. Hisatake. About 90% of the soybeans planted in this vicinity consist of a greenish yellow variety called 'Te-cha-chin' which is used for oil and also utilized by the farmers for bean curd, miso, and other food purposes. Only about 10% of the beans planted are yellow seeded varieties, the principal one of which is called 'Ho-an-tou.'" Address: Agricultural Explorers, USDA, Washington, DC.

749. 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 4621 (2 May 1930). Hsiungyaocheng [today's Xiongyue, Liaoning province], Manchuria. "We were taken over to the experimental fields and had an opportunity of seeing the native methods of planting corn, between the hills of which soybeans will be planted about a month later. After our visit to the fields, we were taken to see the station laboratories. Considerable work is being done in Entomology and Pathology, especially apple pests and diseases..."

We were taken to the Entomological Laboratory where we met Mr. Yasuo Arakawa, who took post graduate work at Cornell in 1925 and speaks English very well. He stated that the worst insect pest of the soybean in Manchuria is the pod borer which we observed so abundantly in Hokkaido [Japan] last season. This insect is especially serious in North Manchuria where often 50% of the seed crop is injured.

At the pathological laboratory... we were especially interested in the wild legume specimens, but were advised that there are not many species of wild legumes in this section.

Page 4623. Negative. #45094. "Soja max. Soybean and corn planting. View showing the leveling of a furrow in which corn has been planted at intervals of about 42 inches. When the corn is about 6 inches high soybeans are planted between the corn hills."

Neg. #45095. "Soja max. Corn and soybean planting. Scattering compost soil in the furrow after corn has been planted. After the soil is scattered, the furrows are leveled."

Page 4624. Neg. #45096. "Soja max. Corn and soybean planting. View showing a Manchurian farmer plowing a furrow in which corn is to be planted at intervals of 43 inches. When corn is 6 inches high soybeans are planted between the corn hills.

Neg. #45097. "Soja max. Soybean and corn planting. View showing the planting of corn by [two] Manchurian farmers. The furrow is made in the middle of a last year's row. When the furrow is made, the planter follows dropping 4-5 grains of corn about 42 inches apart in the row. When the corn is 5-6 inches high soybeans are planted between the corn hills."

Page 4625-4625 (3 May 1930). Hsiungyaocheng, Manchuria. "After breakfast at the Inn we went to the Experiment Station where we met Dr. Riuzo Watanabe, Director of the Station, and whom we had met in Washington, D.C. in 1925. Dr. Watanabe spoke fairly good English... He stated that the soybean is not the principal field crop [in this section] and that the method of culture is quite different from the sections further north where the soybean is the main crop." "We were advised that it was dangerous to go very far from the towns on account of bandits. At this season the bandits resort more to the hills but as the crops grow up they approach the outskirts of the town hiding in the kaoliang and other crops. The basha [horse-drawn rickshaw or cart; Indonesian becak / bechak] drivers have certain limits at different seasons to which they will go outside of town as the bandits rob them of their horses."

Kaoliang and millet were being scattered broadcast in the furrow and covered with compost soil and the furrow then leveled with a wooden V-shaped implement. In the planting of corn, sometimes the corn is [planted in] alternate rows, the vacant row being left for soybeans to be planted about the first of June. Soybeans were also planted in all corn, midway between the corn hills when the corn plants are about six inches high. Photographs were taken yesterday of the corn planting near the station.

"After watching the planting operations the farmer took us to his house within a compound and allowed to go through the various buildings to see how a middle-class Manchurian farmer lives. This man with the members of four families of relatives, all living in the compound, work about ten acres.

"From the farmer's home we returned to the Experiment

Station where we had lunch." Neg. #45098. A Manchurian farmer with his typical wooden plow.

Page 4629 (4 May 1930). Dairen [Dalian], Manchuria. "In the afternoon a survey was made of Japanese and Chinese stores for soybean products. Soybeans apparently are not used as extensively in confections as in Japan. The peanut which is grown very extensively in the Kwantung [today's Guangdong] Province seems to take the place of soybeans in candies and as a roasted confection. The adsuki, however, is used very extensively in the making of paste cakes, about the same as ones seen in the confectionery stores in Japan. The adsuki products are handled entirely by Japanese shops as none were observed in any of the Chinese stores."

Page 4633 (5 May 1930). Dairen, Manchuria. "In the morning went to the American consulate to have May expense account sworn to and obtain mail. Our office room rent was paid for the month of May.

"After lunch we went to the office of Mr. Satoh of the S.M.Ry. with regard to visiting more of the experiment station. He advised that it would be best to visit the Kungchuling [today's Gongzhuling, in Jilin Province] station first as this is the principal soybean breeding station, and soybean planting was now in progress. We thought it best to wait until we had a visit with Dr. Kanda, Director of the Kungchuling station, before making any plans for visiting other stations. Dr. Kanda would advise us as to the experiment stations and experiment farms having soybean work that would be interest to us.

"We were given four soybean products from the S.M.Ry. Central Office by Mr. Satoh:

1. Soybean oil lecithin. Obtained from soybean oil by German process of extraction.

2. Soybean oil extracted with the new alcohol extraction process developed by S.M.Ry. Central Laboratory.

3. Soybean flour–fat free. This flour, nearly white, is made from the cake obtained through the alcohol extraction method.

4. Soybean flour. Flour made from soybean oil cake through the German process.

"In discussing our trip to north Manchuria, Mr. Satoh thought it best that we take the 9:00 a.m. express which would reach Kungchuling at 8:30 p.m. the same day.

Page 4641-4642 (6 May 1930). Kungchuling, Manchuria. "We went to the Kungchuling experiment station about 9:00 a.m. where we met Dr. Kanda, the Director, who speaks very little English. He called at the Office of Forage Crops, Washington, D.C. two years ago with reference to information on the soybean industry in the United States.

Kungchuling is the center of a very extensive soybean growing section and the experiment station is doing much work in the improvement of native soybean varieties. Over five hundred varieties are under test yearly and more than two thousand varieties have been experimented with. Dr. Nakamoto is the soybean expert and has charge of soybean investigations. At present he is confined to his home after an illness.

"The morning was spent with Dr. Kanda and information obtained concerning soybean culture and utilization in this section. We were taken to the grain laboratory and shown the hundreds of samples of soybeans that Dr. Nakamoto is working with. The great range in size, color and shape of the seed was very interesting.

"After lunch, Mr. Ota, Agricultural Engineer of the station called at the Inn and with a Chinese assistant we visited the Taiwaho Soybean Oil Mills run by Chinese. We met Mr. Ku-?u-Yang, manager of the mills and his assistant, Mr. Son-pu-ro. We were taken through the mills and each step of producing from delivery of the beans to the extraction of the oil was explained. The mill was operating the screw presses and has thirty of them. Each press handling five cakes, thus pressing at one time 150 cakes. During the busy season 900 cakes are turned out daily, working twenty-four hours in 4 hour shifts. The season of this mill is from October until about the first of June. Panoramic and snapshots were taken of scenes within the oil mill compound. See pictures at the end of today's notes.

"When we had finished inspecting the oil mills we were taken to some Chinese stores where Chinese soybeans and Chinese soy sauce were sold. The Chinese miso is more liquid (like a thin paste) than the Japanese and not ground, but both taste very much alike. There were three grades of soy sauce, all of a sweeter flavor than the Japanese soy sauce but not quite so thick, with the exception of the 1st grade, which was thicker than is Japanese soy sauce. We found two kinds of mung bean vermicelli in the store, one rather fine and the other coarse, more like noodles. Bundles of each of these kinds were purchased for our mung bean exhibit.

After our visit to the Chinese store, we went to a Chinese bean curd factory. In grinding the soaked beans for making the milk mass [masa?] a stone mill was used. The process of making the bean curd is practically the same as followed in Japanese tofu or bean curd factories. The Chinese bean curd, however, appeared to be pressed more and therefore the texture more compact than Japanese bean curd.

Page 4644. Neg. #45101. "Soja max. Soybeans. Kungchuling, Manchuria. View showing the storage of soybeans in Osier bins in the yard or compound of a Chinese Soybean Oil Mill."

Neg. #45102. "Soja max. Soybeans. Kungchuling, Manchuria. View showing soybean oil storage tanks and building where oil presses are" (Continued). Address: Agricultural Explorers, USDA, Washington, DC.

750. 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 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 soybeans. Only occasionally did we 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 was by no means the small seeded varieties." Address: Agricultural Explorers, USDA, Washington, DC.

751. 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.

752. 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:*** (Continued): Page 4679 (15 May 1930). Dairen, Manchuria. "In the morning we worked on notes for the quarterly report. After lunch a picture was taken of the dwarf wisteria... The remaining film of the recent trip north was developed and for the most part turned out to be very good.

"A letter was received from Mr. Loyd V. Sturo, Agricultural Commissioner of the U.S. Dept. of Agriculture, Bureau of Economics, located at Berlin, Germany. We were given information on the soybean industry throughout

European countries. Practically all of the bean imported, of which Germany is the heaviest importer, are used in the production of oil and oil meal. The latter product is used most extensively for cattle feeding although some is used as human food in the making of various kinds of bread."

Page 4893-4895 (17 June 1930), Dairen, Manchuria. "We left for the Dairen Wharves oil pier and on our way we picked up a secret service man from the Military Police Office that we might take some movies. On arrival at the oil pier office we found that the English boat had not yet arrived though it was due at 8:00 a.m. The boat was said to be on its way to another wharf. In the meantime, we went to the inspection house of the soybean oil storage yards of the S.M.Ry. [South Manchurian Railway] Co. nearby. This oil laboratory merely tests the oil that is brought to the storage yards from the Dairen mills and from the oil mills along the S.M.Ry lines. For export the oil has to be at a certain standard or above. This standard modified from European and American standards is as follows:

"Soybean Oil Standard Test

"S.M.Ry. Oil Laboratory

"Specific gravity 0.922–0.928

"Free fatty acids 0.7–0.9

"Yellow–must be under 45.

"Colored–must be under 5.2

"Moisture–must be under 0.2

"Ash and dust–must be under 0.4

"Appearance–no fluorescence, mineral oil, etc.

"The grades of oil is said to run about the same from all parts of Manchuria. The oil from the vicinity of Harbin is said to differ slightly in color and amount of dust from the oil received from the other parts of Manchuria, All of the soybean oil mills close down by July 1 and do not open until about October. During the three months, July, August, and September, the entire plant is overhauled and made ready for the fall season.

"After lunch, we found that the English boat had arrived at the oil pier. The oil tanks first had to be tested for leaks and measured. We were taken to the First Officer's room and also to see the Captain. They both stated that the shipping of soybean oil was about their most difficult work. The shipping of the soybeans is an easy proposition if the holds are kept well ventilated. After waiting until 4:30 p.m. we were told that leaks had been found in the tanks and after these were fixed the tanks would have to be tested again. The Captain doubted if the would be able to load the oil before morning." Address: Agricultural Explorers, USDA, Washington, DC.

753. 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 4631 (16 May 1930). Chinchou [today's Qinzhou], Manchuria. "At the Kwantung Government Experiment Station we met Mr. Nakatomi and had quite a conference with regard to soybeans and other crops in the leased territory. In this region but few soybeans are planted in fields to themselves. As in the Hsiungyaocheng region the beans are planted between hills of corn when the corn is about 6 inches high. In the Wafangtien [today's Wafangdan] region in the northern part of the Leased Territory, the farmers plant soybeans quite differently from those in any other part of Manchuria. After harvest in the fall, this land is plowed and then in the spring it is plowed again. The land is marked off in rows about 21 inches apart and two beans planted, This method of planting is very similar to the one employed in Hokkaido."

Page 4684. "The beans come down from interior points along the Liao river and at one time Yingkou was the leading port of exporting soybeans and soybean products. At the present time it has the largest Chinese junk shipping trade in beans and other grains. The S.M.Ry. has a branch office at Yingkou and Mr. Satoh wishes us to notify him when we visit the place so he can notify the Yingkou office and their representative will show us about."

Page 4689 (18 May 1930). Dairen [today's Dalian], Manchuria. "During the rest of the day worked on soybean data in bulletins and books on Manchurian agriculture. The history of the soybean in Manchuria, its rise from a Oriental crop to one of inter-national importance and much detailed information on the Manchurian soybean was obtained and also the comparison of the crop with other grain crops in Manchuria."

Page 4693. Neg. #45137. "Soja max. Soybean. Dairen, Manchuria. View showing stacks of bags of soybeans on Chinese Junk Wharf. These beans are loaded on Chinese junks and shipped to Chinese ports."

Neg. #45138. "Soja max. Soybean. Dairen, Manchuria. Chinese coolies loading a Chinese Junk with bags of Manchurian soybeans for shipment to Chinese ports."

Page 4694. Neg. #45139. "Soja max. Soybean oil cake. Dairen, Manchuria. Chinese coolies loading soybean oil cakes on junks. Taken at the Chinese Junk Wharf."

Neg. #45140. "Soja max. Soybean. Dairen, Manchuria. Chinese coolies carrying bags of Manchurian soybeans (each bag weighs 160 lbs) to junk at the Chinese Junk Wharf. These beans are shipped to Chinese ports."

Page 4696. Neg. #45141. "Soja max. Soybean. Dairen, Manchuria. Chinese loading bags of Manchurian soybeans on Chinese junks at the Chinese Junk Wharf. These beans are shipped to Chinese ports.

Neg. #45142. "Soja max. Soybean oil cakes. Dairen, Manchuria. Small stacks of soybean oil cakes on the Chinese Junk Wharf. These cakes are loaded on Chinese junks and shipped to southern China where they are used for fertilizer.

Page 4697-4698 (20 May 1930). Dairen, Manchuria. "Another very mild and clear day. In the morning we went to the office, changed the blotters on the herbarium material and wrote up the plants collected yesterday. Shortly after we went to the wharves and storage yards of the S.M. Ry. to take pictures of the storage and shipping of soybean products as the season is closing and we did not know whether there would be another opportunity..."

"At one of the docks we noted an American ship, the S.S. Golden Wall, from San Francisco. We learned that this boat had brought a cargo of kerosene and gasoline to Dairen and was loading 100 tons of soybean oil cake for America."

Page 4699. Neg. #45143. "Soja max. Soybean. Dairen, Manchuria. View showing the outside storage of soybeans in the storage yards of the South Manchurian Railway.

Neg. #45144. "Soja max. Soybean. Dairen, Manchuria. View showing the outside storage of soybeans in the storage yards of the South Manchurian Railway Yards.

Page 4700. Neg. #45145. "Soja max. Soybean. Dairen, Manchuria. View of storage of soybeans in bags of 160 pounds each, in stack in the outside storage yards of the South Manchurian Ry. Yards.

Neg. #45146. "Soja max. Soybean. Dairen, Manchuria. Bags of soybean seed stored in storage of soybeans in the storage yards of S.M.Ry. The stacks are covered with matting and then with canvas. Each stack contains a carload sacks of beans (166 lbs. each).

Page 4701. Neg. #45147. "Soja max. Soybean oil cakes. Dairen, Manchuria. View of soybean oil cakes at door of bean cake storage house in storage yards of S.M.Ry.

Neg. #45148. "Soja max. Soybean. Dairen, Manchuria. View showing bean cakes stacked to the doors of the storage houses which are given entirely to the storage of soybean oil cakes. South Manchurian Ry. Storage Yards.

Page 4793 (21 May 1930). "The peak of shipments of soybeans and bean products is during December and January. He gave us a card so that in going about the yards and wharves no one would interfere with us."

Page 4710. Neg. #45159. "Soja max. Soybean. Dairen, Manchuria. Loading a German ship with bags of soybeans at Wharf of S.M.Ry. storage yards.

Neg. #45160. "Soja max. Soybean, bean cake. Dairen, Manchuria. Stacks of soybean oil cakes stored in oil cake warehouse of S.M.Ry. storage yards."

Page 4711. Neg. #45161. "Soja max. Soybean, oil cake. Dairen, Manchuria. Stacks of soybean oil cakes stored in an oil cake storage warehouse of the S.M.Ry. storage yards."

Neg. #45162. "Soja max. Soybean. Dairen, Manchuria. Bags of soybeans stored in a warehouse in storage yards of the S.M.Ry."

Page 4712. Neg. #45163. "Soja max. Soybean. Dairen, Manchuria. Coolies unloading bags of soybeans from truck and storing in wharf warehouse. In storage yards of S.M.Ry."

Neg. #45164. "Soja max. Soybean. Dairen, Manchuria. Loading soybeans on German ship at wharf of S.M.Ry. Storage Yards."

Page 4713. Neg. #45165. "Soja max. Soybean, oil cake. Dairen, Manchuria. Loading Chinese boat with soybean oil cakes at Wharf in S.M.Ry. yards. These cakes are shipped to Chinese ports to be used as fertilizer."

Neg. #45166. "Soja max. Soybean, oil cakes. Dairen, Manchuria. Loading soybean oil cakes on Chinese ship at Wharf of S.M.Ry. storage yard."

Page 4714. Neg. #45167. "Soja max. Soybean, oil cakes. Dairen, Manchuria. Loading a Chinese boat with soybean oil cakes at Wharf of S.M.Ry. storage yards. The cakes are shipped to Chinese ports and used for fertilizing purposes.

Neg. #45168. "Soja max. Soybean, oil cakes. Dairen, Manchuria. Loading Chinese ship with soybean oil cakes for shipment to Chinese ports. Loading at Wharf of S.M.Ry. yards.

Page 4715. Neg. #45169. "Soja max. Soybean, oil cakes. Dairen, Manchuria. Loading soybean oil cakes on Japanese boat at Wharf of the S.M.Ry. storage yards. These cakes are shipped to Japan chiefly for fertilizing [for use as a fertilizer].

Page 4717 (22 May 1930). Dairen, Manchuria. "These cakes were being sent to Japan for use as fertilizer for rice paddies and mulberry plantations... At one wharf we found another Japanese ship being loaded with bags of [soy] beans for the Main Island [Honshu] to be used for soy sauce, miso and tofu."

Page 4719. Neg. #45170. "Soja max. Soybean, oil cake. Dairen, Manchuria. View of a cadet officer in front of stacks of bean cakes in oil cake storage house in S.M.Ry. yards. This officer accompanied us while we were taking movies."

Neg. #45171. "Soja max. Soybean, oil cake. Dairen, Manchuria. Hoisting soybean cakes on board a Japanese boat for shipment to the Main Island where cake is used for fertilizer."

Page 4720. Neg. #45172. "Soja max. Soybean. Dairen, Manchuria. View of stacks of soybean oil cakes in oil cake warehouse in the S.M.Ry. storage yards." Neg. #45173 "Soja max. Soybean. Dairen, Manchuria. View of wagon load of soybean oil cake on way from oil mill to oil cake storage warehouse in the S.M.Ry. Storage Yards."

Page 4721. Neg. #45174 "Soja max. Soybean. Dairen, Manchuria. View of loading soybean oil cakes on Japanese boat for shipment to the Main Island were the cakes are used for fertilizing purposes."

Neg. #45175 "Soja max. Soybean oil cake. Dairen, Manchuria. View of soybean oil cakes in oil cake storage house in storage yards of the S.M.Ry."

Page 4722. Neg. #45176. "Soja max. Soybean. Dairen, Manchuria. View of wagon loads of bags of soybean seed being taken from storage yards of S.M.Ry. to the oil mills for crushing."

Neg. #45177. "Soja max. Soybean. Dairen, Manchuria. View of wagon loads of soybean seed on way to soybean oil

mills from storage yards."

Page 4723. Neg. #45173. "Soja max. Soybean oil cake. Dairen, Manchuria. View of stacks of soybean oil cakes in oil cake storage warehouse in the storage yards of the S.M.Ry."

Neg. #45174. "Soja max. Soybean oil cake. Dairen, Manchuria. View of unloading bean cakes from wagon at wharf storehouse in S.M.Ry. yards. These cakes have been inspected and are being stacked in warehouse for export."

Page 4725, 4726, 4727 (23 May 1930). "In the morning received a cablegram through the American Consulate from Mr. Ryerson as follows:" May 22. "Dorsett reported seriously by sister. Cable present condition stop. Take utmost care. Ryerson."

A reply was sent in code through the State Department to Ryerson as follows: "Dorsett still in hospital, slowly recovering. Utmost care taken. Morse."

"About 2:00 p.m. we took a car and went down toward Hoshigaura Beach to look up legumes and grasses." "Kudzu was noted in many gullies and had made several feet of growth. Returned to Dairen about 6:00 p.m." Address: Agricultural Explorers, USDA, Washington, DC.

754. Dorsett, P.H.; Morse, W.J. 1930. Research 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 4793 (21 May 1930, Dairen). "In the morning we went to the office of the Wharf Master to learn exact location of loading of soybeans and bean cake at the wharves. We were told of certain piers where boats were being loaded and also just at this time shipments were rather slow. The peak of shipments of soybeans and bean products is during December and January [when the rivers are frozen and can be used as roads]. He gave us a card so that in going about the yards and wharves no one would interfere with us.

"We first went to the oil cake storage warehouses where we found coolies unloading bean cakes from wagons that had just come from the oil mills."

"It was learned that produce stocks stored on the Dairen Wharves today totaled 245,722 tons of which 103,470 tons [42.1%] of soybeans were in mixed storage, 22,436 tons of soybeans other than under mixed storage, 24,691 tons of

soybean oil cake and 2,876 tons of soybean oil."

Page 4794. We learned that the Wharf Master "was rather exercised because he learned we did not have a Fortified Zone Police with us in taking pictures of the wharves. Mr. Suyetake stated that our permits allowed us to take still or snapshots in the fortified zone without an officer along, but that with taking movies we must have an officer along. The Fortified Zone Police Office was phoned and we were advised that Mr. Suyetake's interpretation of the permits was correct. When taking stills or snapshots we did not need to have an officer with us but we should turn in a print of each picture for inspection. With the movie, however, we should have an officer with us an the movie film would also have to be inspected by the office."

Pages 4795 to 4799. Photos of the Dairen wharves, soybean oil cake and soybeans being loaded and unloaded. Address: Agricultural Explorers, USDA, Washington, DC.

755. Dorsett, P.H.; Morse, W.J. 1930. In Dairen and 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:*** Pages 4729-4730 (24 May 1930). Dairen [today's Dalian]. Manchuria. "We went to the office of the Fortified Zone Police about 8:30 a.m. where we met the Cadet Officer who was to go with us again in our motion picture travel.

"Our first stop was at the Mitsubishi Soybean Oil Mills, where Mr. Yoshida, the manager, was awaiting us. Motion pictures as well as snapshots were taken of oil cake and bean storage in stacks in the oil and bean storage yard. Pictures were also taken of the drying and sacking of cracked oil cake. The cakes had become heated from too high moisture content and had molded more or less. Such cakes were cracked up, spread out on canvas, raked over occasionally and allowed to dry out in the sun. This material is sold for fertilizing purposes. Pictures were also taken of the stacks of grass used in the oil presses in place of cloth."

"We then went to the Chinese Junk Wharf at another end of the city and found only the loading of junks with bean cakes. Pictures were taken of the carrying of the bean cakes to the junk and also of the loading of the junk (close up).

"After lunch we developed the snapshots taken and also two rolls of movies which turned out very good. The scene should be of interest to our American soybean growers, especially those in the sections where the oil and oil meal industry is being developed. We have three rolls of fairly good soybean scenes which we must take to the office of Fortified Zone Police for inspection and approval.

Page 4731. Negative #45180. "Soja max. Soybean oil cakes. Dairen, Manchuria. Soybean oil cakes loaded on a Chinese Junk at the Chinese Junk Wharf.

Negative #45181. "Soja max. Soybean oil cake. Dairen, Manchuria. Soybean oil cakes stored in stacks under matting covering in the yards of the Mitsubishi Soybean Oil Mills."

Page 4732. Negative #45182 [photo missing]. "Soja max. Grass used in oil process. Dairen, Manchuria. Stacks of bundles of grass used in place of cloth in the oil process when pressing out soybean oil. This grass comes from Southern China and the South Sea Islands. in yards of Mitsubishi Soybean oil mills."

Neg. #45183. "Soja max. Soybean, oil cake meal. Dairen, Manchuria. Drying cracked up soybean oil cakes in yards of Mitsubishi Soybean Mill Company. The cakes had become moldy and have been cracked up and are drying out in the sun. To be used for fertilizing purposes."

Page 4733. Neg. #45184. "Soja max. Soybean. Dairen, Manchuria. Raking over cracked up soybean oil cakes that became moldy in stacks. In yards of Mitsubishi Soybean oil Mills.

Neg. #45185. "Soja max. Soybean. Dairen, Manchuria. Bags of soybeans stored in stacks in the yards of the Mitsubishi Oil Mills Co."

Page 4734. Neg. #45186. "Soja max. Soybean. Dairen, Manchuria. Loading soybean oil cake from oil cake storage to wagons which carry the cakes to the boat wharves for export."

Neg. #45187. "Soja max. Soybean. Dairen, Manchuria. Soybean oil cakes stored under matting in the yards of the Mitsubishi Oil Mill (Soybean)."

Neg. #45188. "Soja max. Soybean oil cake. Dairen, Manchuria. Chinese coolies carrying soybean oil cakes to Chinese Junk at the Chinese Junk Wharf."

Page 4737 (25 May 1930). Dairen, Manchuria. "In the morning went to the office and changed blotters on the herbarium material. Motion picture spools of black and white film numbers 43, 44 and 45 were written up and made ready to send to the Fortified Zone Police Office for inspection and approval.

Page 4738-4740 (26 May 1930), Dairen, Manchuria. "We had made arrangements to visit the midway section between Port Arthur and Dairen to look up wild plants. The officer told us that at any time we wished to see any of our motion pictures on the screen we could take the matter up with the Dairen Police Office and they would be glad to project them. Landscape views in the Fortified Zone are certainly out of the question..."

"We left by the 1:00 p.m. bus for the first tunnel station, Kokatu, between Dairen and Port Arthur which took a little over half an hour's ride." "The wild soybean was found scattered all along in waste places."

Page 4743-4744 (27 May 1930). Chinchou [today's Jinzhou, Liaoning province], Manchuria. "We left at 7:30 a.m. by bus for the Kwantung Government Experiment Station at Chinchou where we arrived about 8:30 a.m. and

found Mr. Nakatomi awaiting us. With some other station men we went to a Chinese farm about 2 miles from the station to see methods of soybean planting in the Chinchou section... This farmer was planting a piece of new land using the 'Mosheto' [sic, Moshito] variety, the seed of which is very similar to our Virginia and is used only for green manure purposes on new land. Furrows are made about eighteen inches apart and the seed is scattered along in the furrow rather thickly by hand. As the farmer scatters the beans ahead of him he kicks the soil over the beans with his feet. The soil is them compacted over the beans with an oval shaped stone roller. Motion and other pictures were taken..."

Nearby: "We found the farmers busy everywhere planting soybeans between hills of corn. The corn had been planted about the first of May in about 18 inch rows and in hills about 42 inches apart. The plants were about 5 inches high and 5-7 per hill. Men were making holes midway between the corn hills while others followed dropping 6-10 beans per hill [hole?] and then throwing soil over the hill with their feet. In some fields the farmers were thinning the corn plants to one plant per hill and several fields were seen which had already been thinned. The variety of soybeans used by farmers throughout this section is a yellowish green seeded sort very much like the Austin variety."

Page 4745. Neg. #45191. "Soja max. Soybean planting. Chinchou, Manchuria. Planting 'Mosheta' [Moshito] soybeans on land for green manure. The plow makes a furrow in which the beans are scattered and the beans are thrown over the seed by the planter."

Page 4746. Neg. #45192. "Soja max. Soybean planting. Chinchou, Manchuria. Planting soybeans between hills of corn in field of Chinese farmer near Chinchou.

Neg. #45193. "Soja max. Soybean planting. Chinchou, Manchuria. Chinese farmer planting soybeans between hill of corn. 8-10 beans are dropped to hill. All the acreage of corn is planted this way."

Page 4747. Two photos show mung bean (*Phaseolus aureus*) noodles drying in the sun on lines in Chinchou, Manchuria.

Page 4748. Neg. #45196. *Panicum italicum.* Chinese farmer planting millet in furrow just made by plow. The gourd-kaoliang stalk seeder is used.

Neg. #45197 "Soja max. Soybean planting. Chinchou, Manchuria. Chinese farmers planting soybeans between hills of corn. Farm field near Chinchou.

Page 4749. Neg. #45198. "Chinese farm village. Near Chinchou, Manchuria." In the foothill section.

Neg. #45199.

Page 4745. Neg. #45191. *"Panicum italicum.* Millet. Chinchou, Manchuria. Chinese farmer planting millet in furrow with gourd-kaoliang stalk seeder in Chinese farm near Chinchou." Address: Agricultural Explorers, USDA, Washington, DC.

756. U.S. Department of the Interior, Census Office. 1930. William J. Morse, Edna (his wife), and Margaret (their daughter) in the 1930 U.S. Census in Dairen, Manchuria. Washington, DC. May 24.

• ***Summary:*** State: Various–Temporarily residing abroad. County: Dairen Consular District; Manchuria. American Consulate–Dairen. Taken May 24, 1930, by William R. Langdon, American [Consulate General], Dairen, Manchuria, Page 276A.

U.S. residence: 6809 5th Ave. [sic, 5th St.], Takoma Park, Maryland.

Note: Today (Dec. 2012) the address of this house is 6809 5th St., Washington, DC 20012.

William J. Morse. Head of Household. Owned home. Valued at $12,000. They had no radio. They don't live on a farm. White. Male. Age 45. Married. Married at age 27. He didn't attend school this year. He can read and write. He was born in New York. Both parents were born in New

York. Occupation: Agricultural explorer for the United States government. He was working on his last regular work day. He was not a veteran of the US military or naval forces.

Edna S. Morse. Wife. Female. White. Age 46. Married. Married at age 27 years old. She didn't attend school this year. She can read and write. Born in the District of Columbia. Father born in Virginia; Mother born in the District of Columbia. No occupation.

Margaret C. Morse, Daughter. Female. White. Age 8 years, Single. She attended school during the year. She probably can't read and write since there are dashes in those columns. She was born in the District of Columbia. Her father born in New York. Mother born in the District of Columbia.

757. Dorsett, P.H.; Morse, W.J. 1930. In Yingkou (Newchwang), 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 4753 (29 May 1930). Yingkou (Newchwang), Manchuria. "For some time we had been advised by Mr. Satoh of the S.M.Ry. [South Manchuria Railway] that we should go to Yingkou (Newchwang) to see junk transportation of soybeans on the Liao River. There have been so many things to see on the soybean industry in a short time that we did not find time until today.

"We left on the 9:00 a.m. express and arrived in Ta-Shih-Chiao [Dashiqiao] at 1:08 p.m. where we changed trains. The Yingkou train left at 2:00 p.m. and we arrived at Yingkou at 2:35 p.m. Newchwang has always been a familiar name to us for from here, by Frank N. Meyer, were sent in four samples of soybeans, three of which were given varietal names by Dr. C.V. Piper as follows: S.P.I. No. 19183, Wilson; 19184 Fairchild; 19186 Morse. From 19186 the Virginia was selected and this variety is one of the most generally grown in the United States and since its selection and distribution has brought millions of dollars to American farmers. The Wilson is extensively grown in the Middle Atlantic States and Corn Belt states for forage and the Morse is quite generally grown in Arkansas, Missouri and the southern half of Illinois. These introductions were sent in by Meyer in 1906 and through the years have brought many, many millions of dollars to U.S. farmers through seed, forage and pasture. Little did Meyer realize the money he was pouring into the farmers' pockets through these three small samples of soybeans. We are in hopes that we will be equally as fortunate in picking some good varieties.

Page 4754-4756. "During our few minutes stop at Haiungyaocheng Mr. Hisatake of the S.M.Ry. [South Manchuria Railway] Experiment Station at this place met us and said he phoned to Mr. Satoh at Dairen that farmers were now planting soybeans in the corn and we should come by Friday to see this method. We told him arrangements had been made for us at Yingkou with some of the S.M.Ry. men to be with us this afternoon and Friday, but that we could come Saturday.

"Upon arrival at Yingkou we were met at the station by Mr. U. Kawashima of the Foreign Service Department and Mr. Shitami, Agricultural Engineer of the S.M.Ry. Co. We were first taken to the railway storage yards which are along the banks of the Liao river. Large quantities of soybeans and bean cake were in outside storage stacks and in the warehouses along the river bank. Nearly all of the beans in storage were yellow seeded varieties used for oil and oil cake. We found some stacks of black soybeans which were being loaded on freight cars. These had been brought down the river in junks from near the Kaiyuan district and were a mixture of black seeded varieties which resemble very closely the Wilson, S.P.I. 19183, as it was first introduced. We were told that this black soybean was especially good for poor soils and is used only for green manure purposes.

"Chinese coolies were busily engaged in loading freight cars with bags of beans and bean cake. On the river, the current of which reminds one of the Mississippi, were seen junks coming and going, loaded with bags of beans and bean cakes. After taking some snapshots and movies of the storage and loading of beans and bean cake, we went to the local office of the S.M.Ry. where we met Mr. Sekimoto, the manager. Through him we learned that in the Yingkou section there is much alkali land and the agricultural engineers of the S.M.Ry. are working on methods of reclaiming this land..."

"Large quantities of soybeans, bean cake and bean oil are brought from interior points down the Liao River to Yingkou by Chinese junks. A large percent of these products as well as other agricultural products are shipped by rail to Dairen.

"The products shipped by boat go to Southern China ports and to various islands of the East Indies. Although water freight to Dairen is cheaper than rail freight, the railway is very much quicker and allows the merchant advantages of better prices for his products. River transportation of beans, in fact all agricultural products, is most active in October and part of November. The river then freezes up and no more river transportation until the middle or latter part of April when there is a heavy river freight, especially of beans and bean cake until the forepart of June.

"After our visit with Mr. Sekimoto we went to a Japanese Inn. Mr. Shitami advised us just before leaving that some freighters would be loaded early in the morning with beans and bean cake, and that it was also the best time to see the Chinese junks come to the wharves with bean cake and beans from northern points along the river. He said he would call for us about 7:00 a.m. so we could see the busy time at

the wharves.

Page 4757. Neg. #45200. “Soja max. Soybean. Yingkou, Manchuria. View of stacks of bean cake and bags of beans in outside storage yards of S.M.Ry. Co.”

Neg. #45201. “Soja max. Soybean. Yingkou, Manchuria. Stacks of bean cake and bags of beans in outside storage in yards of S.M.Ry. Co.”

Page 4758. Neg. #45202. “Soja max. Soybean. Yingkou, Manchuria. Stacks of bean cake and bags of beans on wharf of S.M.Ry. Co.”

Neg. #45203. “Soja max. Soybean. Yingkou, Manchuria. Chinese coolies carrying bags of soybeans from stack to freight car in yards of S.M.Ry. Co.”

Page 4759. Neg. #45204. “Soja max. Soybean. Yingkou, Manchuria. Soybean oil cakes in open storage in the storage yards of the South Manchuria Railway Co.”

Neg. #45203. “Soja max. Soybean. Yingkou, Manchuria. View of stacks of soybeans in open storage in yards of S.M.Ry. Co.

Page 4760. Neg. #45206. “Soja max. Soybean. Yingkou, Manchuria. View of stack of soybeans stored under matting and canvas in the storage yards of the S.M.Ry. Co.”

Page 4761. Panoramic view of stacks of soybeans in storage yards.

Page 4763 (30 May 1930). Yingkou, Manchuria. “Mr. Shitami of the local office of the S.M.Ry. called at the inn about 7:00 a.m. to take us to the wharves to see the Chinese junks from up the Liao river unloading beans and bean cakes and also the loading of beans and bean cakes on large freighters. We first went to another section of railway storage yards which we did not see yesterday and found large quantities of beans and bean cakes stored under matting and canvas. A few samples of beans were gathered from under the stacks.

“At the wharves we saw coolies busily engaged in loading a large Japanese freighter with beans and bean cake for Formosa. From one side the cakes and beans were being carried on the boat while on the other side small Chinese junks were carrying the loads of bean cakes to be loaded from that side. The river was quite lively with Chinese junks going up and down the river and for the most part these were loaded with bags of beans and bean cakes. It was a very pretty sight and panoramas, stills and movies were taken...”

Page 4765. Neg. #45209. “Soja max. Soybean. Yingkou, Manchuria. Chinese junk loaded with bean cakes, on the Liao River.

Neg. #45210. “Soja max. Soybean. Yingkou, Manchuria. Chinese coolies carrying bean cakes from warehouse to Japanese freighter.”

Page 4766. Neg. #45211. “Soja max. Soybean. Yingkou, Manchuria. Chinese coolies unloading a Chinese junk, The black soybeans were loose and are being bagged. These beans came from the Kaiyuan district along the Liao River and are used for green manure.”

Neg. #45212. “Soja max. Soybean. Yingkou, Manchuria. View of a Japanese freighter being loaded with bean cakes and bags of beans. On the wharf side Chinese coolies are carrying cakes and bags of beans while on the water side, Chinese junks are unloading bean cakes.

Page 4767. Neg. #45213. “Soja max. Soybean. Yingkou, Manchuria. View of a Chinese junk loaded with bags of soybeans on the Liao River.

Neg. #45214. “Soja max. Soybean. Yingkou, Manchuria. View of a Chinese junk bringing bean cake down the Liao River from a northern point.

Page 4768. Neg. #45215. “Soja max. Soybean. Yingkou, Manchuria. View of a soybeans in bags stored under matting and canvas in the storage yards of the S.M.Ry. Co.”

Neg. #45216. “Soja max. Soybean. Yingkou, Manchuria. View of Chinese coolies carrying bean cakes from warehouse to freighter at wharf of the S.M.Ry. Co. on the Liao River.” Address: Agricultural Explorers, USDA, Washington, DC.

758. Dorsett, P.H.; Morse, W.J. 1930. In Yingkou (Newchwang), 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 4769. Neg. #45217. “Soja max. Soybean. Yingkou, Manchuria. Chinese junk load of bags of soybeans just brought down from a northern point on the Liao River.”

Neg. #45214. “Soja max. Soybean. Yingkou, Manchuria. View of a Chinese junk loaded with bags of beans pulling into the wharf. The beans were brought down the Liao River from a northern point.”

Page 4770. Neg. #45219. “Soja max. Soybean. Hsiungyaocheng, Manchuria. Chinese farmers planting row of soybeans between corn rows. Corn was planted about May 1. (This picture should be with those taken May 31, but to get it there means the changing of too many numbers).”

Neg. #45220. “Soja max. Soybean. Yingkou, Manchuria. View showing stacks of bean cakes and bags of beans in outside storage in the yards of the S.M.Ry. Co.””

Page 4771. Neg. #45221. “Soja max. Soybean. Yingkou, Manchuria. Chinese coolies loading bean cakes and beans on freighter at the wharf of the S.M.Ry. Co.”

Neg. #45222. “Soja max. Soybean. Yingkou, Manchuria. Chinese coolies loading bean cakes and beans on a Japanese freighter at the S.M.Ry. Wharf. The freighter will go to Formosa.”

Page 4772. Neg. #45223. “Soja max. Soybean. Yingkou, Manchuria. Chinese junks bringing bean cakes and beans down the Liao River from northern points.”

Neg. #45224. “Soja max. Soybean. Yingkou, Manchuria. Chinese junk load of soybean oil cake being brought down the Liao River to the S.M.Ry. Wharf.”

Pages 4773-78. Neg. #15225-#15230. Panoramic views of a wharves and freighters, stacks of beans and bean cakes.

Pages 4779-4781 (31 May 1930). Hsiungyaocheng, Manchuria. “Warm, clear and very windy. About 7:30 a.m. Mr. Hisatake, assistant director of the station, phoned that they could be planting soybeans in the corn. After breakfast we went to the experiment station where Mr. Hisatake met us and took us directly to the fields.

“The first method of planting was that of planting a row of soybeans between two rows of corn. The corn had been planted the first week in May and now was 5-6 inches high and had been thinned to one plant per hill. A furrow was made between the corn rows (a row had been left for soybeans between the corn rows) and directly behind the plow came a man making a sort of path in the furrow and compacting the soil. The planter followed with a basket of beans scattering beans rather thickly in the compacted path. The beans were covered and the furrows leveled by a

V-shaped wooden implement drawn by a donkey and guided by a man. The farmers vary more or less the bean the bean rowed method as follows: 2 rows of corn and one row of beans; 2 rows of corn and two rows of beans; or alternate rows of corn and beans. In all cases the beans are not planted until the corn plants are 5-6 inches high. As a general rule, corn is planted about the first week in May and the beans about the 1st of June.

"The other method of planting is that of planting the soybeans in a hill between the hills of corn in the corn row. This method differs a little from that observed in the Chinchou district. In the latter place a small hole was made with a hoe between the hills of corn while today the man used a long narrow bladed hoe and made rather a short furrow between the hills of corn..."

"After lunch, we took a walking trip with a young botanist from the station, through the foot hill sections and the farming sections..."

"Upon reaching the railway station we found our luggage and a parcel containing 55 varieties of soybeans grown at the Experiment Station.

"We left Hsiungyaocheng on the 5:23 express and arrives at Dairen at 8:30 p.m."

Page 4781. Neg. #45231. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Chinese farmers planting soybeans in row between rows of corn. The corn pants are about 6 inches high."

Neg. #45232. "Soja max. Soybean. Hsiungyaocheng, Manchuria. View of Chinese farmers planting soybeans in furrows between rows of corn."

Pages 4782-4785. Negs. #45233-45239. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Views of Chinese farmers planting soybeans in furrows between rows of corn." Address: Agricultural Explorers, USDA, Washington, DC.

759. Morse, W.J. 1930. Utilizacion de la soya [Utilization of soybeans]. *Cuba* (*Santiago de las Vegas*). *Estacion Experimental Agronomica, Circular* No. 69. 40 p. May. Translation by Emma L. Sena of USDA Farmers' Bulletin 1617. [Spa]

• ***Summary:*** In the introduction, Ing. Francisco B. Cruz, Director of the Agronomic Experimental Station, E.C., praises an imported soy oil named "Aceite comestible de Soya." A full-page ad for this product (just before p. 36), apparently with the brand name Excelsior, is also shown.

Contents: Introduction. Soybeans for human food: Dried beans (*Los frijoles secos.* Also used as a substitute for coffee or like roasted peanuts), green or vegetable beans (*Los frijoles verdes*), soybean flour (*harina de soya*), soybean oil (*aceite de soya*), soy sauce (*salsa de soya*), soybean sprouts (*vastagos de soya*), soybean vegetable milk (*leche vegetal de soya,* including the solid material or residue {*la materia sólida, el residuo*} [okara] which is separated from the liquid soymilk), soybean curd [tofu] (*cuajada de soya*).

Note 1. This is the earliest Spanish-language document seen (Jan. 2013) that uses the term *vastagos de soya* to refer to soy sprouts.

Note 2 This is the earliest Spanish-language document seen (June 2013) that mentions okara, which it calls *la materia sólida, el residuo.*

Note 3. This is the earliest Spanish-language document seen (April 2013) that uses the term *cuajada de soya* refer to tofu.

Soybeans for livestock (*la soya para el ganado*): For swine, dairy cattle, beef cattle, sheep, poultry. Soybeans for oil: Methods of processing beans for oil, utilization of soybean oil. Soybean meal: Soybean meal for human food, soybean meal for stock feed, for swine, for dairy cattle, for beef cattle, for poultry. Soybean meal as a fertilizer. Miscellaneous uses of soybean meal. Soybeans for hay: Soybean hay for dairy cattle, for beef cattle, for horses and mules, for sheep, for swine, for poultry. Soybeans for pasturage: Swine, sheep, or poultry on soybean pasturage. Soybeans for silage. Soybeans for soilage [green crops for feeding confined animals; a term first used in 1928]. Soybeans for soil improvement. Soybean straw: Feeding value, and fertilizing value of soybean straw. Address: USDA, Washington, DC.

760. 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 4811 (1 June 1930). Dairen, Manchuria. "The day has been quite warm and clear. In the morning worked on numbering the samples of soybean seed collected at Yingkou and Hsiungyaocheng. Changed blotters on the herbarium material at the office.

"The samples of beans from the Hsiungyaocheng district represent an excellent series of varieties developed through selection by the station. Mr. Hisatake, the soybean expert, is growing about 60 varieties and gave use seed of all he had available at the time."

Page 4813 (2 June 1930). Dairen, Manchuria. "The stills, movies and panorama films taken on the recent trip of soybean transportation, storage and planting, were developed. All turned out good, especially the two spools of movies. We were rather fortunate in obtaining the scenes on the Liao River at Yingkou, as the season will soon close."

"The samples of soybean products collected about Dairen were wrapped for shipment. Compared with our collection of products in Japan, we are afraid that the Manchurian collection will be rather small. Nearly all products collected thus far are made from soybean oil, such as soaps, lecithin, and hydrogenated oil for a lard substitute.

Page 4815 (3 June 1930). Dairen, Manchuria. "The samples of seed collected on our recent trip were finished... The black seeded varieties are very similar to our Jet (17861), Peking (17852), Wilson (19183) and Cloud (16790) varieties.

"After lunch we went to the office of Mr. Satoh, of the S.M.Ry. with reference to soybean work. We found that he is revising the English edition of the bulletin "Soybeans in Manchuria" and that it would be available for distribution within a few weeks.

"Four parcels consisting mostly of soybean seed and soybean products were weighed up and packed for shipping."

Page 4817 (4 June 1930). Dairen, Manchuria. "During the day the parcel packages numbers 197, 198, 199 and 200 were wrapped and sent by commercial parcel post to Mr. Ryerson. A letter was written explaining the contents of each package and the second cards for the numbers were sent under separate cover.

"The pictures [photos] taken on last week's trip were placed in jackets and written up."

Page 4821-4823 (5 June 1930). Dairen, Manchuria. Negs. #45243-45245. "Chinese fertilizer cakes. Dairen, Manchuria. View showing mixing pit in which manure of various kinds is mixed with soil and water and made into cakes, which are about 18 inches in diameter and 3 inches thick. These are allowed to dry... until firm and then placed in ricks."

Page 4827 (7 June 1930). Dairen, Manchuria. "About 8:30 a.m. we went to the office of the Fortified Zone Police to pick up the officer whom we had arranged for yesterday to accompany us to the wharves to take some movies. We found that no officer was available in that office so they obtained a man from the Military Police Office."

One of the guards advised us to go to the oil laboratory and storage yards of the S.M.Ry. At the laboratory and inspection building we found wagons being unloaded of drums of soybean oil which were brought from the various oil mills in operation about Dairen. Each drum holds 361 kin of oil.

"The oil is tested and unless it reaches a certain standard is used locally in the manufacture of oil or fat products. The oil that reaches the standard or above is exported.

Page 4829. Neg. #45248. "Soja max. Soybean. Dairen, Manchuria. View showing the loading of trucks with sacks of soybeans which have been cleaned and are to be taken to the wharves for export.

Neg. #45249. "Soja max. Soybean. Dairen, Manchuria. View showing the storage of sacks of soybeans in open storage in the open storage yards of the South Manchurian Railway."

Page 4830. Neg. #45250. "Soja max. Soybean. Dairen, Manchuria. View showing Chinese coolies carrying soybean oil cake from freight car to oil cake stack in open storage yards of the South Manchurian Railway."

Neg. #45251. "Soja max. Soybean. Dairen, Manchuria. View showing stacking of soybean oil cakes in open storage yards of the South Manchurian Railway storage yards."

Page 4831. Neg. #45252. "Soja max. Soybean. Dairen, Manchuria. View showing the stacking of soybean oil cakes in the open storage yards of the South Manchurian Railway storage yards."

Neg. #45253. "Soja max. Soybean. Dairen, Manchuria. View showing the stacking of soybean oil cakes in storage yards of S.M.Ry. storage yards. The cakes have just been brought from box cars. The cakes are near the wharf and are for export."

Page 4832. Neg. #45254. "Soja max. Soybean. Dairen, Manchuria. View showing the unloading of drums of soybean oil at the oil storage yards of the South Manchurian Railway. Each drum holds 361 kin of oil"

Neg. #45253. "Soja max. Soybean. Dairen, Manchuria. View showing wagon with three drums of soybean oil cakes on way to oil storage yards and oil laboratory of S.M.Ry. Co.

Pages 4833-4837. Panoramic photos of scenes around Dairen with handwritten, illegible captions.

Page 4843 (9 June 1930). Neg. #45262-45263. "Soja max. Soybean. Dairen, Manchuria. Chinese farmer cultivating and soybeans. Corn planted about May 1st and beans planted about June 1st.

Page 4844. Neg. #45264. Stone grinder. Kokaton,

Manchuria. View of a stone grinder and mill stone used commonly for grinding millet seed into flour.

Page 4847 (11 June 1930). Dairen, Manchuria. We first learn today that Dorsett was very sick from April 11 to June 11; taken to a Japanese hospital in Dairen, he almost dies of double pneumonia. Morse does the work of both men and does not inform USDA of Dorsett's critical condition.

Page 4849 (12 June 1930). Dairen, Manchuria. Morse and company (without Dorsett) "left by the 9:30 a.m. train to make a survey of wild legumes along the railway section between Dairen and Port Arthur." No wild soybeans were found.

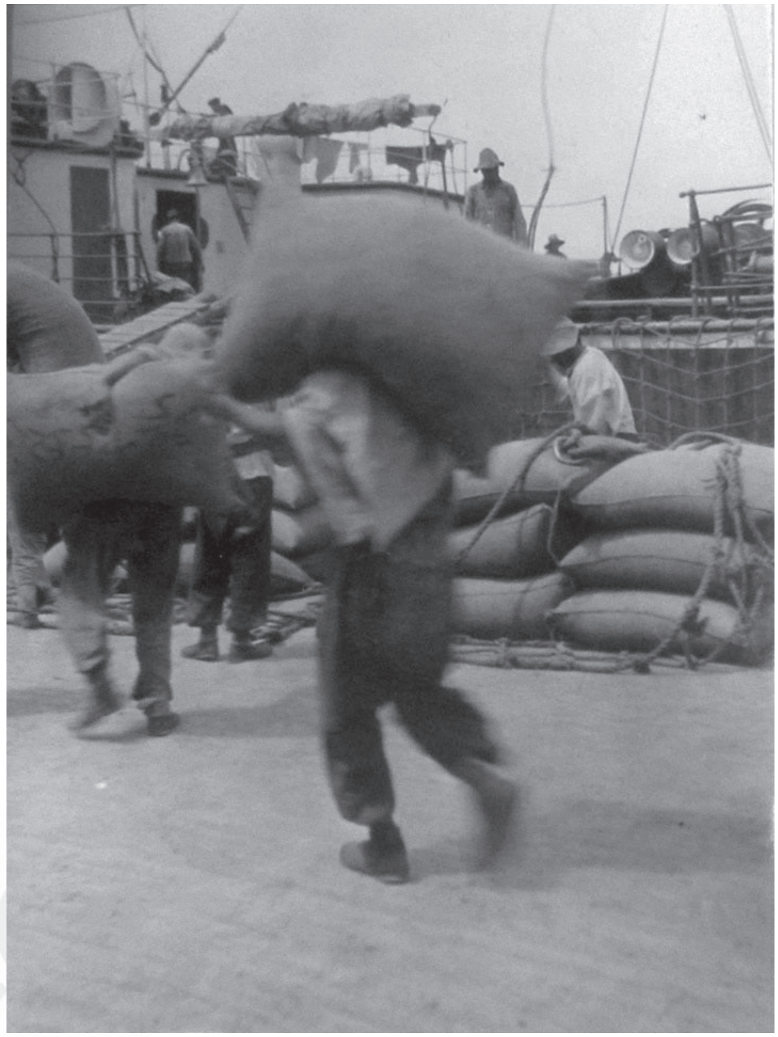
Page 4853-4854 (13 June 1930). Dairen, Manchuria. "Three sets of pipes, about 8 inches in diameter extend from the storage oil yards of the S.M.Ry. Co., Mitsui and another company to the pier extending well out into the harbor. The oil is piped by connections at the wharf into large tanks in the holds of the vessels. No oil is shipped in drums or cans as was previously done. Pictures were taken showing the arrangement..."

Page 4855. Negs. #45268-45269. "Soja max. Soybean. Dairen, Manchuria. Close up of pipe used to pipe soybean oil into oil tanks of freighters.

Page 4856. Neg. #45270. "Soja max. Soybean. Dairen, Manchuria. Drums of soybean oil on cart drawn by coolie and wagon load of drums. On the way to soybean oil storage yards.

Neg. #45271. "Soja max. Soybean. Dairen, Manchuria. Tank car loads of soybean oil [on a train] pulling into the oil storage yards of the South Manchurian Railway Company.

Page 4857. Neg. #45272. "Soja max. Soybean. Dairen, Manchuria. Loading bags of soybeans on a German freighter at wharf of S.M.Ry. Storage Yards."



Neg. #45273. "Soja max. Soybean. Dairen, Manchuria. View showing the stacking of bags of soybeans in open storage in the storage yards of the South Manchurian Railway Company."

Page 4858. Neg. #45274. "Soja max. Soybean. Dairen, Manchuria. Loading bags of soybeans from storage stack to carry to wharf warehouse for export. In storage yards of S.M.Ry. Co."

Neg. #45275. "Soja max. Soybean. Dairen, Manchuria. Unloading flat cars of bags of soybeans in storage yards of S.M.Ry. Co. The beans have just come from Kaiyuan District, Manchuria."

Page 4859. Neg. #45276. "Soja max. Soybean. Dairen, Manchuria. View showing bags of soybeans being loaded on Japanese freighter at Dairen wharves in storage yards of S.M.Ry. Co."

Neg. #45277. "Soja max. Soybean. Dairen, Manchuria. Loads of soybeans in the storage yards of the South Manchurian Railway Company."

Page 4860. Neg. #45278. "Soja max. Soybean. Dairen, Manchuria. Chinese children sweeping up

soybeans from the road into pans. This road is the main road from the oil mills to the S.M.Ry. Storage Yards, and Chinese women and children are all along the road sweeping up the beans that have leaked from the bags."

Neg. #45279. "Soja max. Soybean. Dairen, Manchuria. Stacking of bags of soybeans in open storage of the S.M.Ry. Storage Yards." Address: Agricultural Explorers, USDA, Washington, DC.

761. Dorsett, P.H.; Morse, W.J. 1930. Re: Request for photographic supplies from Eastman Kodak Co. (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. June 16. Unpublished log.

• ***Summary:*** Page 5176. Letter dated 16 June 1930 from Dairen, Manchuria, to Eastman Kodak Co., Shanghai, China. "Gentlemen: Please forward to us, at your earliest convenience, by express, the following photographic supplies:

"15 spools Eastman No. 10 Cartridge Motion Picture Film, length 100 foot, perforated, for use in standard (35 mm.) Automatic Motion Picture Camera.

"100 Packs Eastman Kodak Films No. 518, 3¼ x 4¼ for use in Eastman Graflex Camera.

"25 spools film No. 122, 3¼ x 5½, 10 exposures for use in Eastman No. 34 Panoramic Kodak.

"Please ship the above material addressed to Dorsett and Morse, c/o U.S. American Consulate, Dairen, Manchuria. Upon receipt of goods and invoice, we will send you a post office money order for the amount of your bill.

"Very truly yours, Dorsett & Morse." PHD/rd. Address: Agricultural Explorers, USDA, Washington, DC.

762. 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 4907 (18 June 1930). "Dairen, Manchuria. P.H. Dorsett's notes: Dorsett will proceed to Peiping about July 15 for the purpose of exploring for legumes in the vicinity of Peiping.

"This arrangement is practically in accord with suggestions and instructions from Washington [DC]. In our opinion, the dividing of the personnel at this time is a mistake. However, be that as it may, we, in following instructions, will do the very best that we can."

Page 4908. Neg. #45301. "Soja max. Soybean, Dairen, Manchuria. Unloading soybean oil cakes and stacking on wharf of the Chinese Junk Wharf.

Neg. #45302. "Soja max. Soybean, Dairen, Manchuria. Chinese coolies loading soybean oil cakes on a Chinese junk at the wharf of the Chinese Junk Wharf.

Page 4909. Panoramic Neg. #45303. "Soja max. Soybean, Dairen, Manchuria. Unloading of bean cakes and stacks of bean cakes at the Chinese Junk Wharf.

Page 4911 (19 June 1930). Dairen, Manchuria. "W.J. Morse's notes: We received a message from Kaiyuan that due to continued dry conditions, crops were in a poor condition and that soybean cultivation would not probably be done until in July. This will delay our trip to North Korea and North Manchuria until next week. In view of this, we planned to go to the vicinity of Chinchou to collect seed of *Astragalus*...

Page 4912. "A short visit was made to the Dairen market but about the only new thing noted was bundles of soybean plants for use as a green vegetable bean [green vegetable soybeans]. These were noted at several stands and we learned that they had come from the Shimonoseki district (Japan).

Page 4987 (24 June 1930). Dairen, Manchuria. "Mr. Morse's notes: En route to Kokai, Korea... We left Su Chia Tun on the Mukden express at 3:49 p.m. for Antung. The crops were about the best we have seen. We began to see more soybeans planted along according to the North Manchuria method... We arrived at Antung on the Yalu River

at 9:00 p.m."

Pages 6130-6131 (10 Oct. 1930). Nanzankai, Manchuria. "Morse's notes: From Chinchou we went to the farming village of Nanzankai to secure pictures of soybean threshing and seed cleaning. At several places we found the farmers busy spreading soybean plants out on the threshing floor. Stacks of soybeans, mung beans, millet, kaoliang (heads) were about the threshing grounds and also kaoliang stalk cribs of corn. In the threshing, the soybeans are threshed first, then mung beans, millet and kaoliang.

"We found that the soybean plants are spread out on the threshing floor in the morning. They are left to dry out until late morning or afternoon.

"After lunch at Chinchou, we returned to Nanzankai and found the farmers busy threshing. At some of the smaller threshing grounds they were using flails in threshing soybeans At one large ground, several men were using flails and two stone rollers were being use in threshing soybeans. After the plants ad been well rolled and flailed, the mass was loosened up with wooden forks and flailed and rolled again. After the second threshing, the coarse straw was removed with forks and the remaining material raked and scraped into two large piles.

"After piling, the material was thrown into the air by shovelfuls, separating the beans and fine trash by the wind method. Movie, still, and panorama pictures were taken of the various operations.

Considerable amounts of peanuts are grown in this section. The nuts are picked from the stems by Chinese women and children.

Page 6132. Neg. #46004. A panoramic view of a threshing floor in Manchuria.

Page 6133. Neg. #46005. "Soja max. Soybean. Nanzankai, Manchuria. General view of threshing ground showing threshing of soybeans with stone rollers."

Neg. #46006. "Soja max. Soybean. Nanzankai, Manchuria. Chinese farmers loosening up soybean plants with forks after the first rolling and flailing."

Page 6134. Neg. #46007. "Soja max. Soybean. Nanzankai Village, Manchuria. General view showing the threshing of soybeans by stone rollers drawn by horse and mule and also flailing out of the seed."

Neg. #46008. "Soja max. Soybean. Nanzankai Village, Manchuria. Threshing out soybeans by stone rollers" [pulled by horses and mules].

Page 6135. Neg. #46009. "Soja max. Soybean. Nanzankai Village, Manchuria. General threshing scene showing rolling, flailing and forking of the bean plants."

Neg. #46010. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese farmers placing soybean plants on threshing ground. After drying in the sun for a few hours, the plants are threshed with stone rollers and flails."

Page 6136. Neg. #46011. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese farmer flailing soybeans on small farm south of Chinchou."

Neg. #46012. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese farmer spreading soybean plants on threshing ground."

Page 6137. Neg. #46013. "Soja max. Soybean. Nanzankai Village, Manchuria. Close-up view of threshing

out soybeans with stone rollers drawn by a horse and mule.

Neg. #46014. "Soja max. Soybean. Nanzankai Village, Manchuria. Close-up view of farmers cleaning soybean seed."

Page 6138. Neg. #46015. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese farmers using rake and kaoliang broom in one of the stages of cleaning soybean seed."

Neg. #46014. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese farmer sweeping up soybean seed with kaoliang broom."

Page 6139. Neg. #46017. "Soja max. Soybean. Nanzankai Village, Manchuria. Chinese farmer cleaning soybean seed by throwing the seed and trash in the air with a shovel, and the wind does the rest."

Pages 6140, 6141, 6142. Neg. #46018-#46020. Three panoramic photos with handwritten illegible notes. "Soja max. Soybean. Nanzankai Village, Manchuria. Soybean threshing floors."

Page 6143. Neg. #46021. "Soja max. Soybean. Nanzankai Village, Manchuria. After cleaning, the Chinese farmer often stores the seed in small Osier bins at one side of the threshing ground."

Neg. #46022. *"Arachis hypogea.* Nanzankai Village, Manchuria. Chinese farm children picking peanuts from the vines."

Page 6144. Neg. #46023. *"Arachis hypogea.* Nanzankai Village, Manchuria. View of children picking peanuts from the vines. Just as the picture was taken, the children ran like a bunch of scared rabbits, except a little girl at the extreme right." Address: Agricultural Explorers, USDA, Washington, DC.

763. 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)."

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

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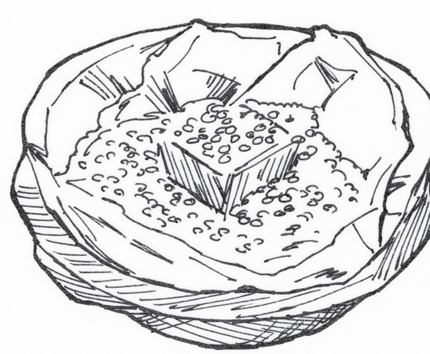


green soybeans in the baskets of several Korean vegetable stands." Negative #45793 and #45794. Two photos show these "green vegetable soybeans" and "shelled green soybeans."

Page 5845 (16 Sept. 1930). Fa Hua Ssu Temple, Chihli, China. P.H. Dorsett's notes. "We left Tang Shan about 8:30 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."

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.

764. 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 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.

765. 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.

766. 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 5082 (2 July 1930). Kungchuling, Manchuria. W.J. Morse's notes. "We went to the S.M.Ry. Experiment Station in the morning where we met Dr. Nakamoto, the expert in charge of soybean work. It was learned that Mr. Kanda who was director of the station on our previous visit had been retired and that Dr. Nakamoto will succeed him as director of the station in the near future.

"Dr. Nakamoto went over thoroughly the soybean work being done by the station and also the soybean situation in the Kungchuling region. He also made many suggestions regarding our soybean investigations in Manchuria whereby we might save time and at the same time see all phases of the soybean industry in North and South Manchuria. We were taken over the experimental grounds and found very extensive soybean selection and variety work being carried on, The soybeans are all looking excellent and for the most part are in bloom.

After lunch, Mr. Ota, assistant engineer at the experiment station, took us in the nearby farming section where we could see the cultivation of soybeans. The second cultivation is now being given the crop and is being done with a harrow shovel plow and by hand hoeing. Soybeans are grown very extensively about Kungchuling and we saw some very large fields. On our return to the inn we passed through the Chinese section where the Chinese grain merchants have large store yards. Most of these yards or compounds contained a large number of Osier bins of soybeans. The Chinese merchants were very badly hit by the low demand of European countries for soybeans The seed was purchased last fall at a fair price but with the slow demand and great fall in the price of silver, the merchants are very heavy losers."

Page 5084. Letter from P.H. Dorsett, Agricultural Explorer in Dairen, Manchuria, to Mr. Leon H. Ellis, Second secretary of Legation of the United States of America, Peiping, China.

Dear Sir; My delay in replying to your favor of April 18th is due to the fact that I was in the hospital when the same arrived, and have only recently been discharged...

"I am planning to leave Dairen shortly after July 15 for Peiping, and trust that upon arrival there I will find conditions in that region favorable for agricultural exploration work.

"Please arrange to hold any mail which may be received at the Legation and addressed to P.H. Dorsett and Ruth S. Dorsett... Very truly yours,..."

Page 5184-5185 (17 July 1930). Chinchou, Manchuria. W.J. Morse's notes. "In the early part of the season we were taken to the wall surrounding Chinchou by Mr. Nakatomi of the Experiment Station and found more or less alfalfa plants which varied in habit of growth and color of flowers. We were told that this alfalfa was probably introduced from Russia by the Russians during their occupation of this territory many years ago (previous to 1905 [when they lost the Russo-Japanese War]).

"We have watched this alfalfa at various times that seed might be collected as the variety might have value in the study of disease resistant strains which the Department is now carrying on extensively...

Page 5185. Neg. #45310. "Medicago sativa. Alfalfa, Chinchou, Manchuria. View showing P.H. Dorsett picking alfalfa seed along road of wall surrounding Chinchou."

Page 5186 (18 July 1930). Dairen, Manchuria. "P.H. Dorsett's notes. Mr. Y. Nakanishi, Secretary of the Soybean Oil Association, whom we intended going to see, was in Shanghai and would not return before the 24th, we were told by Mr. Takamori. However Mr. Takamori promised to tell him that it was our intention to call, and to carry to him our kindest personal regards."

Page 5222-5223. Letter from P.H. Dorsett, Agr. Exp., dated Sunday 27 July 1930, in Peiping, China, to W.J. Morse. "Dear Morse: It will be a week tomorrow since we pulled out of Dairen and left you and the family as well as other good friends at the railway station."

"We had a very pleasant ride from Dairen to Mukden where we arrived on time... I saw many fine lots of soybeans on the way up, both alone and in interplantings which would make excellent pictures and I itched to be out with the cameras."

"Most of the time since our arrival it has been close, muggy and fearfully hot.

"From the time we got up last Tuesday morning until

within a short distance of Peiping the plantings of soybeans and other crops were about the same as we saw between Dairen and Mukden, except that there was much more kaoliang than corn. About noon on the way to Peiping we ran into a section where we saw an interesting feature in connection with interplanted soybeans in kaoliang. Here and there we saw areas where the lower leaves of the kaoliang had been stripped off for some three feet above the ground. I judge that this was done primarily to give more light to the interplanted soybeans. The stripped off leaves, perhaps were used for stock food. I will try to get pictures showing this practice. It might be well for you to be on the lookout for this practice while on your field trips in Manchuria."

"Living here is very much cheaper than in any place I have been in the orient. We have two nice large rooms and a private bath on the third floor, front of the Grand Hotel Des Wagons-Lits with board, American plan, at a monthly rate of 400,000 Mex per month." This equals "$107.96 per month, which seems unbelievable, in comparison with what we have paid in Japan and Manchuria... If the above proves to be correct, it will pay you to wind up your work over there as soon as you can and come to Peiping. From what I saw Tuesday en route to Peiping there is fully as much for you to see in the field here in China as there is in Manchuria, but of course not in the way of shipping.

"On Thursday we went to the Peiping Union Medical College." Dorset saw Dr. McIntosh, the lung specialist who "found my lungs in pretty good condition but that he would like to have a dental X ray, also an X ray of my lungs, as well as an electro cardiogram and an examination of my eyes. Well I have run the gamut and am still alive and none the worse for the wear. The doctor told me yesterday that none of the examinations showed anything to be especially alarmed at, but that it would be necessary for me to take things a little easier and under no circumstances should I do any mountain climbing and should not get fatigued by long tramps or over work. The Dr. may however have a different story to tell Ruth when she gets a chance to talk with him concerning my condition.

"I plan to get started on field work next week... I hope this finds you all well and happy and that your work is progressing nicely. Sincerely yours,..."

Page 5224 (28 July 1930) Peiping, China. "P.H. Dorset's notes... We saw two or three vegetables which we did not see in 1924-25 while here.

Page 5224-5225 (28 July 1930). Nanzen, Manchuria. "W.J. Morse's notes. Left by the Chinchou bus and stopped off at Nanzen where we have observed the best and most extensive soybean plantings. The soybeans are in nearly all mixed plantings with the corn. The largest per cent of the fields have the beans and corn in the same row. The rows are about 21 inches apart The corn was planted about May 1 in 42-inch hills. About June 1 the corn was thinned to 1 plant per hill and a hill of beans planted between the corn hills.

"In this section a few fields were noted in which two rows of beans alternated with three rows of corn. The rows were about 21 inches apart. The corn was sown about May 1 and the beans about June 1.

Some excellent fields of Italian millet were observed and only a few fields of Japanese millet.

Page 5226. Neg. #45381. Soja max. Soybean. Nanzen, Manchuria. Fields of soybeans and corn Three rows of corn and two rows of corn planted alternately. Corn planted about May 1 and beans about June 1. Rows 21 inches apart.

Neg. #45382. Italian millet. Nanzen, Manchuria. Field of Italian millet on farm near Nanzen. Millet is used quite extensively as food by the Manchurian farmer. Morse is standing in the field with the millet waist high. He is wearing a straw hat with a black band around the rim.

Page 5230 (29 July 1930). Hsiungyaocheng, Manchuria. "Mr. Morse's notes. Left on the 9:00 a.m. express for the S.M.Ry. Experiment Station at Hsiungyaocheng. We went at once to the experiment station with Mr. Hisatake, the expert in charge of crops. Mr. Hisatake was first connected with the Kungchuling station and Mr. Nakamoto first started the soybean work at that station which is now doing the most extensive work with soybeans in Manchuria.

"We visited the soybean variety plots which are kept up for supplying seed to different stations. About eighty varieties are under test but no breeding work is being carried on. One of the most outstanding varieties is the Moshito variety, the seed of which is very similar to that of the Virginia. However the plants are quite different from the Virginia principally in plant characters. The habit of growth is somewhat similar to Virginia, more or less twining at the terminal. It is grown principally on new land and makes an excellent forage and ensilage sort. Some of the Moshito selections also look very promising.

Page 5231. Neg. #45387. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Variety plot of the Moshito variety of soybean in the variety plot test on S.M.Ry. Experiment Station. This variety is used for green manure on new land. Appears to be an excellent variety for forage and silage in the U.S."

Neg. #45388. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Soybeans grown in 21-inch rows in young mulberry plantation for green manure.

Page 5231. Neg. #45389. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Plot of the Moshito variety of soybeans in variety plot test on S.M.Ry. Experiment Station. The Moshito is used for green manure on new land and looks to be a very promising variety for forage and silage in the U.S."

Neg. #45390. "Soja max. Soybean. Hsiungyaocheng, Manchuria. Soybeans planted in 21-inch rows in mulberry plantation for green manure purposes." Address: Agricultural Explorers, USDA, Washington, DC.

767. Dorsett, P.H. 1930. Re: How he caught double pneumonia 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. July 5. Unpublished log.

• ***Summary:*** Pages 5122-5124. This letter from Dairen, Manchuria, is a reply to Dr. A.J. Pieters, Senior Agronomist, Acting in Charge, Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

"I trust that you and other officials at the Department of Agriculture will not be too severe in your censure of Mr. Morse for not advising the office of my illness. He has had worries enough at this end of the line without causing him more from Washington. I can readily understand how Morse felt when I went down so suddenly and was so severely ill. He had to pick up the details of my work and carry them on at the laboratory and in the field to the best he could without any advice or assistance. In addition to these numerous troubles, he was worried almost sick on account of my condition."

"On arrival in Dairen, April first, we spent several days searching for a suitable laboratory room and finally found one in the Cohin building. As it was near Spring, the heat had been turned off in the building and the room was quite chilly and sometimes really disagreeable. However we went to work fitting it up with a temporary darkroom and shelves. On the 11th our official baggage was received and we got it unpacked and practically put away on that day. During the afternoon I spoke to Mr. Morse who was not feeling at all well, and cautioned him about over-doing. Just after quitting, between four and five o'clock but before leaving the office, I felt a shiver run up my spinal column, but felt no pain and had no symptoms of a cold (as far as I know).

"That night I took a couple of Aspirin and the next day called in a physician. On the 13th Dr. K. Kondo, the Japanese doctor who was attending me, pronounced my trouble as double pneumonia, and on the 14th I was taken to the Doctor's private hospital where I remained for practically two months. During the major part of the time I was more or less delirious and critically ill. In fact the doctor for a week or more did not give me any hope of recovery. However, I was pulled through and on June first I left the hospital and went to the Yamato Hotel... to recuperate. I spent ten days there, returning to the Yamato Hotel in Dairen where we are stopping, on the evening of the 10th of June."

Knowles Ryerson has developed new plans for Dorsett and Morse, which Dorsett describes. "Morse will remain with headquarters Dairen and continue his soybean research investigations throughout southern and central Manchuria. As noted above I will proceed to Peiping and do exploration work in that region. Morse will probably join me there in October or November after his work here has been completed. We will likely spend about a month looking up soybean products in Peiping and both of us may return home in December.

"I have suggested some additional work which I consider quite important and would like to have a hand in clearing up before leaving the Orient. If my suggestions in this connection are approved I will remain over here for another year. I will likely spend the winter months in Canton and Taiwan getting back to Peiping in time to put in an entire month looking for wild legume and other interesting plants worthy of introduction.

"I very much appreciate your kind words of caution. Similar advice has come from Dr Woods, Dr. Calloway and Mr. Ryerson, also specific instructions from Mr. Ryerson to slow up. I realize that I am not as young as I once was but already I am feeling a return of my energies, ambitions, desires and determination to do my best. However, I will try and accomplish the work without taking any more chances than are necessary and without taxing my strength too severely.

"With kindest personal regards and best wishes, I remain, Very truly yours..."

Note: Dr. A.F. Woods is Director of Scientific Work, U.S. Department of Agriculture, Washington, D.C. (see p. 5180). Address: Agricultural Explorer, USDA, Washington, DC.

768. Dorsett, P.H.; Morse, W.J. 1930. In Dairen, Manchuria. Soybean oil and meal (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 5146 (Saturday, 12 July 1930). Dairen, Manchuria. P.H. Dorsett's notes. "A fine sunshiny day, and quite warm, especially in the sun. Morse and Suyetake went to the wharf to see what there was new in the way of soybeans. Also to get a line on when there is likely to be an oil boat in to be unloaded. We are anxious to get motion pictures of the loading of an ocean freighter with soybean oil. There was no information in this connection available. However, about a dozen samples of soybeans were secured. One of these samples, a flat seeded variety, is new and of special interest.

"Dorsett worked at the office on his June account and on getting pictures ready for albums, trimming and numbering them. He also worked with the negatives for March, April and May report getting them in shape for sending to Washington. The report will be completed Monday or Tuesday."

Pages 5146-5147 (12 July 1930). Dairen, Manchuria. W.J. Morse's notes. "In the morning we went to the oil pier

of the S.M.Ry. storage yards and found the English freighter 'Achilles' filling a tank with 850 tons of soybean oil. Another tank in the fore part of the ship had been filled a little earlier with 850 tons of soybean oil.

"We were allowed to go down in the hold (at our own risk) and watch the filling of the tank and take pictures. With a 10 inch [diameter] pipe (the oil is piped from storage tanks on shore) it takes about 4 hours to fill and eight hundred and fifty gallon tank.

"We also visited the bean storage and wharf warehouse. We collected 18 soybean samples and one of mung beans from these places.

"At the wharves we saw two German freighters taking on soybeans for Europe, and three Japanese freighters taking on soybean oil cake for the Main Island and Formosa."

Page 5148. "Negative #45357. Soja max. Soybean. Dairen, Manchuria. View in hold of English freighter 'Achilles,' showing the filling of oil tank with soybean oil by pipe. The tank holds 850 tons of oil and it takes about four hours to fill it.

"Negative #45358. Soja max. Soybean. Dairen, Manchuria. View in hold of English freighter 'Achilles,' showing the filling of oil tank with soybean oil. The tank holds 850 tons of oil & it takes 4 hours to fill it.

Page 5149, "Negative #45359. Soja max. Soybean. Dairen, Manchuria. View in hold of English freighter 'Achilles,' showing the filling of oil tank with soybean oil by pipe. The tank holds 850 tons and it takes 4 hours to fill it.

"Negative #45360. Soja max. Soybean. Dairen, Manchuria. General view showing coolies unloading bags of soybeans from a Japanese freighter at Dairen Wharf. The beans were brought from Yingkou (Newchwang). Manchuria."

Page 5159. "Negative #45361. Soja max. Soybean. Dairen, Manchuria. Loading soybean oil cakes on Japanese freighter at Dairen Wharves. Oil cake is used for fertilizer.

"Negative #45362. Soja max. Soybean. Dairen, Manchuria. View showing the unloading of soybeans from a Japanese freighter which has just brought them from Yingkou (Newchwang). Manchuria."

Page 5188-5189 (Saturday, 19 July 1930). Dairen, Manchuria. P.H. Dorsett's notes. "In the afternoon Morse, Dorsett and Suyetake went to the wharves. It is the first opportunity Dorsett has had to see the activities there and also the immense storehouses, or godowns as they are more generally known in the Orient, filled with soybeans and soybean cake.

"We saw a number of ocean-going vessels being loaded with beans and others with soybean cake.

"One of the lines of godowns which Morse and Suyetake found piled full of soybean cake several weeks ago, was today found to be entirely empty.

"After lunch Morse worked on a paper to be read at the next meeting of the Soybean Association of America.

"Dorsett and Suyetake saw to getting the trunks of supplies and equipment, which Dorsett in to take with him, down to the railway station to go out on the 9:00 a.m. train on Monday for Mukden.

"We learned after getting to the station that we would have to see the customs commission's approval for sending these out, before the railway officials would accept them.

"It was necessary, therefore, for Dorsett and Suyetake to make a hurried visit to the commissioner's office to get the required permission.

"We showed him a list of the contents of each trunk and explained to him the nature and character of our work.

"He spoke some English and was very pleasant and agreeable. He called in one of his assistant officers and after about five or ten minutes talk said that he would telephone the railway authorities at the station that he had passed the goods and to receive and send them forward.

"If we had reached the railway station after office closing hours of the commissioner, this might have been rather embarrassing and caused us a day's delay in leaving Dairen.

"Such customs and regulations should in some way be kept in touch with, but it seems that there is no way by which this can be accomplished, except by personal experiences as one goes along."

Page 5189 (19 July 1930). Dairen. W.J. Morse's notes. "A visit was made to the Dairen Wharves and S.M.Ry. storage yards to observe what was doing in the shipping of beans and bean cake. We found several freighters loading beans and bean cake. One European freighter was taking on 3300 tons of beans for European oil mills to be used for oil and oil meal.

"Two Japanese freighters were being loaded with bean cakes for export to the Main Island and Hokkaido. These bean cakes are used in Japan mainly for fertilizer and cattle feed.

"In visiting the bean cake storage houses where three weeks ago we saw thousands of tons of cakes stacked, we found the houses empty and being put in condition for the next season's supply. The shipment of cakes must have been very heavy. The cakes now shipped are being brought direct from the oil mills to the wharf warehouses."

Page 5190. "Negative #45371. Soja max. Soybean. Dairen, Manchuria. View showing Mr. P.H. Dorsett and Mr. Suyetake inspecting a load of soybean oil cakes at Dairen Wharves.

"Negative #45372. Soja max. Soybean. Dairen, Manchuria. Hand truck of soybean oil cakes just brought from warehouse to be loaded on freighter. Mr. Dorsett inspecting cakes."

Page 5191. "Negative #45373. Soja max. Soybean. Dairen, Manchuria. View showing unloading and stacking of soybean oil cakes in open storage at Dairen Wharves.

"Negative #45374. Soja max. Soybean. Dairen,

Manchuria. Loading a Japanese freighter with soybean oil cakes at Dairen Wharves."

Page 5192. "Negative #45375. Soja max. Soybean. Dairen, Manchuria. View showing wagon loads of soybean oil cake being unloaded at Dairen Wharves. Oil cakes are being stacked in open storage.

"Negative #45376. Soja max. Soybean. Dairen, Manchuria. Close-up view of unloading and stacking soybean oil cakes in open storage at Dairen Wharves." Address: Agricultural Explorers, USDA, Washington, DC.

769. Dorsett, P.H. 1930. Re: Thank you for your words of caution about my double pneumonia in Dairen, Manchuria. Plans (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 16. Unpublished log.
• ***Summary:*** Pages 5180-5182. This letter from Dairen, Manchuria, is a reply to Dr. A.F. Woods is Director of Scientific Work, U.S. Department of Agriculture, Washington, D.C.

"Dear Doctor Woods:

"Your very kind and most welcome letter of May 27th was not only greatly appreciated, but it also did me a world of good.

"In addition to your kind expressions of sympathy and counsel incident to my illness and the work of regaining my health, which are much appreciated, your letter also recalled most pleasant years, long since passed, when we were more closely and more intimately associated in the work than we are at present.

"Those pioneer years of agricultural research, the conception and development of the Bureau of Plant Industry are not only years of joy for those associated in the work, but they also stand out in bold relief as the beginning and background of the magnificent Bureau organization and its extensive and invaluable research work of today.

"The experience of being critically ill for something like two months in a foreign country, in a Japanese hospital, with a Japanese doctor and Japanese nurses, is, as you can well imagine, both interesting and novel, and yet not one which I would again care to experience.

"My case was serious form the first, and for several weeks the attending doctor (K. Kondo) and consulting physician (Dr. Todani, at the head of the South Manchurian Railway Hospital) gave no hope for my recovery, but with an apparently able doctor, good nursing, and a rather strong constitution, I survived.

"The first symptoms of trouble which I experienced was a chilly sensation extending up my spinal column. This occurred between five and six o'clock in Friday evening, April 11, just after quitting work and before leaving the temporary office we have fitted up in the Gohin Building.

"After dinner I took a couple of aspirin tablets and retired. I was quite sick the next morning (Saturday) and Dr. Kondo of the Kondo Hospital was called to attend me. On Sunday the doctor diagnosed my trouble as double pneumonia, and on Monday I was removed to the Kondo Hospital where I remained for some 49 days hovering between life and death.

"I left the hospital June first and went to the Yamato Hotel, some twenty miles out of Dairen, in a lovely place by the sea, where I remained for ten days recuperating.

"On the evening of June 10th I returned to Dairen and on the 11th, just two months from the time I was taken ill, I was back at work. Since that time I have been feeling better and daily regaining my strength, and am now, although not yet discharged by the doctor, who comes every four days to see and examine my lungs, am feeling quite myself again.

"In accordance with plans, based on instructions and suggestions from Washington before I was taken sick, I am leaving Dairen on Monday the 21st for Peiping. I will continue my agricultural explorations in that region in search of legumes and other interesting and useful plants for introduction and trial at home.

"Morse will remain with headquarters here in Dairen and continue his research investigations with soybeans in Manchuria until sometime in October or November. He will then join us in Peiping and we will spend a month or so investigating soybean products there. We quite probably will return home in December. However I have suggested some additional work over here which I think is important, an in the accomplishment of which I would like to have a hand. If this is approved, Morse and family will more than likely return in December and Ruth (my adopted daughter) and I will remain in the Orient for another year."

"We will be sure to look you up when we return. Our year spent in Japan was most delightfully pleasant. It is a remarkably interesting and beautiful country and we were successful in getting a nice lot of plant material, also much valuable information, as well as a fine lot of motion and still pictures.

"Sincerely yours,..." PHD/rd.

Note: The latter notation indicates that the letter was dictated by Palemon H. Dorsett and typed by his adopted daughter, Ruth Dorsett. Address: Agricultural Explorer, USDA, Washington, DC.

770. William Morse, P.H. Dorsett, and Mr. Takamine seated in the office of Mr. Takamine at the South Manchuria Railway Co., Dairen, Manchuria, 18 July 1930 (Photograph). 1930.
• ***Summary:*** This 3 by 4 inch black-and-white photo, dated on the back, was sent to Soyfoods Center in 1980 by William Morse's daughter, Margaret Morse Thalman. All three men are sitting.

771. Morse, W.J. 1930. Letter to American Soybean Growers Association, c/o Dr. W.L. Burlison, President, University of Illinois, Urbana, Illinois (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 5196-5198 (20 July 1930, c/o American Consulate, Dairen, Manchuria).

Note: This entire letter is found published at: Morse, W.J. 1930. "Soybeans in the Orient." *Proceedings of the American Soybean Association* 3:96-100 (Sept.). Minor editorial changes have been made in the text to make it clearer. Address: Agricultural Explorers, USDA, Washington, DC.

772. 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."

"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 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.

773. Mr. Suyetake (Japanese interpreter), W.J. Morse, and P.H. Dorsett at Dairen, Manchuria (Photograph). 1930. July.

• ***Summary:*** These two digital photos, each with a caption and date, were sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

In the second photo (see next page), of four men sitting on a bench in front of a window, the man on the left is unidentified; Noburo Suyetake, the translator, is on the right.

774. Morse, W.J. 1930. Re: Heat and humidity in Manchuria are unbearable. Keeping good notes (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. 3. Unpublished log.
• ***Summary:*** Pages 5458, 5459, 5460 and 5461. This letter dated Aug. 3, is from W.J. Morse in Dairen, Manchuria,

to P.H. Dorsett in Peiping, China. "With regard to the hot weather... In all of our tramps about Fuji and other places [in Japan] I did not suffer nearly as much from the heat as I have here in Manchuria. The heat from the sun seems to be so much more intense and seems to go right through one. Suyetake made the remark how hot it is here compared to the main island [Honshu, Japan]. The humidity also seems to be rather high and our clothes, suit-cases and other leather goods have to be cleaned of mold about every other day. My experience thus far with the Manchurian weather is quite different from that which I expected to find after reading volumes on Manchuria agriculture."

"In South Manchuria soybeans are planted mostly with corn although I have seen many fields of sorghum and soybeans, and millet and soybeans. It is quite likely that I may come across this practice between Mukden and Antung and also between Mukden and Changchun for soybeans are grown more or less with sorghums in these regions. I have picked up so much information and seed [sic, seen] so many things along the soybean line that I have never read or heard of during my trips that it almost bewilders me. With such conditions, Dorsett, I am indeed thankful that I am not burdened with the collection of much other material and can devote my short time here in this wonderful soybean country wholly, at least almost wholly, to my friend the soybean. Little do the people back in Washington [DC] realize just what there is in the soybean line over here. The references in letters the past winter and spring to the effect that we have gathered sufficient seed samples and products has made me rather worry."

"With reference to my field notes and pictures, I still try to keep up with you. As to office routine I will omit that and confine my notes to my field activities along with the pictures. I do not care for the notes after they are typed as I keep full notes every day in my daily note-book [notebook] and would not have any use for the notes sent you as I take them out of my books. So just destroy these after you have finished with them."

"Very sincerely, W.J. Morse." Address: Agricultural Explorer, USDA, Washington, DC.

775. Dorsett, P.H.; Morse, W.J. 1930. Roasted soybeans and soy coffee 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:*** Page 5353 (5 Aug. 1930–Dairen, Manchuria). W.J. Morse's notes. "During our visit with Mr. Arakawa in Hsiungyaocheng [Manchuria], July 31, he served us a cold drink which he said was made from roasted soybeans and barley. The product was manufactured in Germany and he bought several boxes at a Russian store in Mukden [Manchuria]. He could not remember the name of the product but he said it came in a green paper package."

"At a Japanese food store we found an instant coffee substitute known as 'Health Coffee' made from soybeans and [word omitted] by a Japanese farmer living outside of Dairen. The same store also had another coffee substitute made from 50 per cent roasted soybeans, and the remainder, coffee and chicory. We were advised to try a Chinese food store for the German soybean coffee. At a large Chinese store we found the same kinds of coffee substitute as at the Japanese store." Address: Agricultural Explorers, USDA, Washington, DC.

776. Dorsett, P.H.; Morse, W.J. 1930. German soybean coffee sold 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 5413 (11 Aug. 1930, Dairen, Manchuria). W.J. Morse's notes. "After taking the July expense account to the American Consulate to be sworn to, we went to a Chinese store to look up a soybean health coffee made by the Chinese. We learned that such a product was made at another store. In looking over the shelves for possible soybean products we discovered the German Soybean Coffee mentioned by Mr. Arakawa and for which we had searched at some Russian stores recently.

"This product put up in a green paper box containing 500 grams, is sold under the name 'Korufranck' and for 35

sen. The material is rather coarsely ground and consists of two-thirds roasted cereals and one-third roasted soybeans.

"Upon inquiring at the other Chinese stores for the soybean health drink, we were told that they make it only during the winter months. It is used as a beverage, food and tonic, and will apparently cure or relieve any ailment known to mankind. It is made from roasted soybean flour, millet, sesame seed, pine nuts, watermelon seeds and walnut meats.

"After lunch we made a seed collecting trip to the Dairen Wharves and S.M. Ry. [South Manchuria Railway] Storage Yards. In our many visits... we have never seen so little activity in the soybean shipping..."

Page 5688 and 5689. A table titled "Itemized schedule of travel and other expenses" for Aug. 1930 includes the following: Aug. 4. 2 Pkgs. bon yuba–30 sen. 10 sheets yuba–30 sen.

Aug. 5. 1 Pkg. soybean health coffee–95 sen. 2 Cans soybean coffee substitute–70 sen. 2 Cans Ajinisono–soybean–2.00 yen. 2 Cans Chinese soybean coffee–1.16 yen. 2 Cans Ajinoto–soybean–2.00 yen. 1 lb. soybean cakes–50 sen.

Aug. 11. Pkg. Masunohana (soybean)–85 sen. Pkg. Setsuguka (soybean)–55 sen. Address: Agricultural Explorers, USDA, Washington, DC.

777. 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 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.

778. 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.

779. Dorsett, P.H.; Morse, W.J. 1930. Re: Reflections on the 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. Unpublished log.
• ***Summary:*** Page 5507 to 5508 (17 Aug. 1930, Peiping, China). Letter from Dorsett to Morse: "This is a glorious work throughout and happy and fortunate is the young man who is given such work to do. America today, perhaps owes her agricultural supremacy directly and indirectly more to agricultural explorations than to any other one agency. Such work is not only of very great economic importance, but is also romantic almost to the extreme." Address: Agricultural Explorers, USDA, Washington, DC.

780. 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 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.

781. 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 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."

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.

782. 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 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."

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.

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 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.

783. 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.

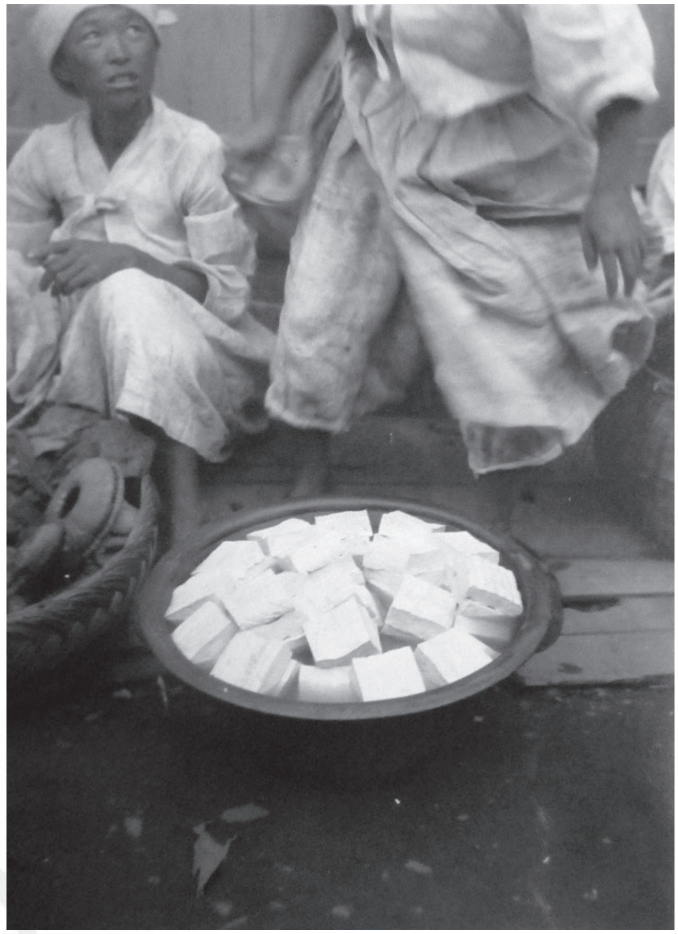
After lunch we visited a grain market... We obtained nine samples among which were the largest yellow and green seed varieties [of soybeans] we have come across. These varieties are said to be used by the Koreans in making their own miso and soy sauce.

"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 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 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.

784. 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.

785. *Daily Pantagraph* (*Bloomington, Indiana*). 1930. Men will eat bean dinner: Soy growers of America to discuss all phases of new crop. Sept. 8. p. 10.
• ***Summary:*** A dinner in which soybeans will be represented in every dish served has been announced as a feature of the annual meeting of American Soybean association to be held at the U. of I. [University of Illinois] college of agriculture, Urbana, this week.

"Ladies of the First Methodist Episcopal church of Urbana will serve the exclusive soybean luncheon at the university south farm Wednesday noon. Soybean fed pork, soybean fed beef, soybean muffins, baked soybeans, a soybean health drink, and soybean ice cream, are listed on the menu."

"J.H. Lloyd, manager of the soybean marketing association, will speak Wednesday evening. Dr. Otto Eisenschiml, president of the National Soybean Oil Manufacturers' association, will discuss possibilities of soybean oil in industry. A paper prepared by Dr. W.J. Morse of the United States department of agriculture, now studying soybean in Manchuria, will be presented."

786. 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."

"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.

787. Dorsett, P.H. 1930. Re: Deeply regret decision made in Washington. Special report on the soybean in the Orient to be prepared by Morse (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 5783 to 5784. This letter dated Sept. 9 is from P.H. Dorsett in Peiping, China to Mr. B.Y. Morrison, Senior Horticulturist Acting in Charge, Foreign Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC. "Dear Mr. Morrison:

"We returned yesterday from a trip of several days to Chang Li [Changli, in today's Heibei province] and vicinity, about 8 hours ride by train to the Northeast of Tientsin."

"While I deeply regret the action taken concerning my recommendation for an additional year's work in the Orient, I am resigned to the Washington decision and the wishes of my friends concerning this matter, and plan to return with Mr. Morse and family when he has completed his soybean investigations in the Orient and is ready to turn his face homeward."

Page 6124-6125. This letter dated Oct. 9, 1930 is from P.H. Dorsett in Peiping to D. A.D. Shamel, Principal Physiologist, Horticultural Crops & Diseases. Bureau of Plant Industry, U.S. Department of Agriculture, Riverside, California, Box 586.

"Your good letter of July 28th and in it the reference to our Brazilian trip brings back a host of pleasant memories. That was a great experience never to be forgotten.

"I outlined work for another year in the Orient which would have taken us to Hong Kong, Canton and Taiwan for the winter, at least, and North Central China for the remainder of the year, but was advised that all at the Office thought it would be best for me to return this winter.

Morse and family and my daughter and I will therefore return home in late December or early January of 1931.

Page 6196. (16 Oct. 1930, Peiping, China). P.H. Dorsett's notes: "Our report up to and including the last day of July contains 5292 typewritten pages. There likely will be something like 1200 pages to add to those already typed by the time we get home. In addition to this there will be a special report on our research investigations of the soybean in the Orient which Mr. W.J. Morse, junior member of the expedition, and soybean specialist of the Department, will prepare.

We are getting our work in the Orient in pretty good shape and if all goes well hope by the time we reach Washington or shortly thereafter, to be able to hand Mr. Ryerson a pretty complete report... concerning the results of our agricultural exploration activities..."

Page 6220 to 6222. (17 Oct. 1930) Letter from P.H. Dorsett in Dairen, Manchuria to Mr. B.Y. Morrison, Foreign Plant Introduction, USDA. "We are sending you by today's commercial parcel post the following parcels of plants and seeds." The number of each parcel is given and the contents listed. "In the herbarium specimens are many specimens of leaf diseases of the soybean, mung bean, and kudzu which should be of interest to our B.P.I. pathologists working on these special diseases.

"We are expecting to leave Sunday, October 19, for Peiping to spend two or three weeks looking up the soybean and its products in that section. The soybean oil industry and the shipping and storage season begins in Manchuria in early November so I will have to return to begin the most important part of the Manchurian soybean work, collecting varieties, information on storage, shipping and the soybean oil industry." Address: Agricultural Explorer, USDA, Washington, DC.

788. 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 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.

789. 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 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 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.

790. 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.

791. 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 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.

792. Dorsett, P.H.; Morse, W.J. 1930. Soybeans in 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 5206 (22 July 1930). En route to Peiping [today's Beijing], China. P.H. Dorsett's notes. "7:00 a.m. In China. En route to Peiping. Raining hard. Corn and Kaoliang in this region are interplanted with soybeans.

"8:15 a.m. Shan-Hai-Kwan [today's Shanhaiguan]. Here we saw part of the Great Wall which is 2500 miles long. In this region and for half an hour's ride before getting here I saw soybeans interplanted with nearly all ordinary farm crops."

"12:20 Kuyeh. Kaoliang, millet, soybeans and other farm crops are grown here quite extensively.

Kaiping. Cloudy but not raining. Kaoliang, corn, millet, soybeans are grown in this section and here as well as in other places noticed today.

"Tongchen. Raining. Kaoliang, corn, millet, cotton, sun-

flowers, with or between all these crops.

Pages 5363, 5364, 5365 (7 Aug. 1930). This is a letter from P.H. Dorsett in Peiping, China to Mr. W.J. Morse, c/o Yamato Hotel, Dairen, Manchuria. Dorsett tells more about the wild soybeans he described earlier growing up reed grass "even though the plants were more vigorous and the leaves were very much larger than the soybeans we saw up the Sungari River near Harbin [Manchuria]. I am sure you would have been deeply interested in seeing these wild soybeans. We talked to a farmer regarding them and he said that they were the true wild soybean with fuzzy pods and dark brown to black seed, and that occasionally they are eaten by the poor classes of Chinese. We hope to have an opportunity later to get good photographs and seed of these wild soybeans.

"We also saw a number of fields of kaoliang interplanted with soybeans, and for some 4 inches [sic, feet] up the stems the leaves of the kaoliang had been stripped off."

"We find everywhere areas of soybeans planted alone but usually inter-planted with kaoliang, millet, maize, perilla and other farm crops. In fact, on our return from the Summer Palace we saw soybeans inter-planted with peanuts, but did not get a picture..."

Page 5905 (22 Sept. 1930). Peiping, China. P.H. Dorsett's notes. "We wrote Mr. Morse in reply to his letter and suggested that he come to Peiping as soon as practicable after October 1, 1930 or he may be too late to see some of the field work with some of the varieties of soybeans grown here about. In fact some of them are now being harvested."

Page 5946. Neg. #45899. "Soja max. Soybean. Near the village of Ssu Tao Chiao, Chihli, China. Soybeans prematurely harvested in small piles to dry. Presumably the harvest of the beans is to enable the farmers to prepare the land and plant wheat." Address: Agricultural Explorers, USDA, Washington, DC.

793. Dorsett, P.H. 1930. Re: Delighted to know that you can come to Peiping by about October 1 (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. 22. Unpublished log.

• ***Summary:*** Pages 5907-5908. This letter dated Sept. 22 is from P.H. Dorsett in Peiping, China to Mr. W.J. Morse, c/o Yamato Hotel, Dairen [Manchuria].

"Dear Morse: I was delighted this morning to receive your letter of September 16th, also your report from August 17th to September 15th inclusive with...

"The season is progressing quite rapidly here and the farmers are making excellent headway in getting in their crops. Millet, corn and kaoliang have pretty well been harvested; mung and adsuki beans, as well as some of the earlier soybeans are being harvested.

"We are delighted to know that you can come to Peiping about October first. We suggest that you do not postpone your visit any longer than is absolutely necessary after October first. I am requesting Mr. Liu to get the names and addresses of parties and firms in Peiping which make and handle soybean products.

"You may have noticed in the local papers that Peiping is more or less upset in connection with military activities. The Shansi troops are retreating from Tientsin and Peiping by the thousands and the Manchurian troops have, we understand, already begun to arrive in Tientsin and also Peiping. This apparently has not interrupted conditions in Peiping except along the railroad arteries..."

"I am delighted to know that your work has been so satisfactory in Chosen. It looks as though by the time you wind up your work there, here at Peiping and vicinity and putting finishing touches on at Dairen, that we will have accomplished worth while in the investigations of the soybean industry of the Orient.

"We are feeling fine and getting along fairly well with our work, and will be delighted to see you again when you reach Peiping..."

"All at this end of the line join in kindest regards and best wishes to you and the family as well as to Mr. Suyetake. Please do not forget to bring him with you to Peiping. I feel sure that he will be interested in seeing this fascinating city and will be able to be of great assistance to you en route, and no doubt while here.

"Sincerely yours, P.H. Dorsett, Agricultural Explorer." Address: Agricultural Explorer, USDA, Washington, DC.

794. Edmondson, J.B. 1930. Eleventh annual business meeting of the American Soybean Association. *Proceedings of the American Soybean Association* 3:109-13.

• ***Summary:*** This meeting was "held on the evening of September 11, 1930 [at the Auditorium, University of Illinois campus] following the last formal program of the convention. The meeting was well attended and the members showed an unusual interest in the activities of the Association, this is spite of the strenuous day they had spent."

Agenda: Call to order. Opening address, by President W.L. Burlison. Appointment of committees by the president. General report, by Secretary J.B. Edmondson. Report of committees. Invitations for 1931 meeting of Association. General announcements. Adjournment.

The following committees were appointed by the president:

(1) Nominating: K.E. Beeson, Indiana
W.E. Riegel, Illinois
K.G. Harmon, Missouri
(2) Legislative: Chas. L. Meharry, Indiana
Harvey Clapp, Virginia

John T. Smith, Illinois
(3) Resolutions: Geo. M. Briggs, Wisconsin
M.O. Pence, Indiana
John Armstrong, Illinois
(4) Auditing: Roy Chasteen, Indiana
M.O. Pence, Indiana

The Resolutions Committee presented 13 resolutions for consideration. Among these, they extended "greetings and best wishes to the new Soybean Oil Manufacturers Association; that we seek the closest cooperation in extending the field of soybean oil utilization, and that we extend our appreciation in particular to Doctor Otto Eisenschiml for his active interest in soybean oil development and for his participation in our meeting." They also express appreciation to the USDA and "particularly to Doctor [sic] W.J. Morse for his work in securing new and improved varieties and for his studies of the many phases of the industry."

After a general discussion of the urgent need of more definite and accurate information regarding the use of soybeans in hog feeding, with special reference to the possible production of soft pork, Chas. L. Meharry made a lengthy "Motion to appoint a special committee on the soft pork problem." He uses the words "soybeans" and "soys." Address: Secretary, American Soybean Assoc., Clayton, Indiana.

795. 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, 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.

796. Morse, W.J. 1930. La utilizacion de la soja en diversas industrias [The utilization of soya in various industries]. *Hacienda* (*La*) (*Buffalo, New York*) 25:298-301. July; 25:347-49. Aug; 25:394-96. Sept. [1 ref. Spa]

• ***Summary:*** This is a translation of USDA Farmers' Bulletin 1617, but with excellent new illustrations. Contents: Introduction. Soybeans in the human diet: Whole dry soybeans, green vegetable soybeans, soy flour, soy oil, soy sauce, soy milk, tofu (*cuajada de soja*). Soybeans in the feeding of domestic animals. Soy oil: Extraction, use. Soybean cake: as a human food, as a livestock feed, as a

fertilizer. The value of soybean forage. Soybean in silage. Soya as green forage. Soybeans for the improvement of soils. Soybean straw.

This article contains many interesting photos: 1. A man with a hand turned stone mill in China grinding soybeans to make soymilk. 2. Soybean cakes stacked and partly covered with tarpaulins at a port in Manchuria. 3. Earthenware vats used for making soy sauce in a courtyard in China. 4. Steamed soybeans being cooled to make miso in Japan. 5. Soybeans intercropped with corn. 6. Manchurians outside a soy oil factory in Dairen. The equipment was installed by the French Oil Mill Machinery Co. 7. Carrying round soybean cakes in a cart at the same factory. 8. A soybean mill at Yokohama, Japan. 9. An Anderson Expeller for the extraction of soy oil. 10. A tractor pulling rotary disks for cultivating soybeans in the USA. 11. Harvesting soybeans with a tractor in the USA. 12. A tractor pulling a harvester-thresher combine in the USA. Address: USDA, Washington, DC.

797. Morse, W.J. 1930. Utilizacion de la soya [Utilization of soybeans]. *Revista de Agricultura, Comercio y Trabajo* (*Cuba*) 11:43-60. Sept. [Spa]

• ***Summary:*** This is a translation of *USDA Farmers' Bulletin* No. 1607 titled "Soybean Utilization" (Morse, Jan. 1930). With an introduction by Ingeniero Francisco B. Cruz, Director de la Estacion Experimental Agronomica, de Santiago de las Vegas, Cuba. Translation by Emma Lopez Seña. Contents: Introduction. Soybeans for human food: Dried beans (*los frijoles secos*), green or vegetable beans (*los frijoles verdes*), soybean flour (*la harina de soya*), soybean oil (*aceite de soya*), soy sauce (*salsa de soya*), soybean sprouts (*vástagos de soya*), soybean vegetable milk (*leche vegetal de soya*), soybean curd [tofu] (*cuajada de la soya*).

Note 1. This is the earliest Spanish-language document seen (April 2013) that uses the term *cuajada de la soya* to refer to tofu.

Soybeans for livestock: For swine, dairy cattle, beef cattle, sheep, poultry. Soybeans for oil: Methods of processing beans for oil, utilization of soybean oil. Soybean meal: Soybean meal for human food, soybean meal for stock feed. Soybeans for hay. Soybeans for pasturage. Soybeans for silage. Soybeans for soilage. Soybeans for soil improvement. Soybean straw.

Note 2. This is the earliest Spanish-language document seen (June 2009) that uses the term *frijoles verde* to refer to green vegetable soybeans. Address: USDA, Washington, DC, USA.

798. 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 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.

799. 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 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."

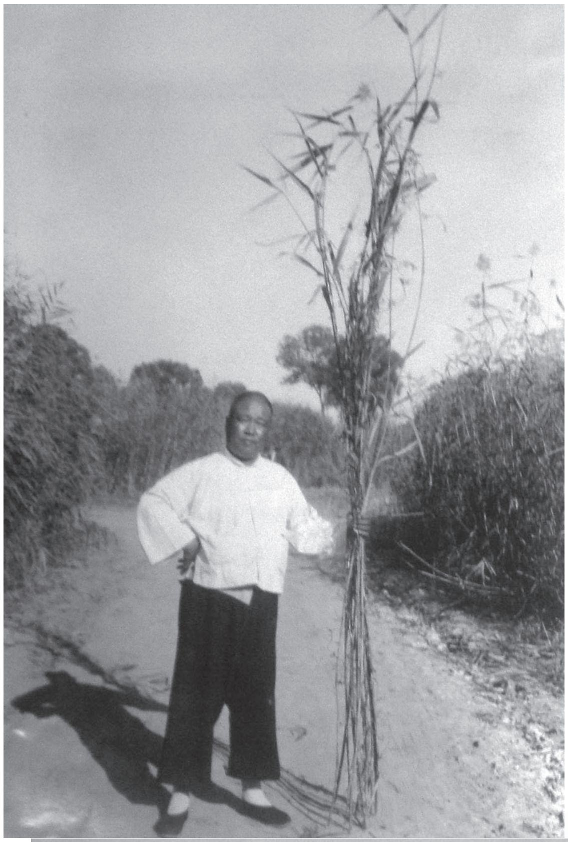
Page 6078. Neg. #45988. "Soja max. Soybean. Makaton, Manchuria. General view of field showing small piles of roots and stubble of soybeans and corn which are used for fuel in the winter. The Chinese farmer makes use of the entire plant.

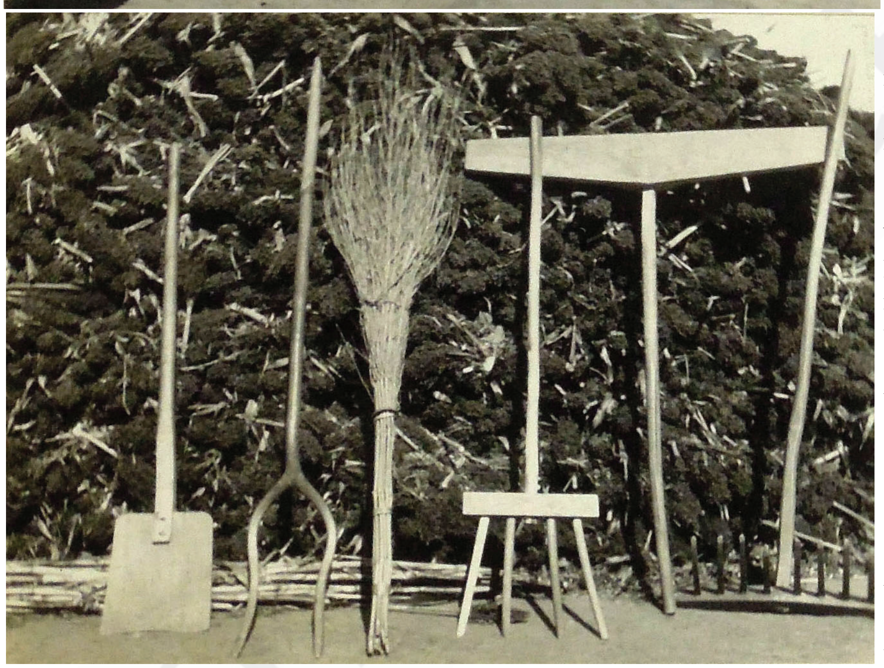
Page 6084. Neg. #45995. "Soja max. Soybean. Near the village of Lo Ton Wen, between Peiping and Feng Tai, Chihli, China. View of Peter Liu holding several grass reeds cut from the patch nearby, showing wild soybeans climbing to the top of the reeds, 10 feet or more in height. Seed secured and numbered 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, 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.

800. Dorsett, P.H.; Morse, W.J. 1930. In Nanzankai, Manchuria, and 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 6181-6182 (15 Oct. 1930). Nanzankai, Manchuria. "W.J. Morse's notes: We went to the American Consulate where we met Dr. Cabot Coville, Vice Consul, who recently advised us he would like to go with us out in the farming sections."

Page 6182. Neg. #46052. "Soja max. Soybean. Nanzankai, Manchuria. Carrying kaoliang-stalk baskets of soybean pods and finely threshed material from the threshing ground. Used for cattle feed.

Page 6183. Neg. #46053. Panoramic view of Manchurian village and threshing grounds. Illegible handwritten caption.

Page 6184. Neg. #46054. "Soja max. Soybean. Nanzankai, Manchuria. View of threshing ground on farm near Nanzankai showing soybean plants on threshing floor and stack of unthreshed soybeans in background."

Neg. #46055. "Soja max. Soybean. Nanzankai, Manchuria. Close-up view of rolling or threshing out soybean seed with a stone roller."

Page 6185. Neg. #46056. "Soja max. Soybean. Nanzankai, Manchuria. Close-up view of threshing out soybeans with stone roller."

Neg. #46057. "Soja max. Soybean. Nanzankai, Manchuria. General view of threshing ground showing soybean plants on threshing floor after first rolling. In foreground, Chinese coolies knocking peanuts off vines over pitch-fork handle."

Page 6187. Neg. #46060. "Soja max. Soybean. Nanzankai, Manchuria. Stack of bundles of soybean straw on edge of threshing ground to be used for winter fuel. The coarse material after threshing is saved for fuel while the fine material (pods, etc.) is used for cattle feed."

Neg. #46061. "Soja max. Soybean. Nanzankai, Manchuria. After threshing scraping the threshed material into piles for cleaning out the seed."

Page 6188. Neg. #46062. "Soja max. Soybean. Nanzankai, Manchuria. Close-up view of Chinese farmer raking threshed soybean material in piles in preparation for cleaning out the seed."

Neg. #46063. "Soja max. Soybean. Nanzankai, Manchuria. Raking up seed, pods and trash into piles in preparation for cleaning out the seed by the wind method."

Page 6189. Neg. #46064. "Soja max. Soybean. Nanzankai, Manchuria. View showing the sweeping up after threshing in seed cleaning."

Page 6190. Neg. #46065. Panoramic view of

Manchurian village and threshing grounds. Illegible handwritten caption.

Page 6191. Neg. #46066. "Soja max. Soybean. Nanzankai, Manchuria. Cleaning soybeans of straw and trash by throwing shovelfuls in air and letting the wind act as a cleaner.

Neg. #46067. "Soja max. Soybean. Nanzankai, Manchuria. Cleaning soybean threshed material on threshing ground.

Page 6192. Neg. #46068. "Soja max. Soybean. Nanzankai, Manchuria. Throwing shovelfuls of threshed material in the air in cleaning soybean seed."

Neg. #46069. "Soja max. Soybean. Nanzankai, Manchuria. Close-up view of Chinese farmer throwing shovelfuls of threshed soybean material in air cleaning out the seed."

Page 6193. Neg. #46070. "Soja max. Soybean. Nanzankai, Manchuria. Cleaning seed by throwing shovelfuls in the air.

Page 6194. Neg. #46072. Panoramic view of threshing grounds in a Manchurian village. Illegible handwritten caption.

Page 6224 (18 Oct. 1930). Dairen, Manchuria. "W.J. Morse's notes: When visiting the National City Bank of New York [several years ago], we were advised by Mr. French, the manager, that the soybean situation in Manchuria was rather dull at the present time, much more so than a year ago. This is due to the light demand from European countries for beans and the somewhat uncertain condition in the soybean oil and cake industry."

Page 6226. This is a letter dated 14 Oct. 1930 from W.J. Morse, c/o American Consulate, Dairen, Manchuria, to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China. "Your letter of October 9 just at hand and very glad to have such good news."

"I want to thank you for the news clippings which give some idea of what is going on in the U.S.A. many letters have been received from Experiment Station friends but such information is mostly local. However from such sources of information, I am led to believe that the soybean is saving the day as a feed and grain crop in the drought-stricken areas. In many sections, soybean hay is the only forage the farmers will have for their winter feed."

"As plans are now, we will leave Dairen Sunday morning on the 9 A.M. express which will put us in Peiping Monday (Oct. 20) evening."

"... with all the legumes you have been sending, it seems they should be at least a little satisfied. In one box we have seed packages representing 24 genera (not species) and in another 20 genera. Al run rather high in the number of species. After this week, my mind won't be at all guilty considering the wild legumes and grass problems. I will feel perfectly at ease in devoting my whole time to the 'most important,' the soybean industry. I have several problems I want to study thoroughly and with an easy mind an unhampered! I feel that I can get excellent results."

Page 6230-6231 (19 Oct. 1930). En route Dairen, Manchuria to Peiping, China. "W.J. Morse's notes: We left Dairen on the 9:00 A.M. express en route to Peiping, China. During the ride from Dairen to Mukden, various forms of activities were observed. All crops had been harvested and with the exception of a small section north of Liaoyang [in today's Liaoning province] the crops had been removed to the threshing grounds.

"One of the interesting things noted all along the line was the digging of the corn, kaoliang and soybean stubble and roots. These are used by the farmers as winter fuel. In some cases the plow was used in taking out the stubble. Men, women and children were knocking the soil free from the roots and placing them in piles.

"A few miles out of Kaiping we saw large groups of carts loaded with sacks of grain coming from different directions. These were on the way to Kaiping market from the distant farming sections."

Page 6238-6239 (22 Oct. 1930). Peiping, China. P.H. Dorsett's notes: Morse, Suyetake, Liu and Dorsett left the hotel about nine o'clock this morning for a day's field trip by auto.

"Our main objective was the park area of Tang Shan to inspect the *Undetermined legume* our #7119, growing there in considerable quantity, and which Dorsett feels is not only extremely interesting, but quite probably by all odds the most

valuable legume which the Expedition has thus far located in the region about Peiping.

"Neither Morse nor Suyetake recognized this small pea podded plant, but both are much interested in the plant. The plants in general appearance and habit of growth very much resemble alfalfa. They are more or less decumbent or creeping and sometimes grow to a length... of six feet." They "are of the opinion that the plant will make a good hay crop. The plants bear seed in abundance and we believe the seed will be easily harvested.

"On October 13th Dorsett collected something more than a pound of seed of this legume which will leave Peiping tomorrow, October 23, 1930, under field number 7119, in the diplomatic pouch for Washington." Morse thinks it may be a *Medicago* [medick or burclover; Alfalfa is *Medicago sativa*].

Page 6241. Neg. #46095. "Soja max. Soybean. Tai Ping Chuang, China. A slightly different view of Chinese farmers chopping dry soybean straw for food for stock, perhaps primarily for donkeys."

Neg. #46096. "Soja max. Soybean. Tai Ping Chuang, China. Chinese farmers chopping dry soybean straw, from which the beans have been threshed, for hay for their stock." Page 6246. Shipment of 22 Oct. 1930, includes "Soja max, #'s 7340 7341, 7342, 7343, 7351, 7352, 7352, 7353, 7354, 7355, 7356, 7377, 7378, 7379, 7380, 7381, 7385, 7392, 7393, 7400, 7401, 7402. These twenty-one numbers of soybeans, collected in different and quite widely separated farming districts, are for the legume collection in Forage Crops, and unquestionably will be of interest to the soybean workers of that office."

Page 6403 (10 Nov. 1930). En route Peiping, China to Dairen, Manchuria. "W.J. Morse's notes: Arrived at Mukden, Manchuria at 6:00 A.M. and found it very cold and windy. We left on the 1:26 P.M. express for Dairen, Manchuria.

"On the train we met Mr. Kufuku, Director of the Soybean Seed Farm at Kaiyuan, who was on his way to Dairen to attend a series of lectures on agriculture at the S.M.Ry. Agricultural Bureau.

"Mr. Kufuku advised us that the trade and movement in soybeans is very slow this season due to the low price of beans. Last year at this time beans were selling at Yen 4.00 per sack while at the present time a sack is selling for about Yen 2.50. Practically all the soybeans have been threshed and cleaned but the farmers are slow in bringing in the seed to the collection centers, awaiting better prices.

Page 6435-6436 (13 Nov. 1930). Dairen, Manchuria. "W.J. Morse's notes: Received a visit from Dr. George N. Vitt, District Representative of the Caterpillar Co. of San Leandro, California. Mr. Vitt is interested in establishing machinery for the planting, culture and harvest of soybeans and said that arrangement had been made with the Kungchuling Agricultural Experiment Station of the S.M.Ry. to carry on such an experiment on the farm of some Japanese in North Manchuria.

"With deep plowing and sub-soiling, he seems to think that level cultivation can be carried on. With the level cultivation all machinery can be used from preparing the land to the harvesting and threshing of the crop and a much cheaper production of beans than with coolie labor. Coolie labor is cheap; ridged cultivation is the experience of centuries; machinery and fuel are very expensive; and the handling of machinery requires experienced hands, the cost of which is high–'Nuf said!'" Address: Agricultural Explorers, USDA, Washington, DC.

801. Dorsett, P.H.; Morse, W.J. 1930. Soybean sprouts, soybean milk, bean mash [okara], and bean curd [tofu] in 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 6252 (23 Oct. 1930, Peiping, China). P.H. Dorsett's notes. "Today we went to the market and saw a number of bean curd [tofu] dealers, also those handling soybean sprouts."

Pages 6264, 6265, 6266, 6267, 6268, and 6275 (24 Oct. 1930). P.H. Dorsett's notes. "We went to Hsi Tan Pailou Street in the northwestern part of the city before tiffin where we found a number of kinds of bean curd and other soybean products, also soybean and other bean and pea sprouts.

"We got a number of still and motion pictures, also quite a collection of soybean products which we hope to get photographed during the afternoon.

"Tomorrow we plan to visit one of the many places around Peiping engaged in bean sprouting and the making of other bean products."

Page 6265. Photo shows soybean sprouts in a market in Peiping (Negative #46113).

Page 6266. Photo taken in same market. "At the extreme left, back, soybean sprouts and string beans, in front soybeans, cauliflower and radishes. At the back left are dry bean curd [doufu-gan, pressed tofu] and Chinese cabbage" (Neg. #46114).

Page 6266. "Chinese curd man shaving from thin sheets narrow strings of soybean curd" (Neg. #46115).

Page 6267. "Peiping, China. Very near life sized picture. Fresh bean curd pressed into thin sheets and fried in soy sauce for five hours. These sheets are sliced into fine strings. Chinese name 'Chien chang'" (Neg. #46116).

Page 6268. "Peiping, China. Small stand along the street selling various forms of soybean curd that have been fried in soy sauce" (Neg. #6268).

Page 6268 (bottom). Peiping. "Most of the baskets contain a greater or less amount of sprouted soybeans; they show in three baskets."

Page 6275. A photo shows: "Soja max. Fried soybean

curd. Peiping [Beijing], China. Between 3/4 and life sized picture. Small squares of fresh bean curd are fried in deep fat (sesame oil). Sometimes several of these fried squares are strung on pieces of grass. D. & M. #7256 (Neg. #46125).

Page 6276. "Almost life sized picture. Round and oblong pieces of fresh bean curd fried in soybean sauce for 5 hours. The cakes are dark reddish brown. Chinese name 'Toufu kan' [doufu-gan] meaning 'dry bean curd'" (Neg. #46126).

Page 6277. "Peiping, China. Life sized picture. Small squares of bean curd that have been boiled in soy sauce for 5 hours. Cakes are dark reddish brown" (Neg. #46127).

Page 6280 (25 Oct. 1930). Peiping, China. "In the forenoon we went to the bean sprouting place of Mr. Chang Tzu Hsien, in the southwestern part of the city. His sprouting house or room is just back of the large public well where water is pumped by coolies and sold to big wheel-barrow men for a few coppers per load. Mr. Hsien sprouts mung beans, yellow and green soybeans; about six days are required to sprout the beans. He uses large earthen bowls are wide shallow jars, about two feet at the bottom, three feet on top and 16 to 20 inches deep, in which to sprout the beans.

"About 1 peck of dry beans are required to make one of the above vessels full of sprouts. Green soybeans are grown and sold with shorter sprouts than either the yellow soy or mung beans. We were told that the best beans for sprouting come from the Kalgan region [Zhangjiakou, a city in Heibei province of North China, adjacent to Beijing to the southeast], but that on account of the price he cannot afford to use these and so he gets his stock from the southeast of Peiping [Beijing].

"The beans are first soaked overnight in hot water and then put into vessels and sprinkled two or three times a day with cold water.

"Mung bean sprouts sell for two cents Mex. per cattie. Yellow soybean sprouts for three and one-half cents per cattie. Green soybean sprouts sell for four cents per cattie.

We next went to the Chi Shun Hung Co., 8 Lien Hua Ssu Street, Peiping, soybean curd and milk manufactory where we spent some little time getting information and pictures.

"Mr. Hao produces both dry and fried curd and milk. He sells soybean milk in about 10

ounce bottles at 1.00 Mex. per bottle, one bottle each day, delivered to his customers. He makes square and round cakes of soybean curd. They are from one-half to three-quarters of an inch thick and about three inches in diameter. These are called dry curd because most of the water is pressed out. They also fry these cakes in soybean oil.

"Mr. Hao also told us that the soybeans from the Kalgan region make the best curd, but that on account of their expense he cannot afford to use them, and buys his from local growers in the vicinity of Peiping.

"In the afternoon we finished up the nearby pictures of soybean products and then took the negatives made in the field and at the hotel to the Hartung Photo Shop to be developed and printed."

Page 6282. Peiping, China. "Wheel cart with baskets used by the peddler of sprouts of mung beans and soybeans" (Neg. #46132). "Side view of wheel cart and baskets used by the peddlers of sprouts of soybeans and mung beans" (Neg. #46133).

Page 6283. "Small grass baskets or forms for shaping fresh bean curd into small round cakes and then from which excess water is pressed out" (Neg. #46134). "Small grass basket forms used in shaping small round cakes of soybean curd for pressing out moisture and the cakes are then fried in soy sauce" (Neg. #46135).

Page 6284. "Basket of square and round cakes of fresh soybean curd from which excess water has been pressed. These cakes are now fried in soy sauce for five hours" (Neg. #46136). "Tub of bean mash [okara] left after straining out the soybean milk which is used in the manufacture of bean curd" (Neg. #46137).

Note: This is the earliest English-language document seen (July 2011) that uses the term "bean mash" to refer to okara.

Page 6288 (27 Oct. 1930). P.H. Dorsett's notes in Peiping. "Early this morning we visited the mung bean sprouting of Mr. Chang, at 66 Pei Yang Shih Kou, Peiping. This gentleman uses tubs in which to sprout his mung beans. The tubs are 12-14 inches across, 24 inches long, and 18-20 inches in height, with about eight small holes in the bottom for draining off surplus water..." The process is described and photos given.

Page 6289. "In the afternoon we called on the establishment of Mr. Chiang who makes what is locally known as 'Southern bean curd.' He uses yellow soybeans. The milk is boiled three times. This curd seems quite different from that ordinarily seen."

Page 6337 (2 Nov. 1930. Peiping, China). P.H. Dorsett's notes. "Tomorrow we plan on visiting Dr. Ernest Tso, of the P.U.M.C. [Peiping Union Medical College] to get such information as we can relative to the making and utilization of soybean milk. We also plan on visiting a soy sauce, soybean jam [jiang] and pickling establishment for the purpose, if possible, of securing still and motion pictures."

Page 6338 (3 Nov. 1930). "In the forenoon we went to the Peking Union Medical College and met Dr. Ernest Tso. The Doctor is especially interested in the food and feeding of young infants, and is experimenting with the use of both cow and soybean milk.

"He showed us pictures of babies fed in part or wholly on cow's milk, as well as those fed on soybean milk and also showed us charts of the results of his work, as well as some of the babies being fed in the hospital.

"Mr. Morse made an arrangement to call on him again Wednesday morning to talk with him about soybean milk and other products and also to learn more about his work."

Page 6607 (5 Nov. 1930. Peking, China). "Inspected soybean milk laboratory and manufacture of soybean milk." Note: No details are given.

Page 6792 (14 Dec. 1930). Peiping en route to Kalgan, China. P.H. Dorsett's notes. "Owing to the fact that when the Morses were in Peiping in November, and Morse, Suyetake, Liu and I, while looking up soybean products, learned that the best soy and mung beans for use in sprouting and making bean vermicelli come from the Kalgan region, we thought it worth while to go there for a collection of soybeans, mung beans and other legumes." Address: Agricultural Explorers, USDA, Washington, DC.

802. Dorsett, P.H.; Morse, W.J. 1930. Roasted soybean flour 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:*** Pages 6252, 6254 (23 Oct. 1930, Peiping, China). P.H. Dorsett's notes. Page 6254. "Soybean macaroons, Peiping, China. Macaroons made from soybean flour [probably dry roasted], wheat flour, sugar and egg whites. Used as a confection. This picture is a little more than half life size. Chinese name 'Huang tou ping' meaning 'yellow soybean cakes'" (Negative #46103).

Page 6256. "Peiping, Chihli, China. Twisted oblong cakes made of roasted soybean flour and sugar. Used as a confection. Chinese name 'Ton su tang' meaning 'crisp bean candy'" (Neg. #46105).

Page 6257. "Peiping, Chihli, China. Life sized picture. Small oblong cakes made of roasted soybean flour, wheat flour and sugar. Material slightly steamed and pressed in molds. Used as a confection. Chinese name 'Ton su tang' meaning 'crisp bean candy'" (Neg. #46106).

Page 6258. "Life sized picture. Thin sheets of candy made into rolls with roasted soybean flour between each sheet. Used as a confection. Chinese name 'Ton su tang' meaning 'crisp bean candy'" (Neg. #46107).

Page 6259. "A little less than three-fourth life sized picture. Small round sweet cakes made from soybean flour


聚順興自造
貨真價實
定期不悞


北平
聚順興自造
東康衛生酥糖
貨真價實
定期不悮


東安市場
稻香春豆酥
電話東局

[probably roasted], wheat flour and sugar. Molded in forms and then baked. Used as a confection. Chinese name 'Ton su ping' meaning 'crisp bean cake'" (Neg. #46108).

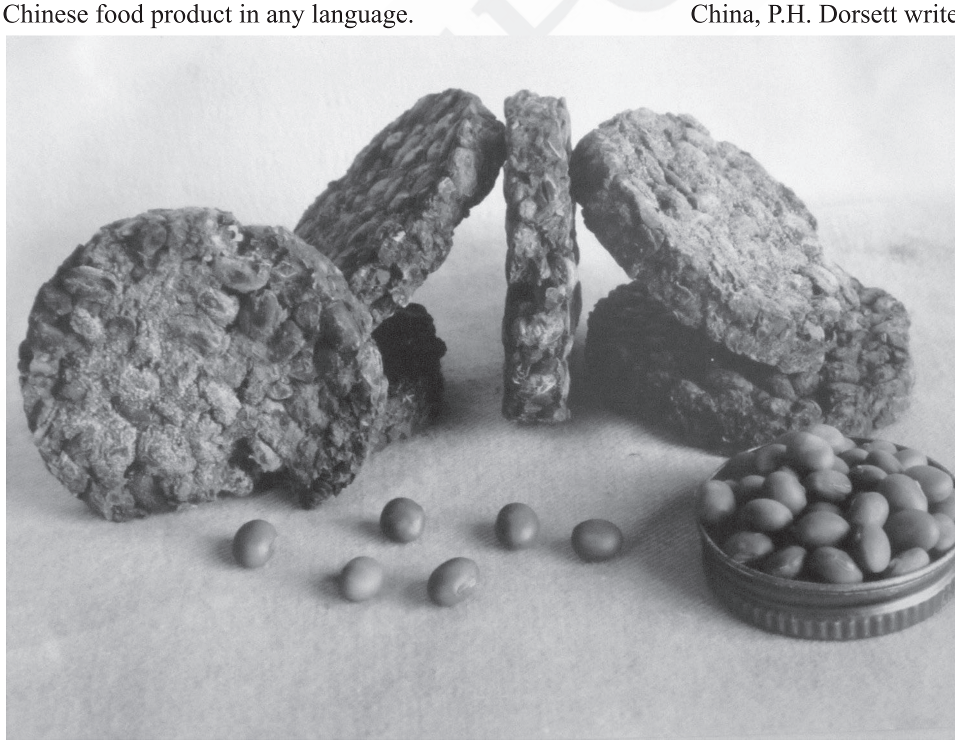
Page 6260. "Almost one-half life sized picture. Small rectangular blocks of roasted soybean flour, wheat flour and sugar. Slightly steamed and pressed in molds. Used as a confection" (Neg. #46109).

Note: This is the earliest document seen (Nov. 2012) that contains a detailed discussion of roasted soy flour in China, or that discusses Chinese products in which roasted soy flour is used as an ingredient. Address: Agricultural Explorers, USDA, Washington, DC.

803. Dorsett, P.H.; Morse, W.J. 1930. A close relative of tempeh in 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. See p. 6264, 6273. Unpublished log.

• ***Summary:*** Pages 6264, 6273. On 24 Oct. 1930, the authors photographed a tempeh-like product on Hsi Tan Pailou Street in northwestern Peiping [today's Beijing], China.

Page 6273. A good photo with the following description: "Soybean Cake. Peiping, China. A life-sized picture. Chinese name *'Tou chiah ping'* [soybean fried cake]. Small cakes made from boiled soybeans. The beans are pressed into small round cakes which are allowed to develop a mold–taking about 7 days. These cakes are broken into small pieces and fried in sesame oil." There are no known references to this Chinese food product in any language.



Note: In 1983 William Shurtleff, while traveling in China, asked at least ten Chinese connected with soyfoods if they had ever heard of or seen *tou chiah ping* and showed them the characters with which the name was written. None had ever heard of or seen it. Address: Agricultural Explorers, USDA, Washington, DC.

804. Dorsett, P.H.; Morse, W.J. 1930. Yuba in 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 6269. P.H. Dorsett's notes. Peiping, China. October 24, 1930. Friday. A photo taken in Peiping shows: "A little more than one-half life sized picture. Small pieces or sticks of yuba [dried yuba sticks] made from the film taken off hot soybean milk. Chinese name 'Fu chu', meaning 'Curd bamboo'" (neg. #46119). Address: Agricultural Explorers, USDA, Washington, DC.

805. Dorsett, P.H.; Morse, W.J. 1930. Pickled soybean curd, red and white [Fermented tofu] (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 6264 (24 Oct. 1930). While in Peiping, China, P.H. Dorsett writes: "... went to Hsi Tan Pailou Street in the northwestern part of the city before tiffin where we found a number of kinds of bean curd and other soybean products... We got a number of still and motion pictures, also quite a collection of soybean products which we hope to get photographed during the afternoon."

Page 6270. A photo shows several small crocks (about 15 cm {5.7 inches} in diameter) in a small carrying case. Dorsett names them "Pickle: soybean curd, white and pink... Peiping, China... Red chiang toufu and white chiang toufu... Chinese name 'Tu ju' ['Fu ju' = Furu], meaning 'curd milk'" (neg. #46120).

Page 6271. A photo shows two crocks of about the same size, one with a tied paper lid, the other

open at the top. "White pickled beancurd. Peiping, China... Chinese name, chiang toufu (white). Small blocks of bean curd placed in jar of rice wine and salt. Jar sealed and placed in sun, where curd cures for a year"(neg. #46121).

Page 6272. A photo shows two crocks of about the same size, one with a tied paper lid, the other open at the top. "Pink bean curd pickled... Peiping, China... Chinese name, chiang toufu (red). Small blocks of bean curd placed in jar of rice wine and salt with red rice [fermented red rice; angkak] (produced by fungus growth). Jar sealed and placed in sun, where curd cures for a year" (neg. #46122).

Note: This is the earliest English-language document seen (Oct. 2011) that uses the terms "pickled beancurd" or "White pickled beancurd" or "Pink bean curd pickled" or "chiang toufu" or "Red chiang toufu" or "White chiang toufu" or "Tu ju" to refer to fermented tofu. Address: Agricultural Explorers, USDA, Washington, DC.

806. Hughes, Harold DeMott; Henson, Edwin R. 1930. Crop production–principles and practices: A handbook of information for the student of agriculture. New York, NY: The Macmillan Co. x + 816 p. Oct. Illust. Index. 25 cm. Reprinted in 1935. [40 soy ref]

• ***Summary:*** A comprehensive, innovative classroom textbook. Both authors are interested in methods of teaching. Harold Hughes lived 1882-1969. Edwin Henson lived 1896- (for biographies see p. vi).

A large table titled "Botanical classification of crop plants" (p. 59-60) is divided into two equal parts (classes):

monocotyledons (such as corn, wheat, millet) and dicotyledons (soybeans, cowpeas, peanuts, alsike clover, etc.). For each plant is given (e.g.): Common name: soybean. Order: Rosales. Family: Leguminosae. Genus: Soja. Species: max. Subspecies: None. Spermatophytes (such as soybeans) are seed-producing plants; they are considered the most highly organized in the vegetable kingdom. Spermatophytes are

further divided into two divisions: the Gymnosperms and Angiosperms (such as soybeans, which have their ovules enclosed in an ovary).

A table titled "Water requirements of certain crop plants and weeds" (p. 129, based on Briggs and Shantz, 1914) shows that soybeans require 744 lb of water to produce 1 lb of dry matter. Several weeds require only 200-300 lb.

A table (p. 156) shows that soybeans have low lime requirements; they tolerated acid soils well. Various studies support this.

A table titled "Legumes grouped on the basis of those which may be inoculated by some strain of bacteria" (p. 163) contains 8 groups: Alfalfa group, red clover group, cowpea group, vetch group, soybean group, bean group, and lupine group. Some groups (such as the vetch group) contain as many as 8 crop plant members. But the soybean group contains only one member: the soybean. Inoculation of soybeans is discussed on pages 162-66.

Soybeans are also discussed in the following sections: "Green manures" (p. 180-82). "Plowing, subsoiling and deep tillage" (p. 209). "Cultivation of soybeans" (p. 258). Effect of drying seeds on germination (p. 342; "Soybean seed dried for 26-59 hours at temperatures ranging from 85 to 115 degrees F. was considerably injured when 50% of combustion gases were used"). "Supplementary crops in the corn field" (their effect on corn yields) (p. 375-76). "Corn [interplanted] with soybeans" (p. 376-79). "Sorghum for silage..." (p. 405). "The combine harvester" (p. 436-37; a photo shows a combine harvester harvesting wheat in Indiana). "Composition of grass and legume hays (p. 536-37; large table). "Annual crops pastured off when mature (p. 541; table comparing corn, cowpeas, velvet beans, peanuts, and soybeans; soybeans have by far the smallest acreage, production, and estimated quantity eaten by livestock, while corn has by far the biggest).

Chapter 29, titled "Soybeans," has the following contents: Introduction. Description of the plant. Soil adaptation. Climatic adaptation. Soybean varieties. Uses of the crop (large diagram from Morse 1927). Culture of the crop. Cultivation of soybeans (to get rid of weeds). Soybeans in mixture with other crops. Rotation value of soybeans. Harvesting soybeans for seed. Soybean hay. Soybeans in corn for silage. Feeding value of soybeans: Hogs–hogging off, lambs–hay, dairy–beans, dairy–hay. With 5 photos, 8 tables and 23 references.

"Sudan grass in mixtures" (p. 677). "Forty of the most important diseases affecting crop plants" (table, p. 739-42; Soybeans are affected by Mosaic (virus), Root knot {*Heterodera radicicola,* nematode}, Anthracnose {*Colletotrichum* sp.}, Bacterial blight {*Bacterium* sp.}, Stem rot {*Sclerotium rolfsii*}).

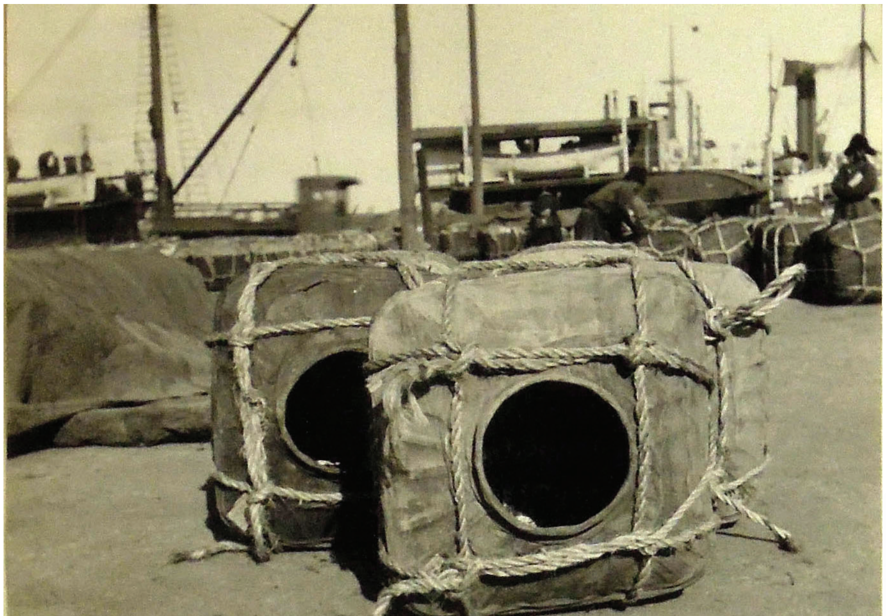
"Effect of rotation of crop yields" (p. 749, 752; incl. table titled "Yields of crops in rotation, Indiana"). "Crop sequence" (p. 753-54). Address: 1. Prof. of Farm Crops, and Chief in Farm Crops, Iowa State Agric. Exp. Station; 2. Asst. Prof. of Farm Crops. Both: Iowa State College, Ames, Iowa.

807. 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 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

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Negative #46257. Soja max. Soybean. Dairen, Manchuria. Close-up view of cart with oil paper lined basket containers of soybean oil.

Negative #46258. Soja max. Soybean. Dairen, Manchuria. Oil paper lined basket containers of soybean oil on wharf awaiting shipment to Chinese ports.

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 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.

808. Dorsett, P.H.; Morse, W.J. 1930. 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:*** Page 6544-6545 (26 Nov. 1930). En route Kungchuling, Manchuria. "W.J. Morse's notes: We left on the 9:00 a.m. express for Kungchuling where the S.M.Ry. holds its annual soybean fair for the Manchurian farmers along the S.M.Ry. lines in the Changchun, Kungchuling and Ssupingkai districts. The Kungchuling Experiment Station distributes about 3,000 koku [1 koku is 4.96 bushels] of seed of the improved variety 'Kungchuling' to farmers in the above districts every year. The S.M.Ry. offers prizes for the best three grades from each district, that is first grade beans in each district receive first prizes, second grade, second prize and so on to four grades.

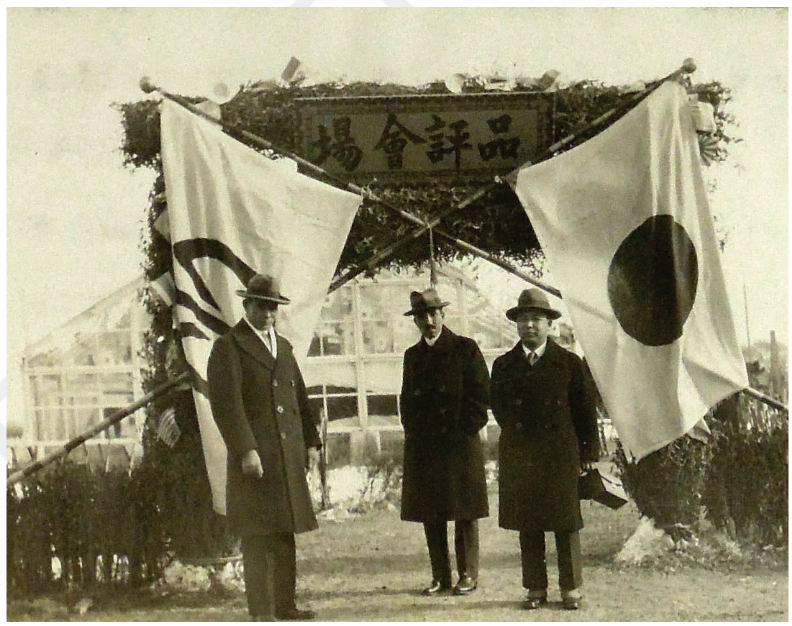
"Prof. Matsushima advised that Chinese farmers from Kaiyuan to Changchun are raising about 6,000,000 koku of the improved variety 'Kungchuling.'

"From Kaiping (south of Mukden) to Kungchuling the ground was covered with snow, increasing as we went northward. Arrived at Kungchuling at 7:28 p.m. and found it extremely cold."

Page 6546-6547 (27 Nov. 1930). Kungchuling, Manchuria. "W.J. Morse's notes: We left with Prof. Matsushima in the morning for the experiment station where we met Dr. Nakamoto, the director, and Mr. Murakoshi. A large archway to the entrance of the experiment station was made of soybean plants and the welcome sign across the arch was made of black soybean letters with a background of yellow soybeans.

"Director Nakamoto took us to the exhibit hall where the seed samples were on display, In all there were 1270 samples of seed from farmers in the Changchun, Kungchuling and Ssupingkai districts. The seed samples were all of the improved 'Kungchuling' variety which was placed in distribution about six years ago by the Kungchuling station. Prizes were awarded to all samples that could be placed in the four inspection grades... The samples were arranged and graded for the three districts."

"Four hundred and twelve farmers received prizes in addition to certificates of merit. The farmers were also given free passage on the railway from and to their homes, and were also given a big feed at noon with plenty of 'hochu' (kaoliang whiskey) The day was known as 'Farmer's Day.' The prizes consisted of blankets, dishes, towels, etc."



Page 6548. Neg. #46268. "Soja max. Soybean. Kungchuling, Manchuria. Welcome gate made of soybean plants. Entrance to the exhibit hall of the soybean seed fair" [see Neg. #46275].

Neg. #46269. "Soja max. Soybean. Kungchuling, Manchuria. At entrance gate leading to soybean seed exhibit. Mr. Murakoshi at right, W.J. Morse in center, and Prof. Matsushima at left" [see Neg. #42676].

Page 6549. Neg. #46270. "Soja max. Soybean. Kungchuling, Manchuria. Close-up view of some of the seed samples at the soybean fair held at the S.M.Ry. Experiment Station" [see Neg. #46274, 46277 46278].

Neg. #46271. "Soja max. Soybean. Kungchuling, Manchuria. Group of Manchurian farmers receiving their prizes at the S.M.Ry. Experiment Station Soybean Seed Fair."

Page 6550. Neg. #46272. "Soja max. Soybean. Kungchuling, Manchuria. View showing Manchurian farmers with prizes won at the Soybean Seed Fair held at the South Manchurian Railway Experiment Station."

Neg. #46273. "Soja max. Soybean. Kungchuling, Manchuria. Manchurian farmers, winners of first prizes at the soybean seed fair held at the Experiment Station."

Page 6554-6555 (28 Nov. 1930). Kungchuling, Manchuria. "W.J. Morse's notes: Today's fair was for the benefit of the S.M.Ry. workers in the Changchun, Kungchuling and Ssupingkai districts. We had rather a lengthy talk with Mr. Murakoshi who is in charge of the agricultural machinery department regarding culture and harvest of soybeans throughout Manchuria. He stated that at the present price of coolie labor machinery on Manchurian is (?) profitable. Ridged cultivation, he stated, is essential on account of the climatic conditions prevailing in North and South Manchuria.

"Several of the stations exhibits were looked over."

Page 6556. Neg. #46275. "Soja max. Soybean. Kungchuling, Manchuria. Large Welcome Arch at main entrance of S.M.Ry. Exper. Sta. during Soybean Seed Fair. Columns and cross pieces made of soybean plants and welcome sign made of black and yellow soybean seed" [see Neg. #46228].

Neg. #46276. "Soja max. Soybean. Kungchuling, Manchuria. At the entrance gate leading to soybean seed exhibit. Dr. Nakamoto in the center, Mr. Suyetake at the left and one of Dr. Nakamoto's assistants at right" [see Neg. #42669].

Page 6557. Neg. #46277. "Soja max. Soybean. Kungchuling, Manchuria. View of one section of the display of soybean seed samples at the Soybean Seed Fair held at the Exper. Station" [see Neg. #46270, 46274, 46278].

Neg. #46278. "Soja max. Soybean. Kungchuling, Manchuria. At the Dr. Nakamoto, Director of the S.M.Ry. Experiment Station holding first prize seed sample of the Kungchuling District" [see Neg. #42670, 46274, 46277].

Page 6558-6559 (29 Nov. 1930). Kungchuling, Manchuria. "W.J. Morse's notes: About 9:00 a.m. Mr. Kosai and a Chinese assistant called at the inn to take us to visit the storage yards of Chinese grain merchants where considerable quantities of beans were being brought by farmers.

"At the first yard we found great activity along the soybean line. The large yard was filled with carts of beans. Most of the beans were in bags but with some carts the beans were in bulk, matting being used on the sides and bottom of the box and also cover of matting.

"The beans were measured from the carts, placed in bags and then carried and dumped in the Osier bins. Although we have been told that there is little injury to seed from the pod borer in the Kungchuling district we found rater a large per cent of borer injury in the different lots examined.

"Three storage places were visited during the morning and all were quite busy handling cart loads of soybeans. Some kaoliang, mung beans and adsuki beans were also observed but in rather small quantities. At each of the storage places the grain merchants have inn accommodations for the farmers. At all places the merchants gave us samples of seed that had come from different villages. All in all the seed was of rather poor quality, showing lack of proper cleaning and storage.

"At each of the storage places visited there were several guards with rifles... Not long ago a merchant of one of the yards was taken from his quarters in the storage place by bandits and held for $10,000 ransom. After his friends raised the required amount, he was released."

"We left Kungchuling at 7:28 p.m. and arrived at Changchun at 8:30 p.m. where the S.M.Ry. man met us and helped us arrange for our trip to Harbin. After changing our yen into Mex. dollars, we purchased railway and berth tickets, left Changchun at 11:39 p.m."

Neg. #46279. "Soja max. Soybean. Kungchuling, Manchuria. General view showing Osier bins with soybeans and the filling of one of the bins in the storage yard of a Chinese grain merchant."

Page 6560. Neg. #46280. "Soja max. Soybean. Kungchuling, Manchuria. General view in storage yard of a Chinese grain merchant showing carts loaded with soybeans and the Osier bins in which the beans are stored."

Neg. #46281. "Soja max. Soybean. Kungchuling, Manchuria. View in storage yard of Chinese grain merchant. Bins filled and partially filled with soybeans."

Page 6561. Neg. #46282. "Soja max. Soybean. Kungchuling, Manchuria. Showing cart loaded with sacks of soybeans, filled Osier bin on which they are placing a top, and filling a bin in the storage yard of a Chinese grain merchant."

Neg. #46283. "Soja max. Soybean. Kungchuling, Manchuria. Manchurian cart loaded with sacks of soybeans in the storage yards of a Chinese grain merchant."

Page 6562. Neg. #46284. "Soja max. Soybean. Kungchuling, Manchuria. View showing carts loaded with bags of soybeans and the filling of Osier bins in the storage yard of a Chinese grain merchant."

Neg. #46285. "Soja max. Soybean. Kungchuling, Manchuria. Cart loaded with soybeans in the storage yard of a Chinese grain merchant."

Page 6563. Neg. #46286. "Soja max. Soybean. Kungchuling, Manchuria. Close-up view of Manchurian cart filled with soybeans. The beans are brought in bulk by the farmer and matting used for bottom, sides and top."

Neg. #46287. "Soja max. Soybean. Kungchuling, Manchuria. Measuring soybeans from a Manchurian farmer's cart in the storage yard of a Chinese grain merchant."

Page 6564. Neg. #46288. "Soja max. Soybean. Kungchuling, Manchuria. Measuring the soybean seed from a Manchurian farmer's cart in the storage yard of a Chinese grain merchant."

Neg. #46287. "Soja max. Soybean. Kungchuling, Manchuria. Showing the measuring of soybean seed from a Manchurian farmer's cart in the storage yard of a Chinese grain merchant." Address: Agricultural

Explorers, USDA, Washington, DC.

809. Dorsett, P.H. 1930. Re: Bandits in China. Research and departure plans (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. Nov. 19. Unpublished log.
• ***Summary:*** Pages 6476 to 6478. This letter dated Nov. 19 is from P.H. Dorsett in Peiping, China to Mr. J.L. Mahoney, Principal Clerk, Foreign Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC. "Dear Joe:

"Bandits in China are more or less active throughout all parts of the country. Only a couple weeks ago an orderly and another one of the marines from the American Legation were held up on the road a few miles to the north of Peiping and relieved of their cash. Never daunted, however, [Peter] Liu, Ruth and I make a trip through that very region once a week in connection with our investigational work concerning the open air storage of persimmons." One village has between 800,000 and 1,000,000 persimmons for the winter market.

Page 6477. "Morse and family arrived in Peiping October 20th and remained with us until November 9th when they returned to Dairen. I think that Morse was very much interested as well as greatly pleased at what he saw in this region of soybeans and soybean products. He surely is in love with his work and he has become so interested in the soybean activities of Manchuria, especially in the vicinity Dairen, that I do not know when he will be able to pull loose and return to America."

Page 6478. To finish his research on persimmons, Dorsett has "decided to remain in Peiping until sometime in March."

"We think it is probable we can wind up the above work so as to sail on the President Cleveland leaving Shanghai March 13th, due to arrive in San Francisco April 7th." Address: Agricultural Explorer, USDA, Washington, DC.

810. Dorsett, P.H. 1930. Re: Research, money, and departure plans (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. Nov. 20. Unpublished log.
• ***Summary:*** Pages 6488 to 6491. This letter dated Nov. 20 is from P.H. Dorsett in Peiping, China, to Mr. Knowles A. Ryerson, Principal Horticulturist, In Charge Foreign Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC. "Dear Mr. Ryerson:..."

"Morse arrived in Peiping October 20th and I did my best to show him about the country and the interesting things in the city, especially soy beans and bean curd establishments, bean vermicelli, sprouting and washing places. He picked up a lot of interesting facts and data, and saw much of interest and value concerning his research work relative to soybeans and their utilization."

Page 6489. "The Morses, with their Japanese interpreter Mr. Suyetake, who by the way is a mighty nice young fellow and has been of very great assistance to the Expedition, left Peiping November 9th on their return trip to Dairen."

Morse, when here, was not able to say definitely when he would be ready to return home. "His is a most fascinating and interesting problem, and I can well understand that he is extremely anxious to get all the information he possibly can concerning the soybean enterprise in its native home.

Page 6491. "We figure that the present allotment of $5000, for the Peking contingent will be sufficient to cover the additional expenses incurred in this work and return Dorsett to Washington.

"It is feared. however, that the allotment of $5000 for the work of the Manchurian contingent may not be sufficient to enable Morse to round up his research work with soybeans as he would like and return to the States.

"In case additional funds are necessary to enable the Manchurian contingent to wind up its work there in good shape (which perhaps at most will not exceed $1000.) cannot be raised there, please let me know and I will see if I can arrange to help Morse out with sufficient funds to enable him to remain and wind up his foreign investigations as he would like." Address: Agricultural Explorer, USDA, Washington, DC.

811. Dorsett, P.H.; Morse, W.J. 1930. Dr. Yamei Kin 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:*** Pages 6542. This is a letter dated 25 Nov. 1930 from P.H. Dorsett, Agricultural Explorer, Peiping, China, to Miss Ann Carrere, Landscape Architect, 2906 N St., N.W., Washington, DC.

"Dear Miss Carrere:... We regret that your departure from Peiping on Monday the 24th prevents you from coming with Doctor Yamei Kin to see a few of the photographs we have made in Japan and China."

Page 6544 (26 Nov. 1930). Peiping, China. "P.H. Dorsett's notes: After tiffin we got together a number of our pictures to show to Doctor Yamei Kin and some friends she is bringing in with her to see them.

"Promptly at five o'clock Dr. Kin came and brought with her Miss Randall and Dr. Sohtsu King. These good people looked over quite a large number of our pictures and also had tea with us.

"It is our belief that they enjoyed our pictures of vegetables taken in Japan and China as much, if not more, than any of the others they looked over."

Page 6746 (10 Dec. 1930). Peiping, China. "P.H. Dorsett's notes: Dr. Yamei Kin called and brought with her, for us to try, a small jar of native peaches which she canned the past season."

Page 6824 (23 Dec. 1930). Peiping, China. P.H. Dorsett's notes: We are reminded that Christmas is only a couple of days off. Just "before dinner a pan of sacred lilies and a plant of flowering almonds [arrived] both from Dr. Yamei Kin." Address: Agricultural Explorers, USDA, Washington, DC.

812. Dorsett, P.H. 1930. Re: Hoping to meet with Mr. B.W. Skvortzow (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. Nov. 25. Unpublished log.
• ***Summary:*** Pages 6539 to 6540. This letter dated Nov. 25 is from P.H. Dorsett in Peiping, China, to Mr. B.W. Skvortzow, 76 Potshtovoye St., Harbin, Manchuria. "Dear Mr. Skvortzow:"

"A short time ago I received a small bag containing seed of"... from you.

"The change of plans which preventing my getting to Harbin and seeing you and my other good friends I fear have since prevented Mr. W.J. Morse, now in South Manchuria, from visiting Harbin and seeing and conferring with you. I was extremely anxious that you and he 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.

"Again, thanking you for your kind assistance, and trusting that this finds you and your family quite well and happy. I remain with kind regards and best wishes,

"Very truly yours, P.H. Dorsett, Agricultural Explorer, Dorsett & Morse Agricultural Expedition." Address: Agricultural Explorer, USDA, Washington, DC.

813. Dorsett, P.H.; Morse, W.J. 1930. 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:*** Page 6565. Neg. #46290. "Soja max. Soybean. Kungchuling, Manchuria. A typical Manchurian farmer who has just come into the Farmer's Inn yard with a cart load of soybeans."

Neg. #46291. "Soja max. Soybean. Kungchuling, Manchuria. General view showing filling of Osier bins with soybeans in storage yard of Chinese grain merchant." Page 6566. Neg. #46292. "Soja max. Soybean. Kungchuling,

Manchuria. View in the storage yard of a Chinese grain merchant showing Osier bins filled and partly filled with soybeans."

Neg. #46293. "Soja max. Soybean. Kungchuling, Manchuria. View showing an Osier bin filled partially with soybean seed in storage yard of Chinese grain merchant." Page 6567. Neg. #46294. "Soja max. Soybean. Kungchuling, Manchuria. Filling osier bins with soybeans in the storage yard of a Chinese grain merchant."

Neg. #46295. "Soja max. Soybean. Kungchuling, Manchuria. Filling Osier bin with soybeans in the storage yard of Chinese grain merchant." Page 6568. Neg. #46296. "Soja max. Soybean. Kungchuling, Manchuria. Filling an Osier bin with soybeans in storage yard of a Chinese grain merchant."

Neg. #46297. "Soja max. Soybean. Kungchuling, Manchuria. View showing the filling of an Osier bin in the storage yard of Chinese grain merchant." Page 6569. Neg. #46298. "Soja max. Soybean. Kungchuling, Manchuria. Filling an Osier bin with soybeans in the storage yard of a Chinese grain merchant."

Neg. #46299. "Soja max. Soybean. Kungchuling, Manchuria. Filling an Osier bin with soybeans and placing the grass top on another bin in the storage yard of a Chinese grain merchant."

Pages 6570, 6571, 6572, 6573, 6574, 6575, 6576, 6577, 6578, 6579. Panoramic views of the scenes described in the smaller photos just above. The handwritten captions are illegible.

Page 6580-81. This is a letter dated 27 Nov. 1930 from Peter Liu in Shanghai, China, to P.H. Dorsett in Peiping. "I did not see any persimmons in the Shanghai streets, but was told by somebody that Hang Chow is a persimmon region...

"I have already found and bought seven different kinds of beans, cured and cooked in different ways. The natives are so wondered at what I am doing, and sometimes I get a whole bunch of people watching me.

"This evening I will decide who will accompany me to Hang Chow and will leave tomorrow morning at 9 o'clock.

"The soybeans, and adsuki beans are very much larger than we found around Peking. I am sure you will be enjoy to see them, when I take them back. I hope I can do well and have a successful trip.

"With my best regards to your daughter Mrs. R.B. Dorsett., Sincerely yours..."

Page 6582 (30 Nov. 1930). Harbin, Manchuria. "W.J. Morse's notes: Arrived at Harbin at 8:00 a.m. in the midst of a snowstorm which soon cleared up for it was too cold to snow much. We were met at the station by Mr. Kadono of the S.M.Ry. Harbin Office.

"After breakfast, Mr. Kadono gave us some rather interesting information on the soybean situation in North Manchuria. At the present time the bean trade is very dull, much more so than in previous years..."

"The centers of bean collection have shifted from last year. Anda has for many years been the largest collecting center for farmers in North Manchuria. Due to a refusal of a change in freight rates on beans by S.M.Ry., the farmers are carting the beans to Sui-Hua, north of Harbin, and to Nankou north of Tsitsihar [Qiqihar]. From Nankou the beans go to Tsitsihar and down the Mongolian Railway, to Chinese ports and from Sui-Hua to Harbin and then either to Dairen or Vladivostok. Beans that go to Dairen for export must be inspected and graded whereas the beans going to Vladivostok are neither inspected nor graded. Along the Chinese Eastern Railway beans are transported in open cars but upon reaching ChangChur [?]..." Page 6613-6614 (1 Dec. 1930). Harbin, Manchuria. "W.J. Morse's notes: "In the morning we went to the local offices of the S.M.Ry... We were given much valuable data on the trading, storage and transportation of soybeans throughout North Manchuria. About 60 per cent of the soybeans and soybean products in North Manchuria are shipped from Harbin to Dairen over the C.E.Ry. [Chinese Eastern Railway] and the S.M.Ry. for export, and 40 per cent over the C.N.Ry. [?] to Vladivostok, Russia, for export.

"Much complaint has been received from European countries on the poor quality of beans from North Manchuria. This has led the C.E.Ry. to install an inspection service of beans shipped over its lines to Vladivostok. All beans passing over the S.M.Ry. lines to Dairen for export must pass inspection at the point of loading even at points along the C.E.Ry. There is great fear among merchants, farmers, and others concerned in the soybean industry that America will soon produce soybeans for export to European countries and seriously affect the Manchurian soybean industry."

"The soybean oil industry in Harbin is very slow at the present time. In previous years, 43 oil mills would be in operation at this time of year, but at present only three mills are running–two Chinese mills and the Anglo-Chinese Eastern Trading Co. The production of oil throughout Manchuria has been crippled by the large importation of soybeans by European oil mills.

"During the day we tried to get in touch with Prof. B.W. Skvortzow but failed, so late in the afternoon went to his home but found him absent." Address: Agricultural Explorers, USDA, Washington, DC.

814. *USDA Plant Inventory.* 1930. Plant material introduced by the Office of Foreign Plant Introduction, Bureau of Plant Industry, April 1 to June 30, 1929 (Nos. 80019 to 80810). No. 99. 46 p. Nov.

• ***Summary:*** Soybean introductions: *Soja max* (L.) Piper (*Glycine hispida* Maxim.). Fabaceae.

No. 80455-80498. "From Japan. Bulbs and seeds collected by P.H. Dorsett and W.J. Morse, Agricultural Explorers, Bureau of Plant Industry. Received May 27, 1929.

No. 80459-80498 are all soybeans. Six of these PI numbers came to have special significance; all were large-seeded and were introduced in the USA.

"80466. Obtained at Nichigahara [Nishigahara], Tokyo, on April 15. 'Okuro Maru Daizu,' originally from Hokushu [sic], used candied and the product is called 'Mimame' [sic, Nimame].

"80472. No. 38. From the Yamato Seed Co., Takadacho, Tokyo, April 15, 1929. *Chusei O Saya Eda Mame.* A large yellow-seeded variety said to be the largest soybean used for garden purposes and to have a sweet flavor. It is said to be used principally as a green bean, being cooked in the pod. Note: Renamed "Chusei" by 7 March 1936.

"80473. No. 39. From the Yamato Seed Co., Takadacho, Tokyo, April 15, 1929, and originally from the Tokyo district. *Cha Mame.* A large brown-seeded variety, said to be used as a green bean when boiled in the pod. Note: Renamed "Chame" by April 1936.

"80475. No. 41. Obtained from the Yamato Seed Co., Takadacho, Tokyo, April 15, 1929, and originally from the Tokyo district. *Higan mame.* A rather late yellow-seeded variety, said to have white sweet meat and to be used as a green bean, being cooked in the pod. Note: Renamed "Higan" by April 1936.

"80476. No. 32. Obtained from the Imperial Seed Co., Takinogawa, Tokyo, April 15, 1929, and originally from the Tokyo district. *Sousei O Saya Eda Mame.* One of the earliest varieties of garden soybeans with large pods and large yellowish-green seeds. It is said to be very sweet as a green bean, being cooked in the pod. Note: Renamed "Sousei" by April 1936.

"80480. No. 63. From the Tokyo Seed, Plant & Implement Co., Konon, Tokyo, April 19, 1929, and originally from the Saitama Ken. *Gokuwase Daihosan Shinbon Daizu.* One of the earliest varieties with an abundance of pods containing yellow seeds. It is said to be used especially as a green vegetable and is the earliest of the varieties used for that purpose. Note: Renamed "Goku" by April 1936.

"80481. No. 64. From the Tokyo Seed, Plant & Implement Co., Konon, Tokyo, April 19, 1929. *Rokusun Daizu.* Six-inches soybean, meaning that 10 beans equal six inches. A large, flat, yellow-seeded variety used as a green vegetable like the green lima bean." Note: Renamed "Rokusun" by April 1936.

Japanese names of other soybeans in this set, arranged by P.I. Number: *Maru Kuro, Mimame* [*sic, Nimame*], *Wase Eda Mame, Furisode, Tsurunoko, Hira Sata Kuro Daizu, Chusei O Saya Eda Mame, Okuro Maru Daizu, Ao Daizu, Tsurunoko Daizu, Kuro Maru Daizu, Souseikurome O Saya Daizu, Sousei Kuro Sakigake, Shiro Tsubu, Sousei Ao Sakigake, Chusei O Saya Daizu, Shikoku Obbikuri Daizu, Sousei O Saya Daizu, Sato Daizu, Chusei Hattoku Daizu, Bansei Gokudai Tsukimi Daizu, Shin Honen Daizu, Eda Mame Uase Chaurame, Eda Mame Uase Ao Sakigake, Tamba Otsubu Daizu, Eda Mame Uase Kuro Sakigake, Eda Mame Uase Kurome Dzaya* [*Daizu?*], *Daikoku Eda Mame, Tsurunoko Daizu, Otsubu Murinabe, O Tsuba Uase Aoshiro Eda Mame, Yedamame Uase Higanmame, O Tsubu Aojiro Daizu.*

Note: The word "Uase" would now (June 2011) be spelled "Awase," and "Yedamame" would probably be spelled "Edamame." Address: Washington, DC.

815. 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 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.

816. Dorsett, P.H.; Morse, W.J. 1930. 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 6746-6747 (10 Dec. 1930). Dairen, Manchuria. "W.J. Morse's notes: After lunch visited Mr. Saito and Prof. Matsushima of the S.M.Ry. Agriculture Bureau. Mr. Saito recently returned from a several weeks' trip in Japan investigating the use of soybean oil cake and gave use some very interesting data and information on a product that we secured little information (other than for fertilizer) while we were in Japan.

"The imports of Manchurian bean cake are gradually increasing in Japan. The use of the cake was as a feed for cattle, poultry and hogs has increased to a very considerable extent as well as the use for fertilizing purposes. New uses for the oil cake are in the manufacture of certain brands of soy sauce and miso.

"Many Japanese experiment stations with animal husbandry divisions have been using bean cake in feeding experiments cattle, hogs and poultry, especially the latter two. Several private animal concerns have been using bean cake in their feeding rations and have experiments going on for the use of increased amounts of bean cake in the rations. This is especially true of hog and poultry farmers."

Pages 6748-6749. This is a letter dated 10 Dec. 1930 from P.H. Dorsett in Peiping, China, to Mr. T.D. Peyne, Yungchang, Yunnan Province, China.

"Dear Sir: A short time ago Mr. Paul O. Nyhus, Agricultural Commissioner, U.S. Department of Agriculture, Shanghai, China, sent me a copy of your most interesting letter under date of July 30, 1930, addressed to him.

"My son [Jim / James] and I were in China in 1924-26 exploring for plants and Mr. W.J. Morse and I spent almost all of 1929 and three months of 1930 exploring in Japan. Mr. Morse is at present in Dairen, Manchuria..."

"Since the U.S. tariff went into effect in 1930, most of the oil mills are adding 5% corn or kaoliang meal to the soybean meal which then goes into mixed feed. The tariff on mixed feeds is $3. per ton whereas the tariff on soybean oil cake or meal is $6. per ton.

"Contrary to information in old publications on Manchurian soybeans, Dairen oil mills now consider the beans from South Manchuria superior to North Manchurian beans for the production of oil. The Kingan variety grown in the Kaiyuan district is considered the best oil variety. Even the native Manchurian varieties grown in the Kaiyuan district are considered superior to North Manchurian varieties."

Pages 6766-6767. This is a letter dated 11 December 1930 to Dr. David Fairchild, 4013 Douglas St., Coconut Grove, Florida, from P.H. Dorsett, Peiping, China.

"Dear Doctor Fairchild: I have let up from the regular every-day grind for a few minutes, not only to let you know that your two good letters, dated October 6th and 14th, have been received and enjoyed immensely, but also to give you the good news about the Chinese white bark persimmon sent in by Meyer about 1909, as I remember."

Page 6798 (15 Dec. 1930) Dairen, Manchuria. "W.J. Morse's notes: In the morning we went to Chinese Customs to arrange for passing of parcels through Chinese Customs from Dairen to Yokohama. The officer in charge, a Japanese, upon looking over the letter from the American Consul and the contents of the parcels, at once phoned the chief engineer to pass all of our parcels without examination. Although Dairen is a free port for entry, it is not a free port for export as export duties are levied on various articles going out from Dairen through Chinese Customs.

"After lunch we met Mr. Furusawa, manager and one of the directors of the Nisshin Oil Company of Dairen. He had just returned from Europe after a six months tour looking over the soybean oil situation in various European countries. The soybean situation was during the past season and is at present very unusual. This has created a very unusual soybean situation throughout Manchuria, and it is hard to predict just where the Manchurian bean situation will pick up or the effect the unusual conditions will have on the industry."

Page 6801. "Kalgan is the gateway to Mongolia, and we understand, was, some years ago, a much better business city than it is now."

Pages 6802-6803 (16 Dec. 1930). Dairen, Manchuria. W.J. Morse's notes: From our talk with Mr. Takemori it is evident that very close watch is being kept on soybean acreage and production in America. The increased tariff on soybeans and soybean oil cake was a severe blow to the Manchurian soybean situation and has strengthened the belief in Manchuria that America is to become a rival of Manchuria in the soybean trade."

Pages 6804-6805 (17 Dec. 1930). Dairen, Manchuria. "W.J. Morse's notes: In the morning we visited Mr. Saito and Professor Matsushima at the S.M.Ry. It was thought by Mr. Saito that we should look up soybean oil cake utilization in Japan and he said he would write several letters of introduction to experiment stations and private concerns in the Kyoto and Tokyo districts.

"We visited the office of the Soybean Oil and Oil Cake Association where we met the secretary, Mr. T. Nakanishi. The tariff question was brought up first and then the great increase in acreage of soybeans in America. The tariff is looked upon as an indication that America is to become a soybean producing country and will take away much of the European soybean trade from Manchuria."

Pages 6806-6807 (18 Dec. 1930). Dairen, Manchuria. "W.J. Morse's notes: We left at 10:00 a.m. in the morning on the steamer Hongkong Maru for Kobe. At the pier were many officials of the Agricultural Bureau of the South Manchuria Ry. and of the Soybean Oil and Oil Cake Dealers Association to see us off. Mr. Saito of the S.M.Ry. gave us several letters of introduction to experiment stations, private concerns, and the Imperial Department of Agriculture that we might make a study of the utilization of soybean oil cake in Japan. He advised that most of this is in the Tokyo and Kyoto districts and that it would be well worth our while to look over this work. The South Manchuria Ry. is doing considerable work to increase the use of soybean oil cake throughout Japan. It is feared that the American *tariff* and *increased acreage* in America will seriously affect the Manchurian oil cake market and another outlet for the bean oil cake must be found." Address: Agricultural Explorers, USDA, Washington, DC.

817. Dorsett, P.H.; Morse, W.J. 1930. Morse returns to 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 6825 (23 Dec. 1930). En route Kyoto to Tokyo, Japan. "W.J. Morse's notes: We left Kyoto on the 8:21 a.m. express for Tokyo arriving at the Tokyo Station at 4:55 p.m."

Page 6830-6831. This is a letter dated 25 Dec. 1930 from P.H. Dorsett in Peiping, China, to W.J. Morse [probably in Japan]. "I was surprised to learn of your trip to Harbin but glad to learn that you had a good time, saw a lot and got a lot of information and pictures even if you and Mr. Suyetake did almost freeze. I am especially glad that you saw Mr. Skvortzow and feel sure that you found him a most interesting fellow. I had not heard that he had dropped his research with soybeans.

"I note that you say 'I have now completed the movie story of soybeans in Manchuria.' Of course in so far as the actual making of the movie negative is concerned, you are correct, but dear friend please allow me to suggest, that from my experience your trouble and work have just begun."

Page 6832-6833. This is a letter dated 10 Dec. 1930 from W.J. Morse, c/o American Consulate, Dairen, Manchuria, to P.H. Dorsett, c/o Wagons-Lits Hotel, Peking, China. "We made a trip in North Manchuria and spent three days in Harbin (Suyetake and I nearly froze). We covered a lot of ground and saw and collected a nice lot of seed as well as some excellent pictures, both movies and stills. I have now completed the movie story of soybeans in Manchuria. Also secured an abundance of data on soys. Am just at the soybean saturation point and hope to clean up shortly and wend my way back collecting some stuff Mr. Saito put me in touch with after he spent a month of study of investigations in Japan on the utilization of soybeans and oil cake. Saw Prof. Skvortzow and he wished to be remembered to you. He dropped his work on soybeans about 2 years ago."

Page 6844-6845 (26 Dec. 1930). Tokyo, Japan. "Mr. Morse's notes: We went to the office of the S.M.Ry. with a letter from Mr. Sato of the Dairen office to Mr. Ohbuchi, Director of the Tokyo office... Mr. Matsuda stated that Japan imported Manchurian soybean oil cake to the value of about ¥40,000,000 yearly. About 80 per cent of this cake is used for fertilizing purposes and the remaining 20 per cent for cattle and poultry feed, and a small amount for the manufacture of soy sauce and miso.

"For the past two years the S.M.Ry. has encouraged experiments in the greater utilization of soybean oil cake for cattle, hogs and poultry with private concerns and experiment stations. Many such experiments have been carried on in the Tokyo and Chiba districts but as yet no official results have been published. Mr. Matsuda advised he would write up data giving the ratio of the various ways in which soybean cake or meal is now used in Japan and also would put us in touch with animal industry experts who have been conducting extensive feeding tests with this product.

"After lunch we visited the office of the Honen Seiyu Co., Ltd., where we met the general manager, Mr. Shosaburo Ishii to whom we had a letter of introduction from Mr. Sato of Dairen. The Honen Co. is strictly a soybean oil milling concern using the German benzin [benzine] extraction process and has one mill at Dairen, Manchuria, one at Shimizu, Japan, and one at Narue [?] (near Osaka), Japan."

Note: An extensive search of the Web in both English

and Japanese by a native Japanese speaker is unable to find a place named "Narue" (or "Harue" or "Marue") anywhere near Osaka.

"The Honen Mills crush about 1,000 tons of Manchurian daily, producing nearly 8,000,000 sacks (84¼ lbs. per bag) and 3,000 cans of oil (½ gallon each)... Before the 1930 U.S. new tariff much meal was shipped to the United States but none is shipped now. Considerable meal is shipped to England, Denmark and India.

"The Honen Co. has issued several pamphlets giving directions for the use of the oil meal in manufacturing soy sauce and some kinds of miso, and also for the feeding of cattle, hogs, and poultry.

"This company does not allow visitors in any of its mills. While at Dairen we tried to visit their plant near the S.M.Ry. storage yards, but were told that no one was allowed to go through the mill."

Page 6953-6954

Page 7070 (31 Jan. 1931). Tokyo, Japan. "W.J. Morse's notes:... we met Professors Matsuzaki and Honda who gave us much information and some publications concerning wild legumes and grasses in the Japanese Empire. With reference to the wild soybean, both botanists stated that they knew of only one species, *Soja ussuriensis.* They had not found or heard of *S. tomentosa* or *S. gracilis* which Professor Skvortzow of Harbin, Manchuria, said occurred in Manchuria. They are inclined to believe that the two species are varieties of *Soja ussuriensis."*

Page 7138-7139 (9 Feb. 1931). Tokyo, Japan. "W.J. Morse's notes: With reference to species of the wild soybean, Dr. Nakai stated that he knows of only one = Soja (Glycine) ussuriensis. He had never heard of *S. tomentosa* or *S. gracilis* which Prof. Skvortzow of Harbin stated are found in Manchuria. He is rather inclined to believe that such species are varieties or subspecies of Soja ussuriensis." Address: Agricultural Explorers, USDA, Washington, DC.

818. 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 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 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.

819. Morse, W.J. 1930. Hokubei gasshû-koku ni okeru nô- seisan narabini riyô no genkyô [The present situation of soybean production and utilization in the USA]. Tokyo: Daizu Kogyo Kenkyu-kai (Soybean Industry Research Institute). 18 p. Translated by Yoshi Takamori. [Jap]
• ***Summary:*** Based on a lecture by Morse on soybeans in Dairen, Manchuria. Address: USDA, Washington, DC, USA.

820. K. Muroshi, W.J. Morse, and K. Matsushima at soybean seed fair. Kungchuling, Manchuria (Photograph). 1930. Undated.
• ***Summary:*** This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

821. William Morse in Dairen, Manchuria (Photograph). 1930.
• ***Summary:*** See next page. This photo shows Morse holding a large, round soybean oil cake from a Chinese oil mill in Dairen, Manchuria.

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

822. 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).

823. Dorsett, P.H. 1931. Re: Work in Peiping. Returning home (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. 28. Unpublished log.
• ***Summary:*** Pages 7108-7109 (4 Feb. 1931). Letter from Mr. P.H. Dorsett, Peiping, China, to Mr. W.J. Morse, c/o Imperial Hotel, Tokyo, Japan.

Dear Morse: Your letter under date of January 28th reached me on February 2nd and early this morning yours of the 29th same to hand.

"I am just about as busy as I have been at any time since leaving home about two years ago.

"We continue our weekly visit to the persimmon storage yard and continue to get more or less imperfect charts due to one cause or another."

"But even in the face of all this interesting work, I am going to take the time this morning to answer your letters, for more than likely this will be my last letter to you on this side of the Pacific, for I assume from your letter received this morning that you are sailing from Yokohama on February 17th for the good old U.S.A.

"Yes, Mr. Ryerson not only wants us to complete our work within the allotment, but specifically states that this must be done, as there are no additional funds which are to be had for this work, or words to that effect."

"Your comments about your recent experience with white miso are extremely interesting.

O! What a display you will be able to make with soybeans and soybean products when members of the Association [ASA] convene in Washington next year. But you will have to get busy on this almost immediately after your return or you will not be ready with your 'show' and it surely is destined to be *some show!*

"Best wishes from all in Peiping, including Peter Liu, to all in Tokyo, including Mr. Suyetake.

"Very sincerely, P.H. Dorsett.

PHD/rd.

Note: Ruth, Palemon H. Dorsett's daughter-in-law (the widow of Dorsett's son), served as Dorsett's secretary–she typed this letter- and general helper throughout this trip. Address: Agricultural Explorer, USDA, Washington, DC.

824. *Los Angeles Times.* 1931. Why import soy? We can grow this bean to perfection. Jan. 11. p. J6.
• ***Summary:*** This article seems to be based on: Morse, W.J. 1927. "Soy beans: Culture and varieties." *USDA Farmers' Bulletin* No. 1520. 34 p. April. It begins: "Californians are accustomed to thinking of the soy bean as a cover crop. It is interesting to note that in its native land, Manchuria, this use of the soy bean is of small importance." There the soy bean is used mainly as a food product; only the by-products, such as bean cake and straw, are used as fertilizer.

Food products include a paste [jiang], fermented for about 2½ months, soy [sauce], bean curd [tofu], dry bean curd cakes, bean curd wafers, flour, and "milk." The expressed oil is used locally mainly for illumination [in lamps]. The better grades are used for cooking and the poorer grades for lubricating, for making printer's ink and varnish,

and "as a waterproofing material in the manufacture of cloth, paper umbrellas, and lanterns.

The bean cake is used to fatten pigs and cattle. In Japan, the cake is used as a fertilizer for mulberry trees and rice fields. "In Manchuria the cake is crushed and mixed with oil and arsenic and placed on the roots of trees to poison insect pests." This insecticide is used to kill the pests that injure the wild trees where silkworms live.

The soy bean was grown in the United States as early as 1804, but only as a curiosity. In Europe it was mentioned as early as 1790. The soy bean first became known worldwide during the war between Russia and Japan [1904-05]. During the war, the many troops quartered in Manchuria created a large demand for soybeans as food. Local farmers increased their acreage. But after the war they found they had a surplus that was for too great for the demand in the local market or the Orient. The price dropped and a trial shipment was sent to London. The timing was perfect, since English vegetable oil mills were running part time because of a small crop of cottonseed and the failure of linseed in the USA and the Argentine. For the rest of that season, the English mills ran full time on soy beans.

825. Dorsett, P.H.; Morse, W.J. 1931. Morse 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 6953-6954 (14 Jan. 1931). Himeji and Tatsuno, Japan. "W.J. Morse's notes: Left Kyoto at 8:33 A.M. for Himeji and went at once to the Hyogo Animal Industry Experiment Station where we had a letter of introduction from Mr. Sato of the S.M.Ry., Dairen, to Prof. Makino, the director. We found that Prof. Makino was ill in bed with influenza. His assistant, Mr. Onuma, took us in charge and explained the feeding experiments with soybean products.

"The station was established in 1921 and conducts breeding and feeding experiments with dairy and beef cattle and hogs. Soy sauce mash (after the sauce has been pressed out), bean curd mash [okara] and soy bean oil cake have been used in mixed feeds for cattle, hogs and poultry since the founding of the station. The South Manchurian Ry. through Mr. Sato's visit last fall, arranged cooperative experimental work in which larger amounts of soybean oil cake are used. Mr. Onuma kindly gave us the standard feed formulas used at the station for dairy and beef cattle, hogs and poultry. In all of these soybean oil cake has an important place.

"In this section farmers formerly used whole soybeans for cattle and hog feed but now soybean oil cake is wholly used as it is much cheaper. However, about 80% of the soybean oil cake imported in the district is used for fertilizing purposes in the rice paddies. The farmers use soybean [curd] mash [okara] and soybean sauce mash. As there is a section (Tatsuno) nearby where soy sauce is extensively manufactured there is an abundance of mash which sells at the present time for 3 sen per kan. When used for feed much of the salt is removed by soaking the mash which is fed only to hogs and cattle. As roughage, genge (*Astragalus sinensis*) is used as silage.

"Mr. Onuma thought we should visit the Tatsuno soy section as the factories make a light colored sauce quite different from the sauce made in other parts of Japan. He gave us a card of introduction to Mr. Yokoyama, the secretary of the Tatsuno Soy Sauce Manufacturers' Association. This Association consists of sixty factories in the Tatsuno region, all making the light colored sauce. These factories use about 200,000 koku (1,000,000 bushels) of soybeans yearly. Light colored soy sauce is said to have a higher flavor and does not color the food in cooking. It is used most extensively in the Kyoto and Kobe districts and along the shores of the Inland Sea.

"We were taken to one of the largest soy sauce factories (Asahi Shoyu Corp.) by Mr. Shizu Tada, chemist of the Association. The manager of the factory took us through the entire plant which covered a very large acreage. The factory has adopted the latest methods and machinery and at present is enlarging the plant."

Page 7011-7012 (22 Jan. 1931). Chiba, Japan. "W..J. Morse's notes: We left early in the morning for China where the Imperial Dept. of Agriculture's Animal Industry farm is located. We had letters of introduction to the director. Dr. Kimura, from Mr. Sato, S.M.Ry. Dairen and Mr. Matsuda, S.M.Ry. Tokyo.

"The Animal Industry farm. known officially as the 'Zootechnical Experimental Farm' is located on the outskirts of Chiba and has about 65 hectares of land. It is a similar institution to the U.S. Dept. of Agriculture Animal Industry Farm at Beltsville, Maryland. The station has well equipped laboratories for chemistry, dairy and meat products, forage crops, and also some up-to-date dairy and cattle barns and poultry houses. Experimental work is carried on with dairy and beef cattle, hogs, rabbits, poultry and bees.

"In the dairy cattle work, Holsteins are used and some very high grade stock for breeding has been imported from the U.S. Soybean oil meal to the content of 20% is used in the standard dairy mash, Up to the present year, corn-soybean silage was used–80% corn and 20% soybeans. The growing of silage crops was discontinued because of insufficient land. In the dairy products line, experiments are being conducted with butter, cheese, milk powder, condensed milk, milk casein and even soy sauce. Milk casein and soy sauce are made from skimmed milk.

"With hogs, the Middle White Yorkshire breed is chiefly used although some work is being done with the Berkshire,

Du Roc [Duroc] and Poland China breeds. About 5% soybean oil meal is used in the standard hog mash.

"The station is doing a very considerable amount of work with poultry. Soybean oil meal with minerals in the standard mash has given more economical results and better quality eggs than fish meal. A large number of experiments are being run with soybean oil meal for egg and flesh production.

"Several breeds of rabbits or hares from European countries, America, Japan and New Zealand are being bred and fed for fur and flesh production. Soybean oil meal and soybean curd mash [okara] are used in some of the feeding experiments.

"In feeding experiments with hogs, poultry, dairy and beef cattle, and rabbits, soybean meal, soybean curd mash, and soy sauce mash are used in varying amounts in comparison with fish meal. Soy sauce mash is used only in hog and cattle feeding work.

"We were given several publications containing results of feeding tests in which soybean oil meal, soybean curd mash, soybean hay, and soy-corn silage were used."

Pages 7106-7107 (4 Feb. 1931). "W.J. Morse's notes: We called on Dr. Ryoji Iwajumi, Chief of the Animal Husbandry Department of the Tokyo Imperial College of Agriculture, to whom we had a letter of introduction from Mr. Sato, S.M.Ry., Dairen, Manchuria. Dr. Iwazumi is held the best authority on forage and feeding experiments of Japan. During the past season he visited the U.S. Dept. of Agriculture and several of the state experiment stations to study animal industry problems. especially dairy and beef cattle.

"At present soybean seed is used in many sections of Japan as feed for horses and work cattle. The beans are always soaked first. Experiments comparing soaked beans and cooked beans indicate no advantage in cooking. More farmers are beginning to use the [soy] bean oil cake or meal in place of beans. As high as 20% of soybean oil meal can be used in mixed feeds with safety but usually 5-10% of the bean oil meal is used in mixed feeds for hogs, poultry, and dairy and beef cattle.

"Dr. Iwazumi stated that the present forage resources will be sufficient to take care of the increase of beef and dairy cattle for several years at the present rate of increase. As forage, mostly wild grasses and legumes (especially Kudzu) are used. In sections where genge clover is grown in the rice paddies for green manure, the top of the clover is cut and used for forage. No soybean hay is used.

"No experiments have been made and there is no practical experience to go by in the matter of the hardness of pork in feeding soybeans or soybean oil meal. Dr. Iwazumi stated that Japanese farmers never feed soybeans to hogs, bean oil meal being used only in mixed feeds for hogs.

"We were given publications showing the production of various grains in Japan that can be used for animal feeding and the per cent of each and its products such as bran that is used for animal feed."

Page 7070 (31 Jan. 1931). Tokyo, Japan. "W.J. Morse's notes:... we met Professors Matsuzaki and Honda who gave us much information and some publications concerning wild legumes and grasses in the Japanese Empire. With reference to the wild soybean, both botanists stated that they knew of only one species, *Soja ussuriensis.* They had not found or heard of *S. tomentosa* or *S. gracilis* which Professor Skvortzow of Harbin, Manchuria, said occurred in Manchuria. They are inclined to believe that the two species are varieties of *Soja ussuriensis."*

Page 7138-7139 (9 Feb. 1931). Tokyo, Japan. "W.J. Morse's notes: With reference to species of the wild soybean, Dr. Nakai stated that he knows of only one = Soja (Glycine) ussuriensis. He had never heard of *S. tomentosa* or *S. gracilis* which Prof. Skvortzow of Harbin stated are found in Manchuria. He is rather inclined to believe that such species are varieties or subspecies of Soja ussuriensis." Address: Agricultural Explorers, USDA, Washington, DC.

826. Morse, W.J. 1931. Visit to Kyuemon Hayakawa Miso Co. in Okazaki, Japan, and soybean oil meal feeding experiments (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. See p. 6997-7000. Unpublished log.

• ***Summary:*** W.J. Morse took notes and photos of his visit to Okazaki on 16 Jan. 1931. He was told by an innkeeper in Okazaki that there are "two factories in Okazaki making the famous Okazaki black miso... We found the Kyuemon Hayakawa Miso Co. factory about 3 miles from the inn. The master of the factory took us through the plant and explained each step of manufacture. Okazaki miso is made entirely from soybeans while other forms of miso are made from rice and soybeans. It takes twenty months to cure black miso. This company sells about 50,000 kan yearly.

"Okazaki miso keeps indefinitely and is used in making soups and preserving vegetables. At breakfast at the inn this morning we had black miso soup and found it had a much better flavor than red miso soup. The black miso is also sometimes used in making forms of soy sauce [tamari] by adding water.

"After our visit too the miso factory we went to Ango where the main agricultural experiment station of the Aichi Prefecture is located. We met the director, Mr. Shinto Kanai, to whom we had a letter of introduction from Mr. Sato, S.M.Ry. [South Manchurian Railway], Dairen. The work carried on by this station consists of animal husbandry (mostly poultry and hogs), horticulture, chemistry and soils, and rice breeding.

"The station has used soybean oil cake in feeding experiments with cattle, hogs and poultry about ten years. For five years it has cooperated with the S.M.Ry. in soybean oil cake feeding experiments. At the present time quite a lot of work is being done in soybean oil cake feeding experiments with poultry.

"Aichi Prefecture is one of the leading poultry sections of Japan. In Japan there are 46,000,000 head of poultry, of which 6,000,000 are in the Aichi Prefecture. Poultry feed consumed in this prefecture amounts to Yen 18,000,000 yearly, of which nearly 40 per cent is produced locally. About Yen 8,000,000 of soybean oil cake is used in the prefecture but largely for rice paddy fertilizer. However the use of the cake for cattle and poultry feed is increasing rapidly.

"The station is doing no work with soybeans [edamamé] with are grown only on the edges of the rice paddies by the farmers. The crop is raised for seed which is used in the home manufacture of miso, soy sauce and bean curd. Several varieties are grown by the farmers and Mr. Kanai said he would collect some and send us."

Page 6999: "Negative #46448. Soja max. soybean miso (Black) Okazaki, Japan. Okazaki black miso made wholly from soybeans curing in the large wooden casks or tubs. The material cures in these casks or tubs twenty months before it is ready for use." The cask is held together by many wide braided bamboo hoops. The cask is several feet taller than the miso maker (wearing an apron with a crest symbol or *mon* on the front) standing next to it. The top of each cask is piled high with about 1,200 pounds of stones to weight the miso.

Page 7000. "Negative #46449. Soja max. Black soybean miso curing in casks, Okazaki, Japan, January 16, 1931, D&M.

"Negative #46450. Soja max. Black miso curing in wooden containers at Okazaki, Japan, Jan. 16, 1931, D&M. Okazaki back miso is made wholly from soybeans and cured in large wooden containers as shown here and in the two previous pictures. Black miso is used in soups, and in preserving vegetables. 1200 pounds of stones are used to weight the miso material."

Page 7002 (Sat., 17 Jan. 1931). Tokyo, Japan. "W.J. Morse's notes: On our way to the S.M.Ry. office we stopped at the Dollar Steamship Line Office to see about reservations for San Francisco.

At the S.M.Ry. office, Mr. Matsuda, agricultural engineer, advised that a special conference on soybean oil cake feeding experiments was to be held the coming Wednesday at the Hog Breeding Farm at Tachikawa. He thought it would be well worth our while to collect data on the experiments to be seen and discussed. It was stated that many of the experiments in which excessive amounts of soybean oil cake were used had not turned out very well. We were given some more publications relating to the results obtained in feeding soybean oil cake, soybean curd mash [okara] and soy sauce mash to cattle, hogs, and poultry."

Page 7005-7006 (20 Jan. 1931), Tokyo and Tachikawa, Japan. "W.J. Morse's notes: We called at the S.M.Ry. Office where we met Mr. Matsuda and some other men who were going to visit the Hog Breeding Farm at Tachikawa. Arriving at the farm we were met by the director who first gave us the results of the soybean oil cake feeding experiments up to the present time.

"Four series of feeding experiments with hogs and pigs are being run, using different percentages of boiled rice, barley and soybean oil meal in the standard feeding mash. With young pigs the different variations of mash are given in addition to the mother's milk. With young pigs the feeding experiments were started when the pigs were two (2) days old.

"From 3-5 weeks the young pigs fed mash with the 40% soybean oil meal made very rapid gains but then began to develop serious stomach trouble (is it any wonder with a 40% bean cake feed?). After four to five weeks all of the pigs had died which were on the 40% bean cake meal feed. Knowing the high content of protein (44-46%) of soybean oil meal, it seems rather a drastic move on the part of the experimenters to start 2-day old pigs on mash containing nearly one-half highly nitrogenous feed.

"In the standard mash used by the station rice bran, barley bran, wheat bran, corn meal, soybean oil meal, fish meal, salt, and calcium carbonate are used. The analysis of this feed is as follows:

"Standard Hog Mash.
"Moisture 10.26%
"Protein 17.13%
"Fat 8.79%
"Carbohydrates 43.60%
"Fiber 7.24%
"Nutritive Ratio 1:5.16"

Page 7007-7008 (21 Jan. 1931) Tokyo, Japan. "W.J. Morse's notes: We visited the Institute of Physical and Chemical Research where we met Dr. U. Suzuki, Prof. of Biological Chemistry at the Tokyo Imperial University and Chief Chemist at the Institute of Physical and Chemical Research, to whom we had a letter of introduction from Mr. Sato, S.M.Ry. Dairen.

"The S.M.Ry. Bureau of Agriculture has a special cooperative relationship with the Chemical Division of the Institute through which Dr. Suzuki is making a thorough study of the utilization of the soybean and its products. The S.M.Ry. is especially anxious to increase the use of soybean oil cake in Japan other than for fertilizing purposes.

"In his work, Dr. Suzuki has been especially interested in the foods of the Japanese people. Next to rice the soybean is the most important food. Ninety-seven per cent of the food of Japanese people is vegetable, two percent marine products, and one per cent meat. Of the vegetables, 12 per cent in protein and 85 per cent carbohydrates, an extremely

wide nutritive ratio. Much of the vegetable protein is supplied by beans, especially the soybean.

"Dr. Suzuki has done much experimental work in the use of soy flour from extraction process bean cake or meal. Much of the work has been done in cooperation with Tokyo bakeries. The bakers have not been successful in making a good bread containing more than 20 per cent soybean flour and 80 per cent wheat flour.

"With reference to Soyamint, Dr. Suzuki advised that this is a soy sauce substitute–one-half chemical and one-half fermentation. We were given considerable data on other soybean products and also publications."

Page 7030-7031 (17 Jan. 1931, Tokyo). In a letter to Dorsett in Peiping, China, Morse comments on the two factories making black miso in Okazaki.

Page 7053 (27 Jan. 1931). Morse notes in a cover letter accompanying two parcels sent from the American Consulate in Tokyo to Mr. K.A. Ryerson, Foreign Plants, B.P.I. [Bureau of Plant Industry], Washington, DC: "Of the products the most interesting is the famous Okazaki Black Miso under [product] numbers 6670 and 6671 which were obtained on a recent trip to Okazaki to learn the process of manufacture. This form of miso is the only one made wholly from soybeans as other forms are made with soybeans and rice. Black miso has been made at the same factory for about three hundred years and no improvements have been made in the methods of manufacture." Address: Agricultural Explorers, USDA, Washington, DC.

827. Dorsett, P.H.; Morse, W.J. 1931. Re: Death of Charlie Lee (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. 22. Unpublished log.
• ***Summary:*** Pages 7218 to 7219. This is a letter dated 22 Jan. 1931 from J.L. Mahoney, Principal Clerk, Foreign Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC, to P.H. Dorsett, c/o U.S. Legation, Peiping, China.

"You will, I know, be very sorry to learn of the death of Charlie Lee, which occurred January 14. You will, of course, remember Charlie who was Morse's right hand man in Forage Crops and was carrying on all his soy bean work [at Arlington Farm, Virginia] during his absence. Without question he will be missed very much by Mr. Morse on his return." Address: Agricultural Explorers, USDA, Washington, DC.

828. Morse, W.J. 1931. Re: Money. Returning home (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. 28. Unpublished log.
• ***Summary:*** Pages 7112 and 7113 (28 Jan. 1931). Letter from Mr. W.J. Morse, c/o American Consulate, Tokyo, Japan to Mr. P.H. Dorsett, c/o U.S. Legation, Peiping, China.

"I have gone over the expenses thus far and figured what it would take to get me home and I figure roughly that it will cost about $1000 more than I was assigned... I owe much to Mr. Sato of Dairen for assistance in this work for if I had left Dairen immediately for the U.S., as I thought I would do, I would have missed a very important part of the soybean work though it has been rather nerve-racking in collecting the data."

Page 7113: "When I think of the amount of soybean data I have to assemble, I almost get cold feet for I recall what work it takes to write a small bulletin and here are two years' data to assemble.

"In your letter to Ryerson, a copy of which you sent to me, you state you desire to have the glory, etc., accorded to the first return. If that is your idea, I am going to hide somewhere along my journey home and wait until you are in Washington [DC] and then return. Glory, honor, etc., have not been in my mind for all I ask is to settle down with my soybean and other legume work and work quietly and in peace. Others can have the glory, but give me simply soybeans."

Mrs. Morse reminds her husband to thank Mr. Dorsett for the clippings he has sent from time to time.

"In Ryerson's letter I notice he advises you not to throw rocks at St. Peter's gates... I think in the spring, Dorsett, you threw [roasted] soybeans [mame-maki] and St. Peter didn't hear you or thought it was hailing."

"We trust this finds you all well and with best wishes from all to all, I am

"Very truly yours,..." Address: Agricultural Explorer, USDA, Washington, DC.

829. Dorsett, P.H.; Morse, W.J. 1931. Soybean cultivation 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 7062 (29 Jan. 1931). "Genge clover is grown as a winter crop on the rice paddies while the soybean is grown as a summer crop in the uplands and also in the rice paddies in certain sections.

"The acreage of genge clover occupies about 65 per cent of the total area of all green manure crops in Japan."

"Soybeans are planted in May between rows of wheat or barley when the wheat or barley are just heading. When the bean plants are in bloom, they are turned under [as green manure], generally the middle part of June." Address:

Agricultural Explorers, USDA, Washington, DC.

830. William Morse examining four wooden boxes of Okazaki miso [Hatcho miso] at Hayakawa Kyuemon Shoten in Okazaki, Japan, 16 Jan. 1931 (Photograph). 1931.
• ***Summary:*** This 6½ by 8½ inch black-and-white photo has been dated from the log of the Dorsett-Morse Expedition (p. 6997). There are three rectangular wooden boxes and one round wooden box. Three of the four are closed and on the front of each is an illustration showing a man with a raised sword on a bridge in Japan; a young boy is at his feet. On one pillar of the bridge is written in large Japanese characters "Yahagi Hashi," since the Yahagi River flows underneath it.

Note 1. According to *The Book of Miso* (Shurtleff & Aoyagi, 1976, p. 219): "A Kabuki drama tells of how Hideyoshi Toyotomi (1536-1598), the child of poor farmers in central Japan's Aichi prefecture, rose to become one of Japan's most powerful feudal lords. When only ten years old, the child is said to have fallen asleep one night on a bridge near his home, wrapped only in a straw mat. A famous robber passing over the bridge scornfully kicked the urchin, who awoke and intrepidly grabbed the man's spear commanding him to stop such cruelty. The robber, impressed with the boy's courage, decided to raise him as his own son. In the play, the straw mat bears the trademark of one of the nearby Hatcho miso shops where it was used to prepare koji. Historians cite the incident to prove that Hatcho miso was being made as early as 1546." On one pillar of the bridge is written in large Japanese characters "Yahagi Hashi."

Note 2. No trademark can be seen on the straw mat on the front of the Hatcho miso boxes in this photo. Perhaps the story was created after 1931.

831. Dorsett, P.H.; Morse, W.J. 1931. Roasted soybeans and bean-scattering ceremonies in Tokyo (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:*** See page after next. Page 7104-7105 (3 Feb. 1931). Tokyo. W.J. Morse's notes: "The section about Shinagawa was visited to look up products of soybeans. We succeeded in rounding up three new products, two from soybean flour and one soybean candy. In addition we succeeded in collecting several fancy colored posters put out by street car companies and railroads announcing bean scattering ceremonies at several big shrines in Tokyo, Nikko and some nearby places. If all the homes, temples and shrines celebrate this day, throughout Japan, the amount of soybeans must run into a considerable item."

A sample color leaflet (vermillion, light blue and dark blue), with blue Japanese characters, is inserted. An illustration (line drawing) shows a man scattering soybeans with his right hand from a small tray held in his left hand, two stations on a street car line (Narita on the left, Oshigami on the right), and the face of Okame, a symbol of fun and happiness. This "specially chosen / famous man" (*toshi otoko*) is wearing the only traditional clothing suited for the occasion: A wide-sleeved *kamishimo* on top and a man's formal divided skirt called a *hakama* on the bottom. Shadowy red devils run away. An illustration of street car line is shown.

The text of the leaflet, an ad printed by the railroad line, reads: Feb. 4. Setsubun get-together. The No. 1 place in the greater Tokyo area for scattering soybeans (*mame-maki*) is Narita Mountain. A train will leave from Oshigami station to Narita station every 15 minutes all night long. The number of connecting trains has been increased for the occasion. For more information, contact the person in charge of customer relations at Keisei Railway's Oshigami branch office at Sumida 3005. Fast. Cheap. No waiting. 86 sen one way.

Page 7129 (7 Feb. 1931). Tokyo. "During the day we visited the Shiba district and found several stores dealing in beans and bean products. For the most part the soybean products were roasted beans, sugared roasted beans, roasted soybeans in cakes and candies and roasted soybeans in balls of baked rice dough. The greenish yellow variety was used, the beans being soaked until fully swollen before being roasted." Two photos (p. 7130) related to Setsubun, show: "A small bundle of dry soybean straw or stems and holly-like plant branches above a door of a home. To a stem of the soybeans is attached a fish head. This is used to keep out the devils which were chased from the home on the night of "Mame Maki" bean scattering night. Parched soybeans were scattered about to chase devils out of the house." The second photo includes Mr. Suyetake–their Japanese interpreter. Address: Agricultural Explorers, USDA, Washington, DC.

832. Dorsett, P.H.; Morse, W.J. 1931. Morse in Tokyo, Japan. Dorsett 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 7127 (6 Feb. 1931, Tokyo). Morse's notes: "Another Washington February day with snow added during the morning. We again worked on extracting data on soybeans from Japanese publications. We have found much valuable data on this crop in Japanese publications. It is evident that a large amount of very good soybean data is locked in Japanese publications of Manchuria and Japan."

Page 7128 (7 Feb. 1931, Peiping). Dorsett's notes: "We worked on reports and official correspondence. At 10:30 a.m. Dorsett went to the dentist. At 11:00 he was at the bank


三州名産
八丁味噌
早川久右エ門商店


節分會
二月四日
關東一の
成田山豆まき
當日は押上成田間
十五分毎に終夜連結車
增發運轉いたします
本所押上
京成電車
旅客係電話墨田三、〇〇五
早くて 安くて 待たずに乗れる
押上
成田
片道 八十六錢

getting a draft on N.Y. [New York] to pay for some seed.

"We packed two parcels today. When things have been sewed up and addressed we will have six to go to the American Legation next Wednesday to be included in the diplomatic pouch for Washington.

"It has been sunshiny and bright today but rather cold after tiffin [a light lunch].

We took a number of pictures to have mounted and then went to a stationery shop to get some supplies.

"Between 4 and 5 o'clock we weighed and calipered four lots of persimmons, ten persimmons to the lot."

Page 7128 (7 Feb. 1931, Tokyo). Morse's notes: "We received today from Mr. Aso of the bacteriology department of the Tokyo Imperial College of Agriculture the following material consisting of two tubes each of five strains of pure culture of *Astragalus sinicus* and five strains of pure culture of *Soja max."*

Two tables show how the tubes were numbered for shipment. Address: Agricultural Explorers, USDA, Washington, DC.

833. Dorsett, P.H. 1931. Re: The real work. Some advice. Congratulations (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. 7. Unpublished log.
• ***Summary:*** Page 7132 to 7133 (7 Feb. 1931). Peiping, China. Letter from Dorsett to Morse, c/o Imperial Hotel, Tokyo, Japan. "Many thanks for the letter of January 31st... Shortly after this, the real work of gleaning the grain from the chaff and preparing it for use begins.

"By the time we get back it will be... just two years, lacking a day, from the time you left Washington [DC] for the Orient until you leave the Orient on your return home.

"In the past two years we have seen much, learned a lot, accumulated much interesting and valuable data, and made many pictures. I gamble, dear fellow and friend, that it has been the most interesting, greatest and grandest two years of your life.

"Please, Morse, listen to one who has been through the experience and do not continue the pace until you board the ship."

"You have done a wonderfully nice piece of work, Morse, and I congratulate you most heartily on the results of your efforts. And remember, if I can help you here, or in any way in Washington after our return, call on me and I will be delighted to do what I can."

"We wish you all a delightful ocean voyage, a pleasant visit with the Oakleys and a safe and pleasant trip across country back to Washington and Home in Takoma Park. With sincere good wishes from all to all, as always. Sincerely yours..."

Note: During the expedition a strong friendship and deep mutual respect grew up between Morse and Dorsett, 22 years his senior. Address: Agricultural Explorer, USDA, Washington, DC.

834. 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.

835. 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. 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.

836. Dorsett, P.H. 1931. Re: Outline for an "Agricultural Report on 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. Feb. 23. Unpublished log.
• ***Summary:*** Pages 7228 to 7230. This letter Feb. 23 is from P.H. Dorsett in Peiping, China to Mr. W.J. Morse, Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

"Dear Morse: When we came up from breakfast this morning we were handed your 'Sayonara' letter from Japan [written on Feb. 16 from Tokyo]. It sure is a great one, and is most heartily appreciated."

"Your tentative outline for an 'Agricultural Report on Manchuria' is very broad and exceedingly complete, but a lot of work will be required to whip it into shape. However, when completed it will be most interesting and no doubt very valuable."

"My dear good friend, I hardly know how to begin or what to say to you on account of the death of Lee [Charlie Lee], your friend and trusted assistant for so many years... a trusted, honored and able assistant in your life's work.

"Be brave and bear the shock and loss as the man I am sure you will prove yourself to be under this almost breaking load of sorrow, and in the end all will be well." Address: Agricultural Explorer, USDA, Washington, DC.

837. Dorsett, P.H. 1931. Re: Departure from Peiping, China. Overview of trip and of Morse (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 3. Unpublished log.
• ***Summary:*** Pages 7272 to 7273. This letter dated March 3 is from P.H. Dorsett in Peiping, China, to Mr. Knowles A. Ryerson, Principal Horticulturist in Charge, Foreign Plant Introduction, Bureau of Plant Industry, USDA, Washington, DC. "Dear Mr. Ryerson:..."

"We are pleased to note that you have enough soybean samples [introductions] to tangle up the feet of every farmer from one end of this country to the other. It is a great crop and it is destined to perhaps become one of the leading, if not the leading, commercial farm crops throughout the United States.

"You are to be congratulated, we feel, on having sent the Department's expert on soybeans, Mr. W.J. Morse, to the home of the soybean to secure data, photographs, etc., of this crop in the Orient before it becomes of major importance in the States. Mr. Morse, I feel sure, on account of this trip, will stand head and shoulders above, not only any one specializing in this crop in the United States, but also in the world. The knowledge and experience that he has gained in the Orient during the past two years will stand him well in hand in connection with the triumphant march of this new introduced crop into the United States."

"With best wishes, I remain, Sincerely..." Address: Agricultural Explorer, USDA, Washington, DC.

838. 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.

839. United States Department of Agriculture (USDA), 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 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.

840. *Miami News* (*The*) (*Miami, Florida*). 1931. Oriental soybean drives out devil. April 5. p. 30.

• ***Summary:*** A soybean from Manchuria is especially noted for its ability to drive out devils at religious festivals. This could supply Miami's churches with a "preacher revival substitute."

The devil ousting soybean was brought to the U.S. by a frequent visitor to Miami, William J. Morse, who has just returned from a trip to Japan, Korea and the steppes of Manchuria. He brought with him 4,000 lots of seeds which he collected; of these 300 [sic] kinds were soybeans.

Oil manufacturers prefer a soybean with high oil content. Pork packers discriminate against pork fed on such beans since it becomes too soft. For such uses, Mr. Morse obtained beans with an extremely low oil content; the oil range is 14% to 22%.

841. *Official Record of the U.S. Dept. of Agriculture* (*The*). 1931. Plant explorer brings back new soybean varieties from Orient. 10(15):113. April 11.

• ***Summary:*** The content of this article is identical to that of USDA's press release of March 28. However, a photo shows William J. Morse "with some of the soybean products he obtained in the Far East." Morse was looking at four boxes of Hatcho miso, one of which was open.

842. Weller, Frank I. 1931. May replace wheat. *News-Palladium* (*Benton Harbor, Michigan*). April 23. p. 10.

• ***Summary:*** A large photo shows William Morse holding a rectangular box of miso, with four other boxes of miso below it on a table. The caption: "William J. Morse, plant explorer, has brought back to the United States new type soybeans from the Orient which may prove substitutes for wheat. He is shown examining samples of 'miso,' soybean ingredient of Japanese soup. At upper left is shown a Manchurian 'cartwheel,' a soybean meal cake fed to livestock."

Morse has brought back 4,000 lots of new soybean seeds. For two years he roamed Japan, Korea, and Manchuria. "His business was to find soybeans which would grow in any soil and under any climate in the United States and be better suited to the manufacture of the plant's some 100 different products."

It is possible, Morse says, that somewhere in this new collection of soybean seeds, "tests may reveal varieties which not only may grow to perfection in any wheat region but also become the foundation for development of new commercial enterprises."

Note: This article, titled "Soybeans might lead to cut in wheat crop," also appears in The Ogden Standard-Examiner (Ogden, Utah; 14 June 1931, p. 20).

Under the title "New soybean from Orient tested for use as wheat substitute," it also appeared in The Evening Journal (Wilmington, Delaware; 30 April 1931, p. 23). Address: Associated Press Farm Editor.

843. *Newark Evening News.* 1931. Explores China for food seeds, finds wide value in soya bean. April 29.
• ***Summary:*** Contents: Introduction (about P.H. Dorsett and W.J. Morse). Soya beans as United States crop. Produce milk and flour. Oriental persimmon. Address: Special Correspondence.

844. *USDA Plant Inventory.* 1931. Plant material introduced by the Office of Foreign Plant Introduction, Bureau of Plant Industry, July 1 to Sept. 30, 1929 (Nos. 80811 to 81619). No. 100. 44 p. April.
• ***Summary:*** Soybean introductions: *Soja max* (L.) Piper (*Glycine hispida* Maxim.). Fabaceae.

No. 81008-81051. "From Japan. Bulbs and seeds collected by P.H. Dorsett and W.J. Morse, Agricultural Explorers, Bureau of Plant Industry. Received July 2, 1929.

No. 81021-81045 are all soybeans. Three of these PI numbers came to have special significance; all were large-seeded.

"81029. No. 271. From the Yamato Seed Co. *Chuseikurome daizu.* A middle-season, black-eyed soybean used as a green vegetable."

"81031. No. 274. From the Yamato Seed Co. *Banseiosayada mame.* A large-podded late variety used as a green vegetable." Note: Renamed Bansei by March 1936.

"81042. No. 299. From the Sapporo Engei & Co. *Kurakake daizu* (saddle soybean). Used as a green vegetable." Renamed Kura by April 1936. Address: Washington, DC.

845. Horvath, A.A. 1931. The soy bean as human food. *Industrial and Engineering Chemistry, News Edition* 9(9):136. May 10.
• ***Summary:*** Contents: Historical background. Properties and uses. Growing interest in soy bean preparations in different countries. Soya foundation proposed.

This article begins: "The soy bean is a plant of early cultivation in China. Its use dates back to the beginning of China's agricultural age under the Emperor Shen Nung. It is mentioned in the *Ben Tsao Gang Mu,* the ancient 'Materia Medica' written in the year 2838 B.C. This bean is remarkable for its richness in oil (average 20 per cent), protein (average 40 per cent), and ash (average 5.5 per cent), and the almost complete absence of starch.

"Since time immemorial the soy bean has been the most universal article in the Chinese dietary. It is also extensively used for food in Korea, Japan, Indo-China, the Philippine Islands, the Dutch Indies, Siam, and India. The Chinese make practically no use of dairy products, and the bulk of the people consume a very meagre 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 soy bean."

"Soy bean milk has been extensively used throughout the Orient since its discovery by the Chinese philosopher Whai Nain Tze long before the Christian era. This milk does not coagulate on boiling, but acids and rennet produce a curd-like precipitate. According to Fisher, soy bean milk gives a much finer flocculent precipitate in the stomach than cow's milk. Its period of stay in the stomach is shorter. Its ingestion results in a feebler secretion of gastric juice; the period of secretion is also shorter. The peristaltic motion of the stomach is less after the ingestion of soy bean milk and more coordinated than in the case of cow's milk.

"If soy bean milk is boiled with a solution containing magnesium chloride or calcium sulfate its proteins are precipitated. The cheese-like product obtained by pressing this precipitate is generally known as bean curd and is called in China 'tofu.' If fresh, it contains approximately 8 per cent of protein and 3 per cent of fat, and is digested, according to Oshima, to an extent of over 95 per cent. Fried tofu resembles beef in its content of protein and fat, and is called in China "the meat without the bones."

"In the Orient tofu forms a very popular and almost indispensable dietary article." Also discusses: Miso, chiang, Worcestershire sauce ("liquid soy sauce... when spiced, is sold under the label 'Worcestershire sauce.'"), W.J. Morse of the USDA, soy bean foods in Europe, Prof. Berczeller, and work at the Physiological Institute of the University of Vienna under Prof. Durig and Dr. Wastl.

"In Russia, the soy bean is fondly called 'our young revolutionary Chinese ally.' 'Plant soy beans and you plant

meat, milk, egg omelets,' is the newspaper cry. Efforts have been made all year to introduce soy bean dishes to restaurants and homes. A Soy Institute was recently organized in Moscow, as well as a special exhibition of soy foods at which 130 varieties of soy dishes, including cutlets, pastry, salads, candy, and beef, were shown. A dinner, prepared entirely of soy beans, was served to representatives of trade unions, factories, Red Army, and the Soviet press. The food was unanimously declared excellent...

"Soya foundation proposed: There are reasons to expect that the United States will become the leader in introducing the soy bean in the daily diet of the white race. An important step should be the establishment of a soya foundation in order to promote the creation of a national soya food research institute." Address: Health Section, Bureau of Mines, Pittsburg, Pennsylvania.

846. *Lowville Journal and Republican* (*Lewis County, New York*). 1931. A 48th wedding anniversary. May 21.
• ***Summary:*** "A pleasant surprise was given Mr. and Mrs. John B. Morse, formerly of Lowville, at their home in Washington, D.C., on the occasion of the 48th anniversary of their marriage, May 9th. Eight tables of bridge were played, after which a covered dish supper was served. Mr. and Mrs. Morse were presented with a purse of gold by the guests."

847. *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.

848. Associated Press (AP). 1931. W.V. [sic, W.J.] Morse new head of soybean association. *Washington Post.* Aug. 19. p. 3.
• ***Summary:*** Columbia, Missouri, Aug. 18–W.J. Morse, director of soybean investigations for the U.S. Department of Agriculture at Washington, D.C., "was elected president of the American Soybean Association at its convention here today. The Arlington experiment fields at Washington [DC, actually Virginia] were chosen for the next convention.

"R.D. Hughes, of Iowa State College, Ames, Iowa, was named vice president, and J.S. Parks, Ohio State University, Columbus, Ohio, was named secretary and treasurer."

849. *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.

850. *Lowville Journal and Republican* (*Lewis County, New York*). 1931. Ten, twenty-five and forty-five years ago: November 4, 1886. May 5.
• ***Summary:*** "John B. Morse has sold his meat market business in Lowville to Thomas Clyne."

Note: Another source spells the name of the buyer as Thomas Clyde.

851. Dittes, Frances L. 1931. The soybean as human food. *Madison Survey* (*Madison, Tennessee*) 13(48):189-90. Dec. 9; 13(49):193-94. Dec. 16. [3 ref]
• ***Summary:*** This paper was presented by Miss Dittes at the 20th annual meeting of the Tennessee Academy of Science, held 27-28 Nov. 1931 at George Peabody College for Teachers, Nashville, Tennessee. It summarizes scientific research on the subject. "In 1917 during the World War, a special committee appointed by the Department of Agriculture, while searching for a cheaper source of protein for human consumption, discovered the soybean."

"At present there is a great interest in soybean preparations throughout the world. In this country the leading forces are the Bureau of Home Economics, and W.J. Morse, of the United States Department of Agriculture. The famous Austrian, Professor Haberlandt, wrote about fifty years ago that the time would come when soybeans would play an important role in human dietary."

"An important step being studied at the present time is the establishment of a soya foundation in order to promote the creation of a National Soya Food Research Institute." Address: Madison Sanitarium Dietitian and Prof. of Home Economics, Madison College, -.

852. Morse, W.J. 1931. 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. 2001) that gives industry or market statistics on green vegetable soybeans by geographical region. Address: USDA, Washington, DC.

853. Liu, Peter. 1931-1932. Reports of Peter Liu, China, 1931-32. Washington, DC: Bureau of Plant Industry, USDA. Foreign Plant Introduction and Forage Crop Investigations. *
• ***Summary:*** Liu was the interpreter for P.H. Dorsett and W. Morse on their agricultural expeditions to East Asia. 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." Roll 27, volume 104. This microfilm roll may also be available for viewing or duplication at one of the various regional branches of the National Archives (e.g. San Bruno, California).

854. William Morse examining soybeans in Japan (Photograph). 1931.
• ***Summary:*** This digital photo, with date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

855. Parker, Edward C.; Campbell, C.E.; Boerner, E.G.; Coleman, D.A. 1932. Protein tests for wheat and oil tests for flaxseed and soybeans: Importance in production and marketing. *USDA Miscellaneous Publication* No. 140. 45 p. Feb. See p. 40-41. [18 ref]
• ***Summary:*** The section titled "Oil content of soybeans" states: "The oil expressed from soybeans is used chiefly in the manufacture of soaps, paints, and varnishes." Morse (1927) "recorded variety variation in oil content from 12.7 to 19.9 per cent in the same season, and similar investigations by the Illinois Agricultural Experiment Station have recorded variations of 16 to 22 per cent [Hackleman, Sears & Burlison 1928]. Wide variations in oil content exist within any given variety, and are caused by variations in climatic and soil environment, and by variations in time of planting and harvesting." Address: Chief, Bureau of Agricultural Economics, USDA.

856. *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.

857. Dugard, Jean. 1932. La valeur alimentaire et industrielle du soja [The food and industrial value of soya]. *Genie Civil* (*Le*) 100(17):419-20. April 23. [3 ref. Fre]
• ***Summary:*** Contents: Introduction. *USDA Farmers' Bulletin* No. 1617, by W.J. Morse. Botanical characteristics of the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soybean. Composition and food value of the soybean. Products derived from soya eaten by humans: Tofu, soy oil, shoyu [soy sauce] (called "soy" in English), soy flour, soy sprouts, miso, natto. The use of soya as forage. Industrial uses of soy oil and cake. The soybean in western Europe: Hansamuehle in Hamburg, Germany; Englehardt & Cie. in Frankfurt, Germany (making powdered soymilk, soy caseine, soy lecithin, etc.); Soybean cake used for animal feed in England, Denmark, Holland, Sweden, and–above all–in Germany, where more than 2 million tons/year are consumed.

858. *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.

859. *Freeport Journal-Standard* (*Freeport, Illinois*). 1932. The problems of this state are air topic. Sept. 1. p. 7.
• ***Summary:*** Friday: "'Naturalizing the Soy Bean' will be discussed by W.J. Moses [sic, Morse], senior agronomist, during the National Farm and Home hour at 11:30 over KYW. Morse has spent years in the orient searching for soybeans that may be adapted for culture in the United States. Dr. A.A. Horvath will tell of the uses of the soybean for human food, and W.H. Eastman, president of the National Soybean Oil Manufacturers' association, will speak on "'Industrial Utilization.'

860. Morse, William. 1932. Soybeans. Radio broadcast. NBC. National Farm and Home Hour. Sept. 2.
• ***Summary:*** As president of the American Soybean Assoc., Morse is presiding over a broadcast from the association's annual meeting. He begins this show, which is carried by a network of 47 associate NBC radio stations, by saying: "I am glad to greet the Farm and Home Hour audience on behalf of the American Soybean Association." During the broadcast, Morse presents three guest speakers. First, Dr. A.A. Horvath of Pittsburg, Pennsylvania, who gives "a review of the uses of soybeans for human food." Second, Mr. Whitney H. Eastman of the Archer-Daniels-Midland Company, who speaks about the industrial uses of soybean oil and meal. Third, Mr. F.P. Latham of Belhaven, North Carolina, who describes "methods of soybean growing on a large scale." Address: [USDA].

861. Rittinger, Fred R.; Dembo, Leon H. 1932. Soy bean (vegetable) milk in infant feeding. Preliminary report. *American J. of Diseases of Children* 44(6):1221-38. Dec. [18 ref]
• ***Summary:*** Fifty infants fed on soy bean milk for more than a year grew well and remained healthy. This influential article begins with a review of the literature on feeding soy and other vegetable milks to infants. "In recent years great interest in the study and use of soy bean preparations has been manifested throughout the world. Prominent forces in this country are the Bureau of Home Economics and W.J. Morse of the United States Department of Agriculture. Von Noorden in Germany, Ducceschi in Italy and Berczeller in Vienna [Austria] are giving their support to the use of the soy bean as a source of food."

The authors then discuss: The nutritional composition of the soy bean, soy bean milk powder as an exclusive food for animals, preparation of soy bean milk flour (dried soy milk) and its composition, their clinical study. Numerous growth curves are given for infants fed breast milk, soybean milk, and cow's milk. The babies fed on soy bean milk alone (plus daily doses of 4 cc cod liver oil and adequate amounts of orange juice) had normal growth curves (i.e. parallel the Holt line). The general health and condition of these babies was good and their resistance to infection was on a par with milk-fed babies. The fat, protein, and vitamin contents of the soy milk are approximately equal to those of cow's milk. "The stool flora resembles that of the normal, breast-fed baby. The economic features (mass production and low cost) are especially significant in a consideration of soy bean milk as an infant food. It compares favorably with the milk of animals from the standpoint of nutritional availability and biologic value. An additional 100 babies are at present under observation on a diet of soy bean milk, either as a complement to breast milk or as an exclusive food." Address: Pediatric Service, St. Ann's Hospital, Cleveland, Ohio.

862. Jones, D. Breese. 1932. Variations in the amino acid content of the protein of different varieties of soybeans. Washington, DC. 7 p.
• ***Summary:*** This document begins: "Last year the Protein and Nutrition Division of the Bureau of Chemistry and Soils carried on some studies to find out if there were any essential differences in the nutritional value of the proteins of different varieties of soybeans. I do not know of any seed that has such a large number of different varieties as the soybean. Mr. W.J. Morse of the Bureau of Plant Industry brought back from the Orient, where he had been making a special survey

of soybeans for the Department of Agriculture, between 4,500 to 5,000 samples of soybeans, representing between 2,000 to 2,500 different types or varieties. Some varieties of soybeans appear so different from others that one would hardly recognize them as soybeans. They differ in color, size, and shape. Some are yellow, others are black, green, and so on. These striking varietal differences suggested that there might be variations in the chemical composition of their total protein content which could affect the nutritional value of their proteins. It is well known that some varieties of soybeans contain more oil than others, and that some contain more protein. We were not concerned with differences in the quantity of protein, but rather in its nutritional quality. The results of these studies will be published soon by Dr. F.A. Csonka and myself in a forthcoming number of the *Journal of Agricultural Research.*

"Proteins differ greatly in their nutritional value. There was a time, and not so very long ago, when it was considered that one protein was as good as another. Attention was paid only to the quantity of protein in a feed. No thought was given to its quality. Today we know that it is possible for a feed to contain 50 per cent or more protein and still be so nutritionally inadequate that an animal could live on it but a short time.

"In order that the significance of some data which I shall present later in this paper may be more clearly appreciated, I shall first discuss briefly how proteins can differ so essentially in their nutritive value.

"Proteins are extremely complex compounds. Most of them are made up of 20 or more simpler compounds chemically bound together to make up the huge protein molecule. These compounds are called amino acids..."

Footnote: "This paper was presented at the Annual Meeting of the American Soybean Association held in Washington, D.C., September 2 to 3, 1932." Address: Principal Chemist in Charge, Protein & Nutrition Div., Bureau of Chemistry and Soils, USDA.

863. Morse, W.J. 1932. Soybeans–Manchuria. 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:*** Perhaps the best book ever written about the soybean in Manchuria; extremely comprehensive and detailed. The only known copy of this book (as of Sept. 2011) is owned by Soyinfo Center (Lafayette, California).

Contents: 1. Manchuria. 2. Topography. 3. Climate. 4. Area and population. 5. Soils. 6. Agricultural methods. 7. Agricultural crops: Distribution.

8. Soybeans: History, importance, important production regions, production, varieties, improvement of varieties, time and methods of planting, cultivation, rotation, fertilizers, harvesting, threshing, seed cleaning and yields, cost of production, marketing, prices, trade competition, transportation, storage of soybeans, mixed storage system, seed inspection, soybean oil cake, storage of bean cakes, soybean oil inspection, storage and transportation of oil, soybean oil industry (history, methods of milling {wedge system, screw system, hydraulic system, [solvent] extraction system}, production of oil mills, number and location of oil mills, present status of mills), export trade in beans, cake, and oil, bean exports, bean cake exports, bean oil exports.

Contains 174 numbered figures, mostly original photos (each with a caption) taken in Manchuria, plus a map of Manchuria. Photos include: (2) Transporting soybeans by junk down the Liao River to Yingkow [Yingkou]. (3) The frozen Sungari River, North Manchuria, provides good roads for the transportation of agricultural crops during winter months. (4) The cow, donkey, and horse assist the farmer in most of his work. (5) The primitive wooden plow made at home is the principal farm implement. (6) The farmer uses a crude wooden cart to carry his plow to the fields. (7) General view of a Manchurian farm village near Nanzankai, South Manchuria, showing farm homes, threshing grounds, and harvested crops stacked about the threshing grounds. (8) View of compound home of the better class of Manchurian farmer. (9) The "Tunhulu" made with a kaoliang stalk and gourd is used in sowing millet and kaoliang. (10) Compacting the soil on sown peanuts with stone rollers in a sandy region of South Manchuria. (11) The wooden roller is commonly used in compacting the soil on soybeans sown on ridges. (12) After harvest the crops are hauled to the village and stacked about the threshing ground. (13) The Manchu farmer occasionally pulls wheat or barley plants instead of cutting with the sickle. (14) Threshing is accomplished with a stone roller pulled over the plants by horse or donkey. (15) Seed is cleaned by throwing shovelfuls in the air and letting the wind separate the seed from the trash. (16) Coolies planting and covering soybeans. (17) Fields of soybeans near Kaiyuan, Manchuria, in July. (18) Field plot of the Moshito variety in South Manchuria. (19) The Moshito variety in a variety field test at the Hsiungyaocheng Experimental Station in South Manchuria. (21) Soybeans are planted on ridges 6 to 8 inches high and the rows 21 inches apart. (22) Farmer in North Manchuria making ridges for planting soybeans. (23) Tramping ridges and planting soybeans in North Manchuria. (24) Planting soybeans on ridges. (25) Tramping ridges, planting beans, and covering with plow. (26) General view of planting and covering soybeans in Manchuria. (27) After the beans are covered the soil is compacted on the beans by drawing a wooden roller over the ridges. (28) Planting the Moshito variety in South Manchuria on new land. (29) Planting soybeans between hills of corn in South Manchuria. (30) Planting and covering soybeans between hills of corn. (31) A furrow is made in early May for corn and every other furrow left for soybean planting in early June, South Manchuria. (32) Planting a

row of soybeans between two rows of corn when corn was 6 inches high. (33) Planting and covering a row of soybeans between two rows of corn in South Manchuria. (34) Close-up view of covering a row of soybeans between two rows of corn. (35) Planting soybeans between hills of corn in the Hsiungyaocheng region. (38) Hemp planted at the ends of soybean rows to prevent animals from injuring the soybean plants. (39) The second cultivation of soybeans is done with the plow. (40) The third and last cultivation of soybeans consists of hand hoeing. (41) Cultivating corn and soybeans in South Manchuria. (42) Cultivating soybeans and corn in South Manchuria. (43) Piles of compost used as fertilizer by the Manchurian farmer. (44) Coolies scattering compost in middle of last year's rows. (45) Fit in which manure and soil are mixed for making fertilizer cakes, South Manchuria. (46) Stacks of fertilizer cakes made from manure and soil, South Manchuria. (47) Field of mature soybeans ready for harvest in North Manchuria. (48) Coolie with short-bladed sickle used in cutting soybeans. (49) Coolies cutting a field of soybeans in North Manchuria. (50) After cutting, the plants are left in small bunches to cure. (51) After curing in the field, soybean plants are hauled to the threshing ground in the village. (52) A Chinese family loading cured soybean plants on cart for hauling to the threshing ground. (53) Loading soybeans on a cart for hauling to the threshing ground near a small village in South Manchuria. Women and children are gathering leaves, broken stems, and other plant material for winter fuel. (54) Long rectangular stacks of soybeans about a threshing ground. (55) Soybeans in stacks about the threshing ground are left to cure for 3 or 4 weeks before threshing. (56) Bundles of immature plants curing on the side of the threshing ground. (57) Cutting soybeans after the corn stalks have been harvested, South Manchuria. (58) General view on a South Manchurian farm of a black seeded variety of soybeans being cured in small shocks. (59) The threshing floor is thoroughly rolled with some rollers before threshing. (60) Small quantities of beans are threshed with bamboo flails. (61) The stone roller used in threshing soybeans and other crops in Manchuria. (62) Soybean plants drying on a threshing ground. (64) General view of a threshing ground after the soybeans have been placed to a depth of 2 or 3 feet. The plants are left to cure for 2 or 3 hours in the sun before threshing. (63) View of threshing ground just before threshing soybeans. (65) The common method of threshing soybeans in Manchuria. (66) Soybean threshing scene in South Manchuria. (68) Threshed material being raked into piles in preparation for cleaning the seed. (67) General view of threshing soybeans by stone rollers drawn either by horses or mules. In the foreground coolies are shocking the plants after they have been rolled once. (69) General view of threshing ground with coolies raking and scraping threshed soybeans into a pile to be cleaned. (70) Primitive method of separating soybean seed from threshed material. (71) Close-up view of coolie throwing shovelful of threshed material in air. (72) View showing cleaned bean seed in foreground. (74) The finer material, pods, and broken stems, left from cleaning, is used for animal feed. (73) Cleaning soybeans by throwing shovelfuls of threshed material into the air. (75) Seed is often stored in small matting bins at side of threshing ground. Continued. Address: USDA, Washington, DC.

864. Morse, W.J. 1932. Soybeans–Manchuria (Continued–Document part II). 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 from page 80: (76) After cleaning, the seed is measured. (77) After cleaning and measuring the seed is often bagged ready for the market. (78) Home-made implements used in cleaning seed from threshed material (79) Rake commonly used in separating the coarser material in seed cleaning. (80) Broom made from kaoliang stalks used in scraping up seed on threshing ground. (81) Native cart used in transporting produce [including soybeans] to market. (82) Cartload of bags of soybeans in the yard of a Chinese inn, North Manchuria. (83) View of a Chinese inn on the outskirts of Harbin, North Manchuria. (84) Arrival of farmer with cartload of soybeans in a Chinese inn yard. (85) View of Chinese inn yard showing accommodations for horses. (87) Manchurian farmer at a Chinese inn near Harbin, North Manchuria. (86) Chinese storage merchants either purchase the soybeans direct from the farmers at the Chinese inns or arrange through the master of the inn for the purchase of seed as the farmer comes in from the country. (88) Manchurian farmers selling cartloads of soybeans in the open soybean market at Kaiyuan, Manchuria. (89) Soybean seed stored in sacks in open storage in railway yards in North Manchuria. (90) Unloading from farm carts and storing soybean seed in osier bins in Chinese merchant's storage yard. Kungchuling, Manchuria. (91) Cartload of soybeans in storage yard of Chinese grain merchant. North Manchuria. (92) Soybeans lumped in piles in a railway yard in North Manchuria. (94) Uncovered rick of bags of soybeans in railway yards in North Manchuria. (93) Open storage in bulk of soybean seed in a railroad yard in North Manchuria. (95) Ricks of bags of soybeans covered with matting and tarpaulin in railway yards, North Manchuria. (96) Cartload of bags of soybeans in Chinese merchant's storage yard, North Manchuria. (97) Beans are sometimes transported in bulk by the farmer. (98 & 99) placed in bags, and dumped in osier bins (100-105). (98) Measuring and bagging beans in Chinese grain merchant's storage yard. (99) Wooden measure used for measuring beans by Chinese grain merchants. (100) Osier bin half filled with soybeans, North Manchuria. (101) Osier bins filled with beans. (102) Filling osier bins with beans. (103) Close-up view of osier bin just filled with beans. (104) Osier bin filled with beans and capped. (105) General

view of Chinese grain merchant's storage yard showing storage of soybeans in osier bins. Kaiyuan, Manchuria. (106) "River beans" at Tingkow, Manchuria, on the Liao River. (107) Manchurian farmers carting soybeans to Harbin across the frozen Sungari River, December 2, 1930. (108) "Train beans" stored in railway yards, Dairen, Manchuria. (109) "Cart beans" stored in osier bins in Chinese grain merchant's storage yard. (110) Coolies unloading a car of soybeans in railway yards. (111) Bags of soybeans are shipped in open cars along the Chinese Eastern Railway in North Manchuria. (112) Train-load of sacks with soybean seed being moved from storage yards in North Manchuria over the Chinese Eastern Railway to Changchung, Manchuria. (113) Beans and bean cake being loaded in large freighter at Yingkow [Yingkou] for shipment to Japan. (114) Soybeans are shipped in closed box cars on the South Manchuria Railway. (115) The foundation of the osier bin consists of logs or heavy pieces of timber over which is laid a matting of closely-woven kaoliang stalks. (116) The sides of the osier bin of matting 15 inches wide, unrolled as the bin is gradually filled. (117) Filling osier bin with beans. (118) Osier bin half filled with beans. (119) Two osier bins nearly filled with beans. (120) Osier bin filled with beans. (121) Osier bin filled with beans and being capped with bundles of millet straw. (122) Filling osier bins with beans and capping a completely filled bin. (125) Side view of bags of beans stacked under matting cover in grain merchant's storage yard, Harbin, Manchuria. (123) Soybeans stored in osier bins in the storage yard of a Chinese grain merchant. Kaiyuan, Manchuria. (124) Scene in the storage yards of a Chinese grain merchant during the soybean marketing season. Kaiyuan, Manchuria. (126) End view of stacks of bags of soybeans covered with matting. Harbin, Manchuria. (127) Stack of bags of beans completely covered with matting and tarpaulin. Harbin, Manchuria. (128) Sacks of soybeans stored under tarpaulin in a Chinese merchant's storage yard. Harbin, Manchuria. (129) General view of sacks of soybeans stored under matting in a Chinese merchant's storage yards. Harbin, Manchuria. (130) Bags of beans stored in warehouse of South Manchuria Railway yards. Dairen, Manchuria. (131) Looking down aisle between stacks of soybeans in warehouse of South Manchuria Railway yards. Dairen, Manchuria. (132) Coolies unloading bags of soybeans for open storage in South Manchuria Railway yards, Dairen. (133) Covered stack of bags of beans in open storage. (134) Inspector drawing sample of beans for inspection in railway storage yard. (135) Inspecting soybeans in railway storage yards. (136) Weighing in bags of beans during inspection in railway storage yards. (137) Inspecting beans in storage yards of Chinese soybean oil mill. Dairen, Manchuria. (138) Wagon load of soybean oil cake on way from Chinese oil mill to oil cake warehouse. Dairen, Manchuria. (139) Coolies unloading wagons of oil cakes at one of the warehouses of the South Manchuria Railway. (140) Millions of soybean oil cakes are piled high in the warehouses of the South Manchuria Railway, Dairen. (141) Close-up view of soybean oil cakes in a warehouse, Dairen. (142) Coolie carrying soybean oil cakes from warehouse to flat car, Dairen. (143) Loading flat cars with oil cakes from warehouse for shifting to wharves. (144) Train of flat cars loaded with oil cakes to be shifted to wharves for export. (145) Coolies unloading flat cars of oil cakes at wharves for export. (146) Coolies unloading oil cakes from box cars at wharf warehouse, Dairen. (147) Oil cakes unloaded from wagons and stacked on wharf for export, Dairen. (148) Soybean oil cakes stacked under covering in storage yards of a soybean oil mill, Dairen. (149) Coolies stacking soybean oil cakes in railway storage yards. (150) Close-up view of coolies stacking soybean oil cakes in railway yard open storage. (151) Soybean oil cakes stacked under cover and in open wharf storage yard. (152) Soybean oil cakes stacked along wharf, Dairen, Manchuria. (153) Unloading and stacking soybean oil cakes at Chinese Junk Wharf, Dairen, Manchuria. (154) Stacks of soybean oil cakes awaiting shipment at Chinese Junk Wharf, Dairen, Manchuria. (155) Broken, molded soybean cakes are spread out on tarpaulin to dry, Dairen. (156) After broken, molded cakes are thoroughly dried in the sun, the material is bagged and sold for fertilizer. (157) General view of the soybean oil inspection laboratory of the South Manchuria Railway showing drums of soybean oil brought from Chinese oil mills for inspection and grading. (159) Drums of soybean oil being delivered at the oil testing laboratory of the South Manchuria Railway. (158) Chinese soybean oil mill with oil storage tanks and osier bins for storage of seed. Kungchuling, Manchuria. (160) Train of tank cars filled with soybean oil from points in North Manchuria. (161) Attaching pipe line from tank to freighter, Dairen, Manchuria. (162) Filling the tanks of a freighter with soybean oil, Dairen, Manchuria. (163) Bundles of grass used in the pressing of soybean oil. (164) Screw type of press [manual] commonly used by Chinese oil mills in Manchuria. Said to have been first used by the Tarkoyuan Mill, Yingkow (Newchwang) in 1896. (165) Soybean flakes being steamed over a vat in preparation for pressing. (166) Soybean oil cakes being carted from oil mills to warehouse in South Manchuria Railway Storage Yards, Dairen. (167) Unloading soybean oil cakes at the warehouse to which they have just been brought from the oil mills. (168) Loading bags of soybean on a German freighter at Dairen. (169) Bags of soybeans being loaded on a German freighter, Dairen, Manchuria. (170) Soybeans being loaded on a German freighter, Dairen, Manchuria. (171) Soybeans are exported to many Chinese ports by junk. (172) Loading Japanese freighter with bean cakes at Dairen, Manchuria. (173) Loading bean cakes on junks for export to Chinese ports. (175) Filling a tank on an English freighter with soybean oil. (174) View showing the filling of the oil tanks of a British freighter with soybean oil at the oil wharf in the South Manchuria Railway yards. (176)

General view of Dairen wharves showing steel drums and oil paper lined baskets of soybean oil ready for shipment to Chinese ports. Address: USDA, Washington, DC.

865. 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. 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.

866. Morse, W.J. 1932. La soya y su importancia agrícola e industrial [The soybean: Its agricultural and industrial importance]. San Salvador: Impr. Nacional. Publicationes del Ministerio de Agricultura. 44 p. 25 cm. Reproducción de un amplio estudio del Dr. W.J. Morse, traducido al Castellano por Emma Lopez Seña y completado con otros interesantes datos comerciales sobre la expresada leguminosa. [Spa]*

• ***Summary:*** This is the reproduction of a large study by Morse, translated into Castilian Spanish by Emma Lopez Seña and published together with other interesting commercial information on the soybean.

Note: This is the earliest document seen (Feb. 2009) concerning soybeans in connection with (but not yet in) El Salvador. Address: USDA, Washington, DC.

867. 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.

868. Cates, J. Sidney. 1933. Soy beans go domestic. *Country Gentleman* 103(2):6, 58. Feb.
• ***Summary:*** Discusses the discovery by Morse and Dorsett of new green-vegetable varieties for human consumption, and the importance of soybeans as a source of protein. The Japanese use the word *daizu* to refer to the soybeans that they grow for dry beans, soil improvement, forage and grain, whereas they use the word *mame* for the soy-bean varieties they grow for green-vegetable use. "The new green-vegetable bean varieties were first grown a year at Arlington [Virginia], where they were sorted out, on the basis of growth habits, into Northern, Southern, and the mid-latitude kinds, and then sent out to field stations for further trial."

869. Hansen, Louis A. 1933. The soy bean as human food. *Life and Health* 48(2):21-23, 27. Feb. Also in J. of the Jamaica Agric. Soc., March 1933, p. 147-50.
• ***Summary:*** This is a good introduction to the soybean, based largely on information provided by Dr. A.A. Horvath (until recently of the health section, U.S. Bureau of Mines) and William J. Morse (senior agronomist at the USDA Bureau of Plant Industry). Discusses: History of the soy bean in Asia (especially China), nutritional benefits, soy bean flour, soy bean milk, and soy sauce.

Photos show: (1) Two men standing in a field of tall soybeans. (2) A person grinding soybeans with a stone mill to make soy bean milk in China. (3) A "Chinese courtyard with pots of fermented soybeans and brine from which the well-known soy sauce is made." (4) Steamed soy beans about to be made into miso in Japan.

Note: In 1968 Hansen wrote a book titled *From So Small a Dream,* about Madison College (Madison, Tennessee), which pioneered soyfoods in the United States.

870. March 4–Henry A. Wallace (D), Iowa, becomes U.S. Secretary of Agriculture under President Franklin D. Roosevelt (1933-1945) (Important event). 1933.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

871. *Washington Post.* 1933. Mr. and Mrs. John B. Morse,... (Photo with caption). May. 9. p. 18.
• ***Summary:*** "... who will celebrate their golden wedding tonight with a dinner at their home, 4220 Thirty-eighth street northwest. Their daughter, Miss Gladys Morse, an employee at the War Department, and their son, Dr. [sic] W.J. Morse, a specialist at the Department of Agriculture, will be present. The couple were married in Lowville, New York, and have lived in this city since 1900."

Note: Their full names are John Baptist Morse and Lena B. Kirschner. According to his death certificate, John was born 27 Dec. 1863 in New York (probably Greig, since that's where his father enlisted for the Civil War on Dec. 28, 1863, but we have no definite confirmation). Married 8 May 1883 in Lowville, Lewis County, New York. Died 3 Nov. 1942 in Washington, DC of coronary thrombosis. Buried 5 Nov. 1942 in Fort Lincoln Cemetery, Brentwood, Maryland.

Lena was baptized on 14 May 1863 as Barbara Magdalena Kirschner in St. Stephen's Church, Croghan, New York.

872. Morse, W.J.; Fuller, G.C. 1933. Soybean investigations in the United States. *Herbage Reviews* 1(2):55-58. June.
• ***Summary:*** "The soybean is no longer an unfamiliar crop to most farmers of the United States and it has also become in a brief period the object of considerable attention of numerous industries. In spite of the extensive investigations that have been conducted with the soybean, the work of developing this plant to its fullest possibilities is just beginning. The explanation for this lies in the fact that the major part of our studies to date have been devoted to the adaptation and development of new varieties. More recently our attention has been called to the great value of the soybean as a food crop and for industrial purposes. At the moment our attention and that of the agricultural worker generally is focused on these additional potentialities of the soybean and its by-products–oil and meal–and the crop is gradually assuming its rightful proportion of a major crop in the agriculture of the U.S." Address: USDA, Washington, DC.

873. *Unknown newspaper.* 1933. Soybean experts of many states welcomed today: L.S.U. president addresses national association. Night session follows banquet. Delegates to visit Teche country Friday and reserve Saturday. Aug. 3.
• ***Summary:*** Contents: Introduction. Soybean from China. Committees named. Soybean products served. Experiments at L.S.U. [Louisiana State Univ.]. Taggart talks. Ayres invited delegates to Stoneville, Mississippi. Spencer speaks. A photo titled "Campus Guest" shows William Morse. The caption says: "Dr. W.J. Morse, senior agronomist, United States department of agriculture, who was one of the main speakers at the opening meeting of the convention of the American Soybean association, which is now being held at the Louisiana State university."

874. *Times-Picayune* (*New Orleans, Louisiana*). 1933. Soybean culture subject of talk: Federal agronomist speaker at session at Louisiana State University. Aug. 4.
• ***Summary:*** "University Station, Baton Rouge, Aug. 3– Dr. W.J. Morse, senior agronomist, in charge of soybean

investigations, for the United States department of agriculture, Washington, D.C., and international authority on soybeans, is a prominent speaker at the 1933 convention of the American Soybean Association, at the Louisiana State University, today and tomorrow." A portrait photo shows "Dr. W.J. Morse." Address: Special to the Times-Picayune.

875. W.J. Morse standing in soybean breeding plots, Louisiana Experiment Station, Baton Rouge (Photograph). 1933. Aug.
• ***Summary:*** This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

876. *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.

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.

877. Crane, Helen R. 1933. The story of the soya. *Scientific American* 149:270-72. Dec.
• ***Summary:*** The article begins: "During the Civil War the Union soldiers were fed a coffee which they did not like very well. It tasted 'so-so' but it failed to whip them on and keep them awake as did the coffee they had back home. No one bothered to tell them it was soybean coffee, and if they had been told what it was, the news probably would have meant nothing to them, for few people in this part of the world had ever heard of the soybean in that time." This "Civil War coffee" was "brought back by some of our traders to the East..."

"Time went on and then, in 1915 a shortage of cottonseed in the South coincided with a surplus

of North Carolina's soybeans that were being cultivated for live-stock. The Department of Agriculture began to dream dreams of an American soy-oil. Had not the Orient been using this oil for thousands of years in making lacquers, varnishes, paints, soaps, printing-inks, candles, waterproofing, and all such?"

Americans discovered that soybean "oil could be extracted by grinding the beans and then placing them in some chemical solvent such as benzol, naphtha, or ether. The solvent was later evaporated, distilled, and used over again..." The Orientals have made comparatively "little use of soy meal for animal feed."

"It was not until as recently as 1917, when conditions brought on by the World War forced the Department of Agriculture to search for a cheap source of proteins for human consumption, that the soy bean was 'discovered' as a real food. More than 400 different recipes exist in Chinese cook-books, some of them dating back to about 3000 B.C., but we Americans did not find them. Our scientists went to work directly on the bean itself–although they may have accepted ideas from the Orient of using it as a flour, a curd, milk, oil, and meal."

"Our food experts, too, have taken with enthusiasm to this new 'almost perfect food... it fills a crying need in our dietary,' they say, and they add that, '... for some strange reason, our knowledge of foods has lagged far behind our other technical accomplishments and we have only just begun to realize the deficiencies of our present foods... the soya will be come a very important accessory.'"

"Soy-milk, which is prepared in a similar manner to almond-milk, is reported by several of our universities to be suitable for use as the only source of proteins in the diet of babies, as well as being adequate for promoting normal growth in children. It is further stated in these reports that invariably better results are obtained from its use in such cases than from cow's milk."

"As for the cheese, or curds, they do not appeal greatly to Occidental taste at first. They seem a trifle strong in flavor and are sponge-like in consistency, but it is prophesized [prophesied] that they will undoubtedly come to be looked upon as the delicacy they are considered to be in the Orient. These curds, prepared in an infinite number of ways, may appear in one form as the 'meat' course, in another as the salad, and in still another as the dessert."

"Flour is now an important product from the soy, and is being manufactured in various parts of the country by the ton. It is used for making breads, cakes, and pastries. To diabetic patients and others in need of a starch-free diet it comes as a blessing, as well as adding a very palatable and nutritious item to the pantry list of any housewife."

"'Ice Cream by the Mile' is the title of an article, to be published soon, which tells the story of the development of a new and better process for making that frozen delicacy."

Photos show: (1) A field of Oo-too-ton [Otootan] soybeans in Orangeburg County, South Carolina. (2) William Morse of the USDA holding a round soybean cake made by pressing the oil from the beans. (3) Laredo soybeans cocked up in the field for curing in White County, Arkansas. (4) A soybean plant growing taller than a man, with corn, in South Carolina; they are used for soil building and "hogging down."

Note 1. This is the earliest document seen (Jan. 2000), published in the USA, that uses the term "the soya" as a noun.

Note 2. This is the earliest English-language document seen (Sept. 2016) contains the term "soy-oil."

878. 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 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.

879. W.J. Morse and C.K. McClelland, Arkansas (Photograph). 1933? Undated.
• ***Summary:*** W.J. Morse (left, in a striped hat) and C.K. McClelland (right) in Arkansas, perhaps at the 1934 meeting of the American Soybean Association.

This digital photo, with caption, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

880. Morse, W.J. 1934. Utilizacion de las habas soya [Utilization of soybeans]. *Revista de Agricultura, Comercio y Trabajo* (*Cuba*) 14(52):77-90. April. [Spa]
• ***Summary:*** Contents: Introduction. Soybeans for human food: Dried beans, coffee substitute, toasted soybeans, fresh green or vegetable beans (*Habas frescas o legumbres*), soybean flour, soy sprouts (*retoños tiernos*), soy sauce, soybean vegetable milk, tofu (*cuajada o queso de habas soya*), soy oil. Soybeans for livestock: Soybeans for hay, for pasture, for ensilage, for fresh forage, for grain. Soybeans for oil. Soybean flour and cake. Soybeans for soil improvement. Address: USDA, Washington, DC, USA.

881. Whitney, Robert F. 1934. Plant hunters scour jungles for flora. *Washington Post.* May 20. p. B3.
• ***Summary:*** Knowles A. Ryerson, now chief of USDA's Bureau of Plant Industry, but formerly head of the department's plant exploration work, states: "An agricultural explorer has to be a natural plant lover and must have studied botany. He must have worked with plants in field and garden." He must "bring 'em back alive."

"Soy beans are now an important crop in a wide area. Several explorers have brought back from the Orient the varieties from which our most important types have been developed. Recently P.H. Dorsett and W.J. Morse returned from a three-year trip with almost 4,000 strains and types now under trial here."

882. Miller, Carey D.; Robbins, Ruth C. 1934. The nutritive value of green immature soybeans. *J. of Agricultural Research* 49(2):161-67. July 15. [11 ref]
• ***Summary:*** Japanese in Hawaii and in the Orient enjoy soybeans in this form. "Green immature soybeans look much like young, tender lima beans, but they have a richer, more distinctive, and more delicious flavor. It is usually desirable to cook them in the pods, boiling them in salted water for 15 to 25 minutes. The beans then slip easily from the pods and can be used in salads or in soups and as a vegetable. The orientals often eat them directly from the pods, especially between meals. Children sometimes carry about a small bag of the cooked beans, break open the pods, and then lick the beans out with their tongues–a practice to be recommended from the sanitary as well as from the nutritive standpoint...

"The seeds of these soybeans (Seaweed, F.P.I. no. 80483) were obtained from W.J. Morse, of the United States Department of Agriculture, who had obtained them from Japan and who stated that they were used only in the green state. The mature seeds were large and flat." One of the varieties was grown out by C.P. Wilsie, agronomist at the Hawaii Agricultural Experiment Station. In several places, the authors call these beans "fresh green soybeans" in the raw state but "cooked green soybeans" after they have been cooked. In the raw state they were found to contain 12.5% protein, 5.1% fat, 0.063% calcium, and 0.00283% iron. In the cooked state they contained 13.8 to 15.0% protein, 2.7 to 4.2% fat, 0.098 to 0.100% calcium, and 0.00344 to 0.00213% iron. The protein is "an unusually large percentage for a fresh green vegetable... [The fat content is low compared with 12-18% found in dried soybeans.] The calcium content of 0.1 percent compares favorably with that of milk and is much higher than in most vegetables... The iron content of green soybeans exceeds that of most other common vegetables. Results showed that cooked immature

soya beans also contained considerably larger amounts of fat and phosphorus than do other vegetables. Vitamin A, B-1, and B-2 (G) are present in adequate proportions, but vitamin C is deficient."

Note: This is the earliest English-language document seen (June 2009) that uses the term "Green immature soybeans" to refer to green vegetable soybeans. Address: 1. Specialist in food and nutrition investigations; 2. Asst., nutrition investigations. Both: Hawaii Agric. Exp. Station.

883. American Soybean Association. 1934. 1934 annual meeting of the American Soybean Association: Little Rock, Arkansas, August 22-23; Stuttgart, Arkansas, August 23-24; Marianna, Arkansas, August 24-25 (Brochure). n.p. 3 p.
• ***Summary:*** This is ASA's 15th annual meeting. The program includes: Aug. 22–Marion Hotel. 7:30 p.m.–Meeting of the Executive Board. 8:30 p.m.–General meeting. Self introductions. Address of the president: Varieties of soybeans for Arkansas and the expansion of the soybean area within the state, by C.K. McClelland, Univ. of Arkansas, Fayetteville. The commercial soybean oil industry, by I.C. Bradley, Manager, Soybean Mill, Taylorville, Illinois. Federal supervision of inspection and trading, by J.E. Barr, Marketing specialist, USDA, Washington, DC.

Aug. 23. 7:30 a.m.–An inspection will be made of several Pulaski county cotton plantations and farms under leadership of J.W. Sargent, County Agent. Stops will be made at the following farms: Harold Young, Geo. Alexander, John Pemberton, J.R. Alexander. 1:00 p.m.–Lunch, Stuttgart. Soybeans and diversification in the rice territory, by Mr. Jacob Hartz, Stuttgart, Arkansas. 2:30 p.m.–Inspection of soybean harvesting machinery and farm of R.J. Dieckoff, and the rice and soybean work at the Rice Branch Experiment Station under leadership of G.H. Banks, Asst. Director.

Aug. 24. 7:30 a.m.–Visit to the rice farms of Mrs. T. Heien & Sons, and Paul Wallworth. 1:00 p.m. Lunch at the Elks Club, Marianna, Arkansas. The value of soybeans as human food, by Dr. Chas. A. Fearn, Director of Soya Food Products, Chicago, Illinois. Edible varieties of soybeans, by Dr. Roy H. Monier, Carrollton, Missouri. 3:00 p.m.–Inspection of soybean and cotton work at the Cotton Branch Station under the leadership of Mr. Claude J. Byrd, Asst. Director. 7:30 p.m.–Elks Club–The way to prosperity for the soybean grower, by Dr. A.A. Horvath, Delaware Experiment Station, Newark, Delaware. Soybeans in the Orient–Illustrated, by Dr. [sic, Mr.] W.J. Morse, Office of Forage Crops, USDA, Washington, DC.

Aug. 25. 7:30 a.m.–Inspection of the soybeans on delta land, Cotton Branch Station and on Crowley's Ridge near Forrest City. 11:00 a.m. Some practical results of soybean soil building, by G.G. Purvis, Manager Plunkett Farm, Biscoe, Arkansas.

"Membership in the Association is $1.00 annually and may be paid on arrival to the secretary or may be sent by mail to G.H. Banks, Acting Secretary, Stuttgart, Arkansas."

Note 1. This is the earliest document seen (March 1999) concerning the active involvement of Jacob Hartz with soybeans.

Note 2. This is the earliest document seen (Sept. 2011) that mentions "Soya Food Products," a company connected with Dr. Charles A. Fearn.

884. McKown, Dallas. 1934. Saga of the soy: When scientists and farmers get together, even beans can join the wonders of the world. *Country Home.* Oct. p. 10-11, 32-36.
• ***Summary:*** From December 1933 until December 1939 Dr. A.A. Horvath was employed at the Agricultural Experiment Station of the School of Agriculture, University of Delaware, in Newark, New Jersey. There he was head of the chemistry department. This article, in which a friendly soybean farmer tells the author how Dr. Horvath arrived in town to begin his work at the experiment station, gives a good sense of Dr. Horvath's dedication to the soybean.

"He came to town last fall to take over his new job at the station. Soon as he'd rented a house and washed up he went down to the business men's clubs and asked if they wanted a speech on soy beans. Don't know if they did or not but he gave the speech anyhow. And at the luncheon where he talked he fed 'em rolls and doughnuts made from soy-bean flour."

"Next he went down to see Mrs. Fader, who runs the bakery in town. Talked her into making up some soy-bean bread. Told her where to order her flour, and when it came he went down with a recipe and a pair of good strong arms and helped her mix the first batch of dough."

"Trouble was, nobody in town had ever heard of soy-bean flour bread, although all us farmers around here have been growing the crop for years. So he had to be Mrs. Fader's salesman and spread the word around. He was pretty good. She sold her first dozen loaves in a couple of days. Saw her the other afternoon and she says before closing up time Saturday nights she's sold over a hundred loaves in the week, right there in that little town."

"Next he pestered the grocery store into stocking up on soy-bean salad oil and cooking oil. He talked the arm off our hardware man and got him to put some soy-bean oil paint on his shelves. Won't quit, I guess, until every store in town sells soy beans in one form or another."

Dr. Horvath told the author directly: "In China 15 years ago I went soy-bean a hundred per cent." He explained that the enamel [paint] on his black Ford car was made of soy bean oil. The horn button and the gear-shift knob were made from soy-bean meal [plastic]. And the castings in his car were poured into molds of sand mixed with soy bean oil. The author adds: "My head started to go around. This made alchemy appear pale and weak."

Dr. Horvath continues: "It's a good thing for American farmers that Henry Ford is interested in the soy bean. He

grows 10,000 acres a year and does most of the research here on the industrial uses of the oil and meal. He has a theory, you know, that a good share of a finished automobile can come off the farm. He has one laboratory where chemists are working with nothing but soy beans.

"In Peking the Chinese Government has a great central laboratory where they research the soy. The Soviets have a research institute for the same purpose in Moscow. But we have none in the United States."

885. Fairchild, David. 1934. Hunting useful plants in the Caribbean. *National Geographic Magazine* 66(6):705-37. Dec.

• ***Summary:*** That winter they gathered and introduced to the USA about 700 species of plants. Discusses: Breadfruit, Captain William Bligh and HMS Bounty (seedless breadfruit), Mr. Allison V. Armour and his research yacht *Utowana,* bonavist bean, nutmeg, orchids, coco-de-mer, Dr. G. Stahel, jackfruit, Lafcadio Hearn (who once wrote poetic stories about Martinique), and Howard Dorsett. A photo (p. 737) shows Fairchild and Dorsett in a research room on board the plant-hunting yacht *Utowana.* Address: Agricultural Explorer, U.S. Dep. of Agriculture.

886. Jones, D. Breese; Csonka, Frank A. 1934. Soybeans content of amino acids varies greatly with variety. *Yearbook of Agriculture* (*USDA*) p. 330-32. For the year 1934.

• ***Summary:*** This chapter is only about animal feeds: "Supplementing feeds to obtain a balanced protein ration is one of the most effective means of more efficient crop utilization, and at the same time tends to decrease the volume of crop production.

"Protein is the most expensive constituent of foods and feeds. Every bag of feed, such as meals and mixed feed, is required by law in every State to be labeled with its protein content. Graduated premiums are paid for wheat according to a scale of increasing protein content. Protein is the element that produces muscle. Without enough protein of the right kind in the diet, animals will not grow, remain healthy, or reproduce.

"Not all proteins have the same food value. One sack of feed may be an ideal ration, whereas another containing the same quantity of protein may be almost worthless because of the poor quality of its proteins. A protein which contains all the nutritionally essential amino acids in sufficient quantities and in a form available to meet the nutritional needs of an animal is referred to biologically as a protein of good quality. Proteins are made up of about 18 or 20 amino acids, 4 of which are essential for the growth and nutrition of animals. These are lysine, tryptophane, histidine, and cystine. When any one of these four amino acids is lacking in the diet, an animal cannot grow or be nourished satisfactorily.

"Proteins in some of our most important foods are deficient and even lacking in one or more of these essential amino acids. Other proteins contain all of them in relatively large quantities. It is of utmost importance to farmers to know how to mix different feedstuffs to produce a balanced protein ration. Satisfactory utilization of foods and feeds depends on the knowledge of how to combine them so that the protein deficiency of one foodstuff can be corrected by mixing it with the proper quantity of another. In order to do this the quantity of amino acids in different foods must be known. This can be developed only by fundamental investigations on the properties and composition of proteins.

"The chief proteins in many foodstuffs have been isolated in the [USDA] Bureau of Chemistry and Soils, and their amino acid composition has been determined. Work is in progress on a method for determining amino acids in feedstuffs without first isolating and purifying the individual proteins. This should give a better picture of the protein value of the feedstuff in its entirety.

"Recent studies in the Bureau of Chemistry and Soils on the proteins of soybeans have disclosed the fact that different horticultural varieties of the same seed may show differences in the amino acid composition. In view of the great increase in the production of soybeans in the United States during recent years, any significant difference in the food value of one variety over another becomes a matter of importance. The production of soybeans in the United States has increased from nearly 3 million bushels in 1931 to more than 16 million bushels in 1932 (1933 Yearbook). In 1931-32, more than 283 million pounds of soybeans were crushed (1933 Yearbook). After the oil was expressed, they yielded 200 million pounds of soybean cake. This press cake, or cake meal, is used for feeding as a protein concentrate. It contains from 37 to 40 percent of protein. The value of soybeans as a source of protein has long been recognized by practical feeders of farm animals. The proteins contain all the known nutritionally essential amino acids, and are rich in lysine and tryptophane. Because some of the proteins of certain of the grains, notably corn and wheat, are deficient in these two amino acids, soybean meal is an excellent concentrate to use as a supplement to these foodstuffs. Studies made with laboratory experimental animals showed that a mixture of 1 part of soybean meal or peanut meal with 3 parts of corn meal or wheat flour is between two and three times more efficient for growth production than either corn meal or wheat flour alone, because of protein supplementation.

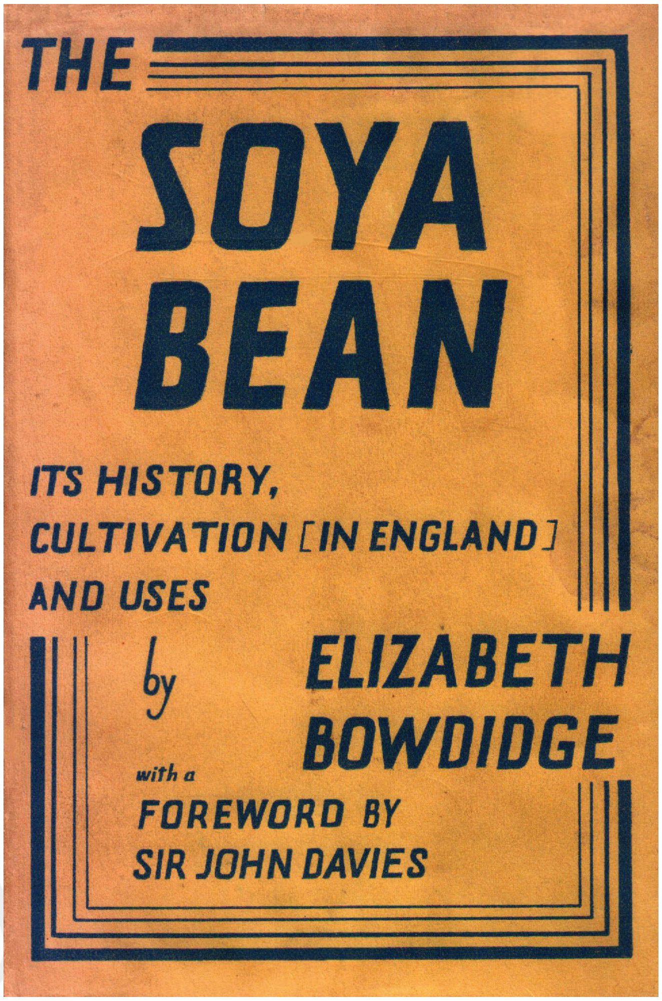
"Few, if any, seeds have as many varieties as the soybean. W.J. Morse, of the Bureau of Plant Industry, brought from the Orient samples of soybeans representing between 2,000 and 2,500 different types and varieties. The unusually wide range of differences in the characteristics of a number of soybean varieties raised the question of whether there may be differences in the nutritional value of the protein of different varieties. Information on this point would be of importance in the selection of varieties grown for the production of seed intended for food or feed.

"Significant Differences Demonstrated: Analysis of glycinin, the chief protein of soybeans, in 12 different varieties, most of them selected on the merit of their widespread popularity among the soybean growers of the United States, has shown significant differences in their composition with respect to 2 of the 4 nutritionally essential amino acids, cystine and tryptophane. The percentages in the different varieties range from 0.74 to 1.46 for cystine, and from 1.89 to 2.84 for tryptophane. Because these analyses were made on the isolated protein of the soybeans and not on the whole seed they do not give an accurate measure of the amino acids in the whole seed or meal. There are other proteins present in smaller proportions concerning the composition of which we have no information. In order to get a better picture of the protein quality of the whole seed or meal, recently developed methods have been applied for the determination of cystine and tryptophane in soybeans which give a fairly accurate picture of the amounts present in the whole seed or meal. Lysine and histidine, the other two essential amino acids, are known to be present in soybeans in adequate amounts and, therefore, have not been considered in these analyses. In table 8 are given the percentages of cystine and tryptophane in the defatted meal of several varieties of soybeans."

This table contains 3 columns: variety name, cystine (%), and tryptophane (%). The percentage of cystine ranges from 0.29 to 0.49 The percentage of tryptophane ranges from 0.91 to 1.17.

"The first six varieties listed in the table [Herman, Mammoth Yellow, Tokyo/Tokio, Peking, Illini, Chiquita], which are among the most popular grown in the United. States, show differences in their cystine content which are significant from the standpoint of their protein nutritional value. For example, the Herman variety contains more than one and three fifths times as much as the Illini variety. The six listed last in the table represent varieties of Korean and Japanese soybeans which have not yet been grown in the United States, except on an experimental basis. Their relatively high cystine and tryptophane values are of interest in case they prove to be adapted to the soil and climatic conditions in the United States." Address: Bureau of Chemistry and Soils.

887. Bowdidge, Elizabeth. 1935. The soya bean: Its history, cultivation (in England), and uses. London: Oxford University Press. xii + 83 p. Foreword by Sir John T. Davies (Director, Ford Motor Co., Ltd.). Illust. 20 cm.
• ***Summary:*** Contents: 1. Introduction. 2. The soya bean in the East: Europe, United States, Canada. 3. Description of the plant: Results of experiments in England, the 1934 experiment in Essex, yields from the four varieties, description of the four varieties, composition of English and other varieties. 4. Culture of the soya bean: Soil requirements, inoculation of the seed, preparation of soil, rates of seeding, sowing seed, cultivation, fertilizers, harvesting the crop, threshing, storage, yields in various countries, soya bean prices. 5. Soya bean hay: Feeding values, time of cutting, soya straw, soya in the mixed crop (in mixed cropping plans with sorghum, maize, etc.). 6. Soya beans for soil improvement. 7. By-products of the soya bean: Oil and its uses, notes on experiments in breeding for oil, methods of extraction, soya cake and meal, results of comparative feeding tests. 8. Food products of the soya bean.



This book describes the successful introduction and cultivation of soybeans in England. The Foreword notes (p. v): "In past years no sustained effort has been made to grow the plant on a large scale in England. The Royal Agricultural Society devoted several years to experiment at Woburn, but in 1914 they reported that the plant was quite unsuitable for growth in this country as it required more warmth than could be obtained here. The British Board of Agriculture reported in 1916 that 'the Japanese and Manchurian varieties hitherto tested cannot be relied upon to produce seed in this country."

In the Preface (p. ix) Ms. Bowdidge acknowledges: "That very able and unique work *The Soybean,* by Messrs. Piper and Morse, has been my principal source of information."

"Efforts to introduce the [soy] bean to English agriculture were begun in 1909 and given up in 1914, and except for the work of Mr. J.L. North nothing further has been done" (p. 9).

The section titled "Results of experiments in England" (p. 15-17) states: "One of the first attempts to acclimatize the soya bean in England began in 1914 at the Royal Botanic Gardens, Regents Park, when it was shown by Mr. North that certain varieties could be 'advanced' sufficiently to produce a mature crop towards the end of September. Many years devoted to careful selection of seed from the varieties in his collection had resulted in several early strains. In 1928, a hybrid was received from Canada which, on passing the experimental stage, was planted out on a number of small plots in various parts of the country. It proved to be a very reliable cropper and matured earlier than any of the sixty varieties previously under test. Planted in the first week in May it was harvested at the beginning of September, and reports of good results came from Middlesex, Essex, Berkshire, Oxfordshire, and Hampshire.

"The largest experimental test ever conducted in this country took place in 1933 at Boreham, Essex, when forty-seven different varieties of the soya bean originating from North America, Canada, Manchuria, and Japan were grown under observation. The selection included four varieties which had been acclimatized by Mr. North. Mr. North was engaged to supervise operations, and 50 lb. of his special seeds was purchased. The results obtained were most interesting."

"There is no doubt at all that the four varieties acclimatized by Mr. North were a great success; two reached maturity on September 1st and two on September 6th. In many cases plants bearing between 300 and 400 seeds were harvested."

"It has been found by Mr. North in the course of more than twenty years' study of the subject, mainly with foreign beans grown in various parts of the country, that no variety of soya bean has any chance of success in England unless it matures in less than 100 days in America. Varieties requiring this length of time in America need nearly a month more in this country and, owing to our colder spring weather, no advantage is gained by earlier sowing. Mr. North's seeds require 124 to 127 days to reach maturity in England but, if grown in America, they would only require 85 to 90 days.

The section on "The 1934 Experiment in Essex" (p. 17-23) notes: "The result of the 1933 experiment was so encouraging that it was determined that a further attempt should be made in 1934 to ascertain whether it would be possible to grow the plant profitably as a field crop and, with this in view, a field of nearly 20 acres was specially prepared for the acclimatized seeds from the 1933 crop."

Joseph Bramah, an English engineer, invented the hydraulic press in 1796, leading to a "great advance in the oil-extraction industry." All "old methods in the western world immediately gave place to the new appliance." More recently the method of solvent extraction has been developed; it is now used throughout the world and removes nearly all the oil from the seeds (p. 69).

"There is plenty of evidence as to the efficiency of soya meal in live-stock feeding, yet it does not appear to be used in this country as widely as its feeding value merits. The prejudice formed when it was first introduced in England as dairy food seems still to exist. It was thought at that time that the use of the meal might affect the taste of milk and butter; but, although this was disproved later, England remains a small user" (p. 72).

Food products of the soya bean (p. 80-83): "It is unfortunate that the inherent conservatism of English people to anything new has been the cause of past failures to popularize soya bean food products for consumption in this country. The bean contains iron, magnesium, calcium, and other mineral salts; phosphorus in the form of lecithin makes it valuable in cases of nervous disorders...

"Soya 'sprouts,' which have been grown and used for centuries in the East, have recently been introduced as a green vegetable. The beans gathered before ripe and prepared in the same manner as green peas are a very satisfactory vegetable and the dried beans, if soaked for forty-eight hours, may be cooked like haricot or butter beans and make a most delicious and nutritious vegetable dish."

There is no doubt that soybean products are gradually becoming established in Western countries. We sometimes eat soybeans without knowing it. "The bean, when properly prepared by roasting, makes an excellent cereal beverage which looks, smells, and tastes like coffee; a sauce, appropriately seasoned with spices, is the so-called 'Worcester Sauce', and soya soups made from the bean taste like beef extract. During the late war, when Germany found herself on the verge of starvation, glutamic acid, produced from the soya bean, was used in German hospitals to form the basis of beef-tea, and it is said that the ground bean also was used at that time for the making of bread. Soya bread, made from properly prepared flour, is obtainable in England and is stated to be of high nutritive value" (p. 81).

Soya flour has long been used in foods for diabetic persons requiring a low starch diet. "The flour contains more protein and fat, and less carbohydrates than ordinary cereal flours, and a certain variety manufactured in England is stated by the proprietors to contain 42 per cent. protein and 20 per cent. fat, having good keeping qualities, 0.13 per cent lecithin phosphoric acid and the vitamins A, B, D, and E. There are many food products on the London market under the names that conceal their soya bean origin. Just before the late war [World War I] an enterprising English firm was making great strides with soya products. Vegetable butter, biscuits, cocoa, milk chocolates and other confectionery, cream, cakes, bread, &c., proved quite a success until a war-time embargo placed upon the importation of soya beans

put a stop to the business; the organizers eventually went to America!" (p. 82).

The author concludes (p. 83): "The soya bean is by far the most valuable of all known beans and our farmers ought to make a serious effort to grow it. It has already been shown that the acclimatized bean will grow in this country, and if crops can be raised profitably and on a commercial basis, a service will be rendered both to the farmer himself and to the country."

Excellent photos show (see p. xiii): (1) A typical example of the soya bean plant grown at Boreham, County of Essex, in 1933. (2) The soya bean plant in full maturity. (3) Bags of English acclimatized soya beans harvested on Fordson Estates, Boreham, Essex, in 1933. Left to right: Brown 'C,' yellow 'J,' black 'O,' and green 'Jap.' (4) A sturdy specimen of the 'Jap' soya bean plant grown at Boreham, Essex in 1934. (5) The 'J' variety. (6) The 'O' variety (for hay) at the seed stage. (7) Aerial view of the soya bean field as it appeared on 29 Aug. 1934. (8) Soya beans inoculated the previous day being fed into the horse-drawn drill prior to sowing. (9) A man seated on an ordinary horse-drawn grain-drill, planting soya beans in rows wide enough to enable cultivation later on. (10) Six men stooping in a field, planting small quantities of different varieties of soya beans by hand in 30-inch rows. (11) A man walking beside a horse pulling a cylindrical roller, which helps to give the seeds a better growth and even stand. (12) Harvesting soya beans with a reaper and binder pulled by a tractor. (13) Threshing soya beans in 1934 with a mechanical 'Ruston' Thresher; many beans were split. (14) Loading sacks of soya beans onto an open-bed truck for conveyance to storage barns. (15) The first English rick of soya hay, grown in 1933. (16) Baled and trussed soya bean straw being ricked; a man is shouldering a bale atop the rick with a ladder propped against one side. (17) Heated cakes of crushed soya beans ready for hydraulic pressing at Erith Oil Mills, Ltd. (18) Soya bean cakes, after leaving the press, are passed through a paring machine where the edges are trimmed at Erith Oil Mills. Address: England.

888. *Unknown newspaper.* 1935. Soybean experts of world attend meet here today: Henry A. Wallace, Secretary of Agriculture, to speak at 3 o'clock this afternoon. 500 visitors expected. Many noted agricultural authorities on National Field Day program. Aug. 22.
• ***Summary:*** Contents: Introduction. Tours slated tomorrow. Noted men on program. Soybean banquet menu. Biggest meeting yet held. Big seed area here. Issue finally settled. Demonstrations scheduled. To reopen at Purdue.

889. *Unknown newspaper.* 1935. Soybean an aid to quintuplets. Aug. 22.

890. *Unknown newspaper.* 1935. Predict soybean will become king of crops in U.S.: Field day speakers see corn and wheat lose leadership in future 'revolution.' Gains in use as food. Product growing rapidly in importance as industrial aid, authorities claim. Aug. 23.
• ***Summary:*** This story is about the opening day of the "national field day of the American Soybean association" in Indiana. Contents: Today's program. Centuries old in China. As linseed oil substitute. Discusses soya lecithin. Solvent extraction urged. Soybean as human food. Local area discussed. Exhibitors introduced. Note: This is the earliest English-language document seen (July 2007) that uses the term "king of crops" to refer to the soybean, or that uses the word "king" in connection with soybeans.

891. Morse, W.J. 1935. Green vegetable soybeans. *Proceedings of the American Soybean Association* p. 44-45. 15th annual meeting. Held 21-22 Aug. 1935 at Evansville and 23 Aug. at Lafayette, Indiana.
• ***Summary:*** "The green, immature soybean is used extensively as a green vegetable in oriental countries. Experiment stations in Japan have developed many varieties solely for use as green beans which are classified by growers and seedsmen as garden beans. About 60 such varieties have been collected during agricultural explorations in Japan by the U.S. Department of Agriculture. These varieties, which range from 75 to 170 days in maturity, have been found to differ markedly in flavor, ease of cooking, and soil and climatic adaptations. Cooperative studies with state experiment stations and special cooperators during the past two years indicate some very promising early, medium, and late green vegetable types for regions adapted to the soybean. The most valuable of these varieties are being increased by several state experiment stations for more extensive studies.

"For green vegetable beans, the soybean should be picked when the beans have reached full size and are still green and succulent. The green beans resemble young, tender Lima beans but they have a richer and more nutty flavor... The immature beans are difficult to shell but if first boiled for about 3 minutes they shell quite readily... The usual oriental way of cooking green soybeans is to boil the beans in the pods, in water flavored with soy sauce or salt and serve them to be eaten from the pod. Many people prefer to cook the beans in the pods, boiling them in salted water for 20 to 30 minutes. The beans then shell readily and may be used as a vegetable, in salads or in soups.

"When soybeans are planted in the garden for table use, it is best to use varieties recommended for green beans. One may, however, use the common varieties although they are smaller, not so easily cooked, and usually lack the distinctive flavor of green vegetable varieties. Green soybeans are not available before midsummer and for continued use, a succession of plantings of the same variety or of varieties of different periods of ripening would be desirable. The Hahto, a medium variety, is the only green vegetable variety

at present handled by growers. The Rokusun, a late type, and two or three early Japanese varieties are being increased rapidly and should be in the hands of growers and seedsmen in the near future."

Note 1. This is the earliest document seen (June 2013) that mentions the soybean variety Rokusun, or any other large-seeded soybean variety in the United States.

Note 2. This is the earliest English-language document seen (June 2009) that uses the term "vegetable types" or "green vegetable types" or "green, immature soybeans" to refer to green vegetable soybeans. It is also the earliest English-language document seen (June 2009) that with the term "Green vegetable soybeans" in the title. Reprinted in *Good Health,* Oct. 1937. Address: Bureau of Plant Industry, USDA, Washington, DC.

892. Morse, W.J. 1935. The American Soybean Association. *Proceedings of the American Soybean Association* p. 3. 15th annual meeting. Held 21-22 Aug. 1935 at Evansville and 23 Aug. at Lafayette, Indiana.
• ***Summary:*** "The soybean crop, a crop of prime importance for many centuries in oriental countries, is no longer an unfamiliar crop to most American farmers, especially to those of the corn belt states. Within the past few years it has also become the object of considerable attention of numerous industries.

"Less than 500,000 acres of soybeans, including acreages in combination with other crops, were grown in the United States previously to 1917. During the period 1922 to 1930, inclusive, the acreage in soybeans more than trebled, 3,758,000 acres being grown in 1930. The July 1 estimate of soybean acreage for 1935 indicates 5,463,000 acres, an increase of 30 per cent over 1934, the north central states leading with a 36 per cent increase and the south central states with only 3.3 per cent increase. The most rapid increases in acreage and production during the past decade have been in the corn belt states. The production of seed, at first, was carried on in only a few well-defined regions, the initial movement in the United States being started in North Carolina. About 1910 a fairly uniform development of soybean culture and utilization began in the region east of the Mississippi River and in the states along the west bank. In 1924, 22 states produced about 5,000,000 bushels of seed and by 1931 seed production had increased to nearly 15,000,000 bushels, the leading states being Illinois, Indiana, North Carolina, and Missouri. In 1934, 17,762,000 bushels of seed were produced of which 14,797,000 bushels–about 84 per cent–were harvested in Illinois, Indiana, Iowa, and Missouri, 67 per cent of the total production of the United States being produced in Illinois and Indiana alone.

"For many years the culture and utilization of the soybean in the United States was the work of pioneers. Through the distribution of seed and literature on cultural methods, the early growers in the great Corn Belt enlisted new friends for the crop in increasing numbers, and through the efforts of growers and states colleges and experiment stations Soybean Field Days became quite common in many sections of the Corn Belt. American agriculture and industry soon realized the value of the soybean and its products and the American Soybean Association was founded in 1920 at the Soyland Farms of Fouts Brothers, Camden, Indiana, to promote and encourage the culture and utilization of the soybean in America. The work of the organization has necessarily been educational through the holding of annual meetings in cooperation with various experiment stations and colleges for the study and discussion of soybean problems and its influence has been considerable.

"The Association would be in a position to exert greater influence in the future development of soybeans in the United States if it received the active interest and continued support of growers and industry. The potential possibilities of the soybean indicate that the crop is to become of still greater economic value in the United States." Address: Bureau of Plant Industry, USDA, Washington, DC.

893. Morse, W.J. 1935. Soybeans: Ancient and modern uses. *Proceedings of the American Soybean Association* p. 34-35, 37. 15th annual meeting. Held 21-22 Aug. 1935 at Evansville and 23 Aug. at Lafayette, Indiana. [1 ref]
• ***Summary:*** The soybean "was sown yearly with great ceremony by the Emperors of China and poets in the ages before the Christian Era extolled the virtues of the soybean in its services to humanity.

"The soybean was included in the 2nd class of drugs and was regarded as having many medicinal virtues. We learn from a materia medica written about 452 A.D. that the soybean was not poisonous but was a specific remedy for proper functioning of the heart, liver, kidneys, stomach and bowels. It was also used as a remedy for constipation, as a stimulant for the lungs, eradication of poison from the system, improving the complexion by cleaning the skin of various impurities, and stimulating the growth and appearance of the hair. We also find that the fresh or green bean was used as a remedy for the following: Dropsical affections, gastric fever, paralysis, bladder trouble, improper circulation of the blood, catarrh or improper flowing of the fluids of the vital organs, heart, liver, kidneys, stomach and bowels, chills and poisoning from eating aconite. Further, it is learned that when the bean was cooked in a powder or meal-like form, the taste was sweet and good and was a remedy for gastritis, fevers, tumorous swellings, paralysis, inability to digest grain foods, and abdominal dropsy. The yellow soybean was used to increase lung power, make the body plump, and beautify the complexion. The beans were also cooked until they were of an oily consistency, mixed with hog's fat and taken in the form of pills in order to fatten and increase the strength of the body, and as a remedy for hoarseness. The soybean was said to have a cooling effect on

the human system. If the beans were boiled into a liquid form and eaten, they eradicated all poison from the system and cured gastric fever, paralysis, pains, and bladder troubles. Bean or soy sauce was considered an antidote for poison caused by eating fish, fresh meat, vegetables, mushrooms, etc. It was also said to cure poison from bites of worms, insects, and bee stings. The yellow, green, and white varieties were regarded as valuable foods for the use of mankind. The black beans were used for food and it was also customary when taking a long journey to feed the horse black beans in order to make it strong. In addition to the use of the beans, many references are made on value of bean sauce, bean milk, bean curd, and bean sprouts for various diseases and other bodily ailments. The stems and leaves of the young bean plants were boiled and eaten by the farming people. No mention is found of the use of bean oil so it is concluded the crushing of beans for oil occurred at a much later date.

"In reviewing the old records, it is most interesting to find that many of the ways in which the ancient Chinese used the soybean as a remedy for human ills are now being found applicable to the same ailments by scientific research in America and Europe." Address: Bureau of Plant Industry, USDA, Washington, DC.

894. Kellogg, John Harvey. 1935. Re: Growing soy beans. Making condensed soy bean milk and soy acidophilus milk. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, Sept. 16. 1 p. Typed, without signature (carbon copy).

• ***Summary:*** "Thank you for your letter of September 5. I am expecting to have 75 or 80 bushels of soy bean seed of the 78-day variety. I shall be glad to know if there will be any demand for this seed and at what price.

"You may be interested to know that our company is making a condensed soy bean milk which may be used either as it comes from the can or with the addition of one or two equal volumes of water according to the degree of richness desired. If you care to have me do so, I will be glad to have sent you a sample for your criticism and also a sample of our soy acidophilus which we are using extensively and with great profit."

Source: Bentley Historical Library, University of Michigan, Ann Arbor. J.H. Kellogg Collection, Box 2, Correspondence.

895. Kellogg, John Harvey. 1935. Re: Growing and canning shell soy beans. Making condensed soy milk and soy acidophilus milk. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, Dec. 9. 3 p. Typed, without signature (carbon copy).

• ***Summary:*** "We have been doing some experimenting this year with growing and canning shell soy beans. I am having a couple of cans sent you so you can see what our product is like. We think it is very fine. The few thousand cans we put up went off like hot cakes.

"We are thinking of doing rather extensive planting this year. We shall not have any seed to sell but may need to buy some more seed.

"Here are some points on which I should like information: 1. Do you know of anyone in this country who is putting up shell soy beans? 2. Are shell soy beans canned in Japan and China, and if so can they be purchased there and brought to this country?..."

"I should also be glad to know if you have other varieties of shell beans of good quality with a growing period of about the same length.

"I am also having sent to you samples of our condensed soy milk. Diluted with two or three times its volume of water, it is, I think you will agree, a very palatable product. We supply this to people who are interested in soy acidophilus milk and willing to take the trouble to make it at home. We supply them with the culture. They simply put the condensed milk into a clean fruit jar, add hot water, let it cool to body temperature and then add the culture and wrap it up in a blanket and set it on the kitchen table and the next day the buttermilk is ready.

"Soy milk produces a much more vigorous growth of the bacillus acidophilus than does cow's milk. The organism is more than twice as large and it grows twice as fast and does not require the long training, 25 to 30 transfers, required when cow's milk is used for the culture medium. In other words, the bacillus acidophilus seems to like vegetable products for a culture medium better than animal.

"I shall be glad to know how you like the milk. If you would like to try making it at home, I will have some more cans and cultures sent to you. The process is so simple any housewife can do it. Slight contamination occurs, of course, but by using a large inoculum this does not matter for the first culture; but a fresh pure culture has to be used every time. If an attempt is made to make a culture from a home made culture it will be likely to fail because of the contamination likely to occur.

"Thanking you in advance for any information you may be able to give me, I remain, dear Sir, Very sincerely yours,

"P.S. Soy acidophilus milk has become so popular at my institution here that dairy milk rarely appears on the table. Everybody likes the soy milk better, and of course when people have been properly informed they want the soy acidophilus milk to change their flora and to get rid of intestinal putrefaction and to encourage bowel action. The effect of the soy acidophilus milk in this particular is very remarkable. In cases of very chronic constipation I have observed complete recovery with two or three normal bowel actions daily.

"The Canadian quintuplets are taking soy acidophilus milk at every feeding and have been doing so since last September when they had an attack of bowel trouble which disappeared as soon as they began taking the soy acidophilus

milk which I sent them and have supplied to them ever since.

"I am accumulating evidence to the effect that the soy bean encourages the growth of the protective organisms in the human intestine to a very pronounced degree and by producing acids not only prevents putrefaction but encourages bowel action.

"I think every effort possible ought to be made to spread information among the people respecting the value of the soy bean, which I am sure is some time destined to become one of the most important staple foods in this country as well as in China and Japan.

"Here is another question: One of the difficulties in the way of the soy shell bean business is the expense of picking from the vines and shelling the pods. Do you know of any machinery that is used for either of these purposes?"

Note 1. This is the earliest English-language document seen (June 2009) that uses the term "shell soy beans" to refer to shelled green vegetable soybeans.

Note 2. This is the earliest document seen (June 2009) that mentions machinery or equipment for picking / harvesting or shelling green soybeans in the pods. However it only asks a question about this machinery.

Source: Bentley Historical Library, University of Michigan, Ann Arbor. J.H. Kellogg Collection, Box 2, Correspondence.

896. Miller, Ernest I. 1935. Soy beans: A partial bibliography. Knoxville, Tennessee: Tennessee Valley Authority, Technical Library. 16 + xii p. Unpublished manuscript. Mimeographed. Index. 28 cm. [248 ref]

• ***Summary:*** Contents: I. Culture. General. Varieties. Culture: General, states and regions. Harvesting. II. Utilization. Feeds and feeding. Fertilizers. Industrial: General, human food, oil. Composition and analysis. Patents. Addenda (22 references, in addition to the 226 references in the basic bibliography). Author index. Index to experiment station and Department of Agriculture publications, listed alphabetically by state.

Page iii states that this bibliography has drawn on the four earlier bibliographies: (1) Piper, C.V.; Morse, W.J. 1923. The soybean. McGraw-Hill. 1923. p. 288-310. (2) Seattle Public Library, Technology Division. 1930. Bibliography on soybeans. (3) U.S. Bureau of Agricultural Economics. 1931. The soybean industry in the United States. Compiled by M.I. Herb. (4) USDA Bureau of Chemistry and Soils, Food Research Div. 1933. Partial list of references on soy beans and soy bean products. 3 p. Address: Reference Librarian, Technical Library TVA, Knoxville, Tennessee.

897. Kellogg, John Harvey. 1936. Re: Growing soybeans in Michigan and making condensed soy milk. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, Feb. 13. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** Dr. Kellogg thanks Morse for his letter or Feb. 7. "The 78-day bean which you sent me a number of years ago reaches the shell bean state in 60 days and matures in 78 to 80 days." "I am interested in what you say about variety 81,031 which scored one hundred. We will be glad to obtain a supply of this variety and as much as is available."

"I shall be glad to have your criticism of the condensed soy milk sent you.

"Thanking you for the valuable information and for your gracious assistance, I am, Sincerely yours."

Note 2. This is the earliest letter seen (Aug. 1999) of various letters exchanged between Dr. Kellogg and William Morse. Note that Morse apparently wrote Kellogg first on 7 Feb. 1936. Letter from Jennifer Jacobs at Bentley Historical Library. 1999. Sept. 8. She is unable to find a letter from Morse to Kellogg dated 7 Feb. 1936 in the Kellogg Papers at Bentley. Address: Miami, Florida.

898. Morse, W.J. 1936. Re: Chusei and Bansei soybean varieties, and making soy milk. Letter to Dr. John Harvey Kellogg, Miami Springs (Miami), Florida, March 7. 1 p. Typed, with signature.

• ***Summary:*** "I have your letter of February 13 with regard to the variety of soybean which you have been increasing at Battle Creek [Michigan] for the past three or four years. The sample of beans was recently received from Battle Creek and in checking it over with our samples I find that it is identical with the type we are now calling Chusei. I may say that the seed is now being distributed under this varietal name.

"Concerning variety 81031, which I wrote you had given such good results in making a high quality milk, we have given the varietal name Bansei to this number. I think that we shall be able to furnish you with 4 or 6 pounds of seed and I feel that it should mature in ample time at Battle Creek. I take it that you wish this seed to be sent in your name at your Battle Creek address. Very truly yours, W.J. Morse, Senior Agronomist."

Note 1. This is the earliest document seen (June 2013) that mentions the soybean varieties Bansei or Chusei. Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

899. Kellogg, John Harvey. 1936. Re: Bansei soybean and making soy milk. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, March 9. 2 p. Typed, without signature (carbon copy).

• ***Summary:*** Dr. Kellogg thanks Morse for his letter or March 7. "I am very glad to know about the Bansei bean. I shall be greatly pleased if you will send me as many pounds as you can of this seed and tell me if it is possible for me to get a larger quantity for planting this year.

"We are using very considerable quantities of soy beans for milk and at the rate it is increasing will soon be requiring about a ton a week.

"I am anxious to get started with your new bean as raw

materials as soon as possible. I should also like to know whether the bean you call Chusei can be obtained in quantity for seed. I am hoping to plant two hundred acres of this bean this year to be used chiefly as a shell bean for canning. Can this be obtained in quantity either in this country or in Japan? Can the Bansei bean be obtained in Japan? I should also like to know if you can give me information about a bean which I am purchasing through a local agency here under the name of Tokyo. It comes from Norfolk here and I am informed that it is imported direct from Japan."

"I consider the soy bean one of the most remarkable of the world's food products and expect to make increasingly large use of it. I have been experimenting with it for many years, but have made rather slow progress because of the multiplicity of other matters requiring my attention. I think from now on I shall make much more rapid progress.

"Could you tell me if anyone has succeeded in making a satisfactory dry evaporated soy milk which will keep?

"Hoping I am not troubling you too much, I am

"Sincerely yours," Address: Miami, Florida.

900. United States Department of Agriculture (USDA), Office of Information, Press Service. 1936. New laboratory set up to study America's fastest expanding crop (News release). Washington, DC. 3 p. March 16.

• ***Summary:*** "Twelve Northern Central States and the U.S. Department of Agriculture have opened a cooperative soybean industrial research laboratory at Urbana, Ill. This development follows the biggest production jump in the history of this crop in America. The states are Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Nebraska, Kansas, Missouri and the Dakotas.

"Three immediate objectives of the new laboratory are: improvement of present industrial uses and development of new industrial uses for soybeans; more facts on the effects of different processes on the quality and quantity of soybean products; and facilities for testing different varieties as to adaptability for industrial use. On experimental plots nearby, plant breeders hope to grow new varieties even better suited to industrial demands.

"Soybean acreage has more than doubled in the last few years... Reasons for this increase–in addition to the demand for beans for food, feed and industrial uses–are immunity of soys to chinch bugs and other pests, good prices compared with other grain crops, drought resistance and high seed yield.

"The laboratory will be in charge of Dr. O.E. May of the Bureau of Chemistry and Soils. Breeding work will be under the direction of W.J. Morse of the Bureau of Plant Industry."

"A question the new laboratory will study is why the same soy varieties growing under varying soil and climatic conditions show a range of 12 to 26 percent in oil and 28 to 54 percent in protein. For paints, varieties having an oil high in 'iodine number' are desirable. For food purposes an oil low in 'iodine number' is better."

"The laboratory is located at the University of Illinois because Illinois is in the heart of the northern soybean area where the yellow oil varieties like the Manchus are produced; because space for housing the laboratory was available there; and because that state is the largest producer of soybean seed."

A illustration titled "The Many-sided Soybean" shows uses of soybean meal (plastics, stock feed, food) and soybean oil (floor covering, paint and cooking).

Note: Interest in soybean plastics increased in 1942 at the start of World War II. It was hoped that they might serve as an alternative to metal, which was now in short supply and being conserved for wartime uses. Address: Washington, DC.

901. Baker, Morgan. 1936. The federal diary. *Washington Post.* March 22. p. S83.

• ***Summary:*** "New laboratory opens: The Department of Agriculture and 12 North Central States have opened a co-operative soybean industrial research laboratory at Urbana, Illinois." According to the USDA, this development follows the biggest jump in soybean production in U.S. history.

The new laboratory will be under the direction of Dr. O.E. May, Bureau of Chemistry and soils. "Breeding work will be under the direction of W.J. Morse, Bureau of Plant Industry." Morse deserves much of the credit for developing soybeans into a major U.S. crop. A few years ago he spent several years in the Orient searching for better soybean varieties.

The names of the 12 co-operating states are given.

Note: The breeding work was *not* under the direction of W.J. Morse.

902. Morse, W.J. 1936. Re: Evaporated soy milk, soybean varieties, and green vegetable soybeans. Letter to Dr. John Harvey Kellogg, The Miami-Battle Creek, Miami Springs (Miami), Florida, March 26. 2 p. Typed, with signature.

• ***Summary:*** "I have your letter of March 9 and with reference to the Bansei soybean, I will say that we will try to spare you as many pounds as possible." There are no longer large sources of either the Chusei or Bansei soybean in this country at present... we obtained the seed from The Yamato Seed Co., Tokyo, Japan. The Bansei was obtained from them under the name *Bansei O Sayada Mame* [probably *Bansei O Saya Eda Mame*] and the Chusei under the name *Chusei O Saya Eda Mame."*

Note: In Japanese, *Bansei* and *Chusei* mean "late grower or late development" and "medium grower or medium development" respectively. *O Saya* means "large pod." *Eda Mamé*–pronounced ay-dah-MAH-may–means "green vegetable soybean."

"The sample of seed which you enclosed is the Tokyo variety and has been grown in this country for many years. During the past two or three years it has increased to a

considerable extent especially in North Carolina, Tennessee, and Mississippi. It is not imported from Japan. All of the seed which is in this country was grown in the states mentioned above. It may interest you to know that in North China and southern Manchuria this light, greenish yellow bean is used in the manufacture of bean milk and bean curd. I am quite sure that you will have no difficulty in obtaining almost any quantity of Tokyo through North Carolina growers and seed dealers... In North Carolina and Virginia you can obtain the Tokyo through the following: T.W. Wood & Sons, Richmond, Virginia, Geo. Tait & Sons, Norfolk, Virginia, The Buxton White Seed Co., Elizabeth City, North Carolina, and F.P. Latham, Belhaven, North Carolina."

"Mr. J.H. Strawser of the Washington Sanitarium, Takoma Park, Maryland, sent me one of the nicest samples of evaporated soy milk that I have ever seen... I understand that Dr. Miller, who is associated with the Missionary College and now stationed in China, has one or two factories producing this soy milk powder. While Mr. Strawser was experimenting with the milk I understood that the soy milk was evaporated through the regular process used in evaporating cow's milk."

Note: This is the earliest document seen (Aug. 2013) concerning the work of Dr. Harry Miller with soyfoods or soy milk.

"The Seaboard Airline Railway, at its experimental farm near Hamilton, North Carolina, has been testing some of our green vegetable soybean varieties. Last year they froze some of the beans and have been sending samples to various places. From all reports it is evident that the frozen bean is a most excellent food product."

Note: This is the earliest document seen (March 2001) concerning the work of a small Seventh-day Adventist food company (the Washington Sanitarium, Takoma Park, Maryland) with soyfoods. Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

903. Kellogg, John Harvey. 1936. Re: Soy Acidophilus Milk and the Dionne quintuplets. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, March 30. 2 p. Typed, without signature (carbon copy).
• ***Summary:*** "We are having great success with our soy acidophilus milk. It cured the [Dionne] quintuplets of serious trouble and keeps them in good health. They have been using it regularly in their daily food for more than a year and a half. Dr. Dafoe writes me that he cannot get along without it. When he stops the use of it the bowels get bad and he has to resume its use at once. I shall be glad to have a liberal sample of this milk sent to you if you would like to try it."

"Sincerely yours,

"P.S. Dr. Miller of China is one of my old students. He sent me a sample of his soy milk powder. It was very fine in appearance, but had a rancid flavor...

"I shall be very glad indeed if you will let me have as much seed as you can of rapid growing vegetable varieties of soy beans. I am planting 150 acres this year, but will be glad to plant 50 more if I can get sufficient seed for the purpose." Address: Miami, Florida.

904. Morse, W.J. 1936. Re: Soy acidophilus milk and the Dionne quintuplets. Letter to Dr. John Harvey Kellogg, The Miami-Battle Creek, Miami Springs (Miami), Florida, April 4. 1 p. Typed, with signature.
• ***Summary:*** "I have your letter of March 30 and was very much interested in the use of your acidophilous [sic, acidophilus] milk by the quintuplets. It seems that Dr. Dafoe certainly should give a good recommendation for your product.

"About a year ago when you returned from Miami [Florida] you left at the Union Station about a half gallon of this acidophilous milk. I liked the product very much and found no difficulty at all in keeping it in the ice box. I should be glad to receive another sample from you.

"I presume that after May 1 you will be at Battle Creek. It will probably be some time in May before I shall know just what amount of seed of Bansei I shall have available. I am planning to send you all that we have left at that time." Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

905. Kellogg, John Harvey. 1936. Re: Soy acidophilus milk. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, April 11. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have your letter of April 4. I have some friends who are going from here to Washington about May 1st and will have them take along several bottles of soy acidophilus milk to hand out to you. It is becoming quite popular here. We have been using 30 to 40 gallons a day for several months. It is much more popular with our patrons than cow's milk."

906. Herrick, H.T. 1936. Meeting of the collaborators of the Regional Soybean Industrial Products Laboratory. Urbana, Illinois. 10 p. 28 cm.
• ***Summary:*** This report (minutes) describes the first meeting of this new organization, held in room 218, New Agriculture Building, University of Illinois, on 22 April 1936.

"O.E. May, Director, Regional Soybean Industrial Products Laboratory, Washington, D.C., called the meeting to order at 10:00 A.M. Each member was called upon to introduce himself. Those present were:

"W.L. Burlison, Head, Dep. of Agronomy, Univ. of Illinois (UI).

"H.R. Kraybill, Prof., Agricultural Chemistry, Purdue Univ. [Indiana].

"R.E. Buchanan, Director, Agric. Experiment Station,

Iowa State College.

"R.M. Hixon, Prof., Plant Chemistry, Iowa State College.

"H.H. King., Head, Dep. of Chemistry, Kansas State College.

"C.H. Bailey, Prof. Agricultural Biochemistry, Univ. of Minnesota.

"W.C. Etheridge, Head, Dep. of Field Crops, Univ. of Missouri.

"W.W. Burr, College of Agriculture, Univ. of Nebraska.

"T.H. Hopper, Head, Dep. of Agricultural Chemistry, North Dakota Agricultural College.

"R.M. Salter, Head, Dep. of Soils, Ohio State Univ.

"A.N. Hume, Prof., Agricultural Chemistry, Univ. of Wisconsin.

"W.J. Morse, Bureau of Plant Industry, U.S. Department of Agriculture.

"J.L. Cartter, Bureau of Plant Industry, U.S. Dep. of Agriculture.

"H.T. Herrick, Bureau of Chemistry and Soils, U.S. Dep. of Agriculture.

"O.E. May, Director, Regional Soybean Industrial Products Laboratory.

"Doctor Burlison nominated Mr. Herrick for secretary, which nomination was seconded and carried.

"Doctor May gave a brief history of the Soybean Laboratory. The Laboratory was organized to deal primarily with the following projects:

"(1) Industrial utilization of the soybean meal.

"(2) Study of the utilization of soybean oil.

"(3) Chemical engineering.

"(4) Analytical.

"The projects as submitted were then discussed thoroughly by each collaborator in turn. It was moved by Doctor Burlison and seconded by Doctor Link that the outline of proposed project and subproject titles be approved by the committee as a basis for the research program of the Regional Soybean Industrial Products Laboratory."

Note: This is the earliest document seen (Dec. 2016) that contains the term "Regional Soybean Industrial Products Laboratory." That name may well have been coined at this meeting.

Source: Univ. of Illinois Archives, Agriculture, Dean's Office Subject Files 1895-1994. R.S. 8/1/2. Box 28. Folder: Soybean Regional Research Lab. Address: Secretary, Bureau of Chemistry and Soils, U.S. Dep. of Agriculture.

907. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries. *Monthly Bulletin of Science and Practical Agriculture* (*International Institute of Agriculture, Rome*) 27(4):117T-49T. April.

• ***Summary:*** Note: The authors use the terminology "Soya is..." throughout the document.

Contents: Part 1. I. General remarks. II. Breeding: Natural selection breeding, pedigree selection, mass selection, selection by cross fertilisation, characters sought for in selection (richness in oil and protein, resistance to disease, yield in seed).

III. Classification of the different varieties of soya (by colour of the seed coat, blossom colour, pubescence, cotyledon colour, seed forms and sizes, hilum colour, pod formation and size and colour), growth periods (early, medium, late, etc.), height and form of plant, growth habits (vining, upright, etc.), leaves (size and shape).

IV. Varieties cultivated in the different countries. A. America: United States (lists alphabetically the names, synonyms, and principal characteristics of the 183 most important varieties presently cultivated; the description of each includes, if known, the date of introduction and place of origin, description of plant, days to mature, seed color, size, and composition). The following varieties are listed. Those followed by an asterisk (*) are not found in any previous seed list: A.K., Aksarben, Aksawa*, Amherst, Arlington, Auburn, Austin, Banner (see Midwest), Barchet, Biloxi, Black Beauty (see Ebony), Black Champion, Black Eyebrow, Black Eyebrow selection I, Black Eyebrow selection II, Black Sable (see Peking), Bopp (see Chernie), S.P.I. 1492, S.P.I. 1492 selection, F.C. 1829, S.P.I. 19186, S.P.I. 19981–I, S.P.I. 20409, S.P.I. 37246, S.P.I. 30594, S.P.I. 30745, S.P.I. 30746, S.P.I. 37053, S.P.I. 37062, S.P.I. 37062 selection, S.P.I. 37241, S.P.I. 37261, S.P.I. 37261 selection, S.P.I. 37294, S.P.I. 37298, S.P.I. 37301, S.P.I. 37396, S.P.I. 38455, S.P.I. 40114, S.P.I. 40371, S.P.I. 44210, S.P.I. 44212, S.P.I. 44508, S.P.I. 44510, S.P.I. 46689, S.P.I. 47131, Brooks, Brown (see Mammoth Brown), Buckshot, Buster Brown*, Buster Brown selection*, Cayuga, Chernie, Chestnut, Chiquita, Cloud, Columbia, Columbian (see Columbia), Dixia [sic, Dixie], Dunfield, Early Black, Early Brown, Early Green (see Medium Green), Early Green selection, Early Virginia Brown (see Virginia), Early Wilson (see Wilson), Early Wisconsin Black (see Wisconsin Black), Early Yellow (see Ito San), Easycook, Easycook selection, Ebony, Eda, Edward, Elton, Essex (see Peking), Extra Early Black Eyebrow (see Black Eyebrow), Extra Select-Sable (see Peking), Fairchild, Giant Brown (see Mammoth Brown), Goshen Prolific, Green (see Medium Green), Guelph (see Medium Green), Habaro, Haberlandt, Hahto, Hahto selection, Hamilton, Herman, Hollybrook, Hollybrook selection, Hongkong, Hoosier, Hope, Hope selection, Hybrid 5-L-3*, Illini, Ilsoy, Indiana Hollybrook (see Midwest), Ito San, Ito San Cross, Jet, Kentucky*, Kingston, Laredo, Laredo Selection, Large Brown (see Mammoth Brown), Large Yellow (see Mammoth Yellow), Late Yellow (see Mammoth Yellow), Lexington, Mammoth (see Mammoth Yellow), Mammoth Black (see Tarheel Black), Mammoth Brown, Mammoth Yellow, Manchu, Manchu selection I, Manchu selection II, Manchuria (see Pinpu), Mandarin,

Medium Early Green (see Medium Green), Medium Early Yellow (see Ito San), Medium Green, Medium Yellow (see Midwest), Merko, Meyer, Midwest, Mikado, Minsoy, Mongol (see Midwest), Morse, Nemo, Nuttall, Ogemaw, Ohio 9001*, Ohio 9035 (see Hamilton), Ohio 9035 selection*, Okute, Old Dominion, Otootan, Peking, Perley's Mongol (see Midwest), Pinpu, Red Sable (see Peking), Riceland, Roosevelt (see Midwest), Roosevelt Medium Early Yellow (see Midwest), Royal (see Wilson Five), Sable (see Peking), Shanghai (see Tarheel Black), Sherwood, Shingto, Shingto selection, Sonoma*, Sooty, Southern (see Mammoth Yellow), Southern Prolific, Soysota, Taha selection, Tarheel (see Tarheel Black), Tarheel Black, Tarheel Brown (see Mammoth Brown), Tashing, Tokyo, Tokio selection, Toyonago*, Trenton, Thurnoko* [Tsuronoko?], Verea*, Virginia, Virginia Early Brown (see Virginia), Watson Black*, Wea, White Eyebrow, Wilson, Wilson-Five, Wing Jet, Wisconsin Black, Wisconsin Early Black (see Wisconsin Black), Wisconsin Pedigreed Black (see Wisconsin Black), Yellow (see Mammoth Yellow), Yoko (see Yokoten), Yokoten, Yosho, Yosho selection.

Varieties grown in each of America's 5 regions. Principal states of North America where soya is grown (Gives a little history and lists the most popular varieties and how/where grown): Indiana, Illinois, Missouri, North Carolina.

A sample description of one of the 183 varieties listed is: "Morse.–Introduced from Newchwang, Manchuria, in 1906. This variety is said to be the most commonly used for oil extraction, the pressed cake being exported to Japan and Southern China as a very valuable fertilizer. Plants stout, erect, bushy, maturing in about 130 days; pubescence gray; flowers both purple and white, 50 to 55 days to flower; pods 2 to 3 seeded; seeds yellowish green with brown hilum, about 2,500 to the pound; germ yellow; oil 18.1%." Note: Though soybean pioneer William Morse did not join the USDA until June 1907, this variety (S.P.I. No. 19186, collected and sent to the USDA in Aug. 1906 by Frank N. Meyer) was later named after Morse.

Example of a state (p. 172): "State of Maryland: The total area planted with soya in Maryland in 1925 was 35,000 acres and since then it has increased steadily. This increase in the area cultivated is due to the fact that farmers wished to reduce their expenditure on concentrated foods. To begin with soya was grown to replace cow peas in the coastal plains and afterwards was generally grown in all the counties of the State. The principal region of cultivation for forage is the dairying district of Piedmont; for seed production, the South-Eastern part of the coastal plains.

"The Experiment Station of Maryland has tested more than 200 varieties, but of these only 30 have been entirely satisfactory.

"With the exception of the quantities necessary for domestic consumption, soya is almost exclusively grown for forage, the best varieties for this purpose being Virginia and Wilson. The late varieties should only be employed in cases where there is a lack of seed." Address: Rome, Italy.

908. Morse, W.J. 1936. Soybean introductions named in January 1936 (Leaflet). Washington, DC: USDA, Bureau of Plant Industry, Div. of Forage Crops and Diseases. 2 p. April 7.

• ***Summary:*** A table (p. 1-2) lists the following 25 soybean varieties, sorted by F.P.I. numbers. For four varieties, the FC (forage crop) number is given in parentheses after the F.P.I. number: Georgian, Palmetto, Monetta, Creole, Waseda, Osaya, Chusei (FC 19976), Chame (FC 19977), Higan (FC 19978), Sousei (FC 19979), Goku, Rokusum [Rokusun], Fuji, Bansei, Shiro, Hakote, Sato [black seeded], Kura [black], Kanro, Hokkaido, Hiro, Toku, Jogun, Suru, Nanda.

For each variety the following information is given: F.P.I. Nos., seed color, days to maturity, use, and states grown (such as southern, north and north central, etc.). Use codes: G = Grain. F = Forage. G.V. = Green vegetable. D.B. = Dry edible bean. Color codes: S.Y. = Straw yellow. O.Y. = Olive yellow. Gr. = Green. Bl. = Black. Br. = Brown. Note: Black soybean varieties are Sato, Kura, and Hiro.

An attached page, titled "Soybeans named in January, 1936," by W.J. Morse, lists 21 soybean varieties in a 3-column table, along with the F.P.I. numbers and (in some cases) the FC [forage crop] number in parentheses. All of these varieties appear among the 25 varieties listed above.

Note 1. This is the earliest document seen (Aug. 2013) that mentions the following soybean varieties: Chame, Fuji, Goku, Hakote, Higan, Hiro, Hokkaido, Jogun, Kanro (in USA), Kura, Nanda, Osaya, Sato, Shiro, Sousei, Suru, Toku, and Waseda.

Note 2. This is the earliest document seen in which soybeans are classified by use as "green vegetable" or "dry edible bean" or both. The difference between the two is not explained. Eight varieties are classified as "green vegetable" only: Chame, Hakote, Hiro, Kura, Nanda, Sato, Sousei, and Waseda. Twelve varieties are classified as both: Bansei, Chusei, Fuji, Higan, Hokkaido, Jogun, Kanro, Osaya, Rokusun, Shiro, Suru, and Toku. No varieties are classified only as "dry edible bean." By "dry edible bean" Morse apparently means that this variety is suited to be made into various types of food. The next year, in the 1937 *USDA Yearbook of Agriculture* Morse and Cartter, in an article titled "Improvement in Soybeans" state (p. 1163): "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 [soy milk], and bean curd [tofu]." Address: Div. of Forage Crops & Diseases, Bureau of Plant Industry, USDA [Washington, DC].

909. W.J. Morse, R.M. Salter and J.L. Cartter (Photograph).

1936.
• ***Summary:*** This photo shows W.J. Morse (Bureau of Plant Industry [BPI], USDA), R.W. Salter [sic, Robert M. Salter], and J.L. Cartter (BPI, USDA) seated at the Regional Soybean Laboratory Conference in Urbana, Illinois. Salter is smoking a pipe.

Note: In his personal scrapbook, W.J. Morse dated this photo as 1937 and wrote that Salter was Chief, Bureau of Plant Industry. However it seems much more likely that this photo was taken at the inaugural meeting of the "Regional Soybean Industrial Products Laboratory" on 22 April 1936, at the University of Illinois, Urbana, Illinois. The minutes of that meeting show that all 3 men were present. At the time of that April 1936 meeting R.M. Salter was Head, Dep. of Soils, Ohio State Univ. He did not become head of USDA's Bureau of Plant Industry until 1942–which indicates that Morse did not date this photo until after 1942!

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004). Address: Univ. of Illinois, Urbana, Illinois.

910. Barton, William S. 1936. Our expanding universe: A department interpreting the news in science. *Los Angeles Times.* May 17. p. H15.
• ***Summary:*** An anonymous farmer writes that U.S. newspapers are overlooking the biggest event of the century in agriculture. According to USDA statistics, the U.S. soybean crop has just doubled in size, from 20 million bushels in 1934 to more than 40 million in 1935. And soy bean production has increased eight-fold in the past 10 years. This makes it America's fastest growing crop. The writer contends that the best way for the farmer to help himself is to develop new crops required by both industry and the human stomach [the basic idea of Chemurgy].

Science has played a major role in establishing soybeans as an important U.S. crop and in opening up new markets for soy products. Much of the credit goes to William J. Morse of USDA's Bureau of Plant Industry. For more than two years he traveled through the Orient, collecting many soybean varieties and sending them back to the USA.

Today soy beans are used in making a wide variety of industrial products, from paint, enamel, varnish, glue and printing ink to rubber substitutes, linoleum, plastics for auto parts and glycerine. They are also used to make various food products such as soy flour, soy sauce, candies, breakfast foods, roasted nut-flavored beans, etc.–as well as livestock feeds.

Twelve North Central States and the USDA recently opened a major soybean industrial research laboratory at the University of Illinois.

Presently 35 mills are crushing soybeans for oil and meal, and a number of cottonseed oil mills are doing the same. Twenty companies are "manufacturing soy foods products, fifteen mills are making soy-bean flour and more than fifty factories are turning out industrial products."

911. Kirk, L.E. 1936. Memorandum on soybeans: Varieties, introduction, selection, breeding, variety testing and other experimental work–of the Division of Forage Plants, Central Experimental Farm, Ottawa. In: National Research Council of Canada. 1936. Proceedings of the Second Conference on Soybeans. Ottawa, Canada. 18 p. See Appendix A, p. A1-A5. Held on 4 May 1936 at the National Research Building, Ottawa. [4 ref]
• ***Summary:*** Contents: Varieties. Introduction. Selection. Breeding. Variety testing. Other experimental work.

Details (including seed color, maturity, and yield) are given on the following soybean varieties produced in Canada in commercial quantities: O.A.C. 211 (by the Ontario Agricultural College), A.K. (Harrow strain), Mandarin (Ottawa strain), Manitoba Brown (or Ogema [Ogemaw]; introduced many years ago from the USA), Wisconsin Black (introduced from Wisconsin), Manchu (Hudson).

"Introduction: Large numbers of soybean introductions have been tested at Harrow since 1923, and at Ottawa since 1928. These have come mainly from Manchuria either directly or indirectly through the United States Department of Agriculture, or Mr. J.L. North, Royal Botanic Gardens, London, England. Others were sent to us by Mr. R.R. Kabalkin of London, England. In some cases we were able to obtain seed samples from districts well to the north of Harbin. Nearly all of our best selections have been made from material introduced directly from Manchuria or that obtained from Mr. J.L. North."

"As the result of an extended trip through Manchuria, occupying two years, Dr. [sic] W.J. Morse, in charge of soybean investigations for the United States Department of Agriculture, brought back about 8,000 seed samples of soybeans. These were grown and classified according to maturity. We were supplied with a complete set comprising the earliest maturity group. Not one of these lots matured as early as our own strains and the great majority did not

ripen at all. Nearly all developed a bad attack of Mosaic, which was introduced with the seed. None of the U.S. strains proved to be of any value."

Breeding: "In 1936, about 30 of the best strains will be subjected to a thorough strain test at Ottawa, and at six branch farms, namely, Nappan [Nova Scotia], Fredericton [New Brunswick], Lennoxville [Quebec], Harrow [Ontario], Brandon [Manitoba] and Lethbridge [Alberta]. One very early strain is being increased at Lennoxville, and a majority of them are being multiplied in a small way at Ottawa."

"Variety testing: A standardized test of soybean varieties for seed production, and also for hay production, is conducted each year at Ottawa," at the six branch farms listed above, and at Kentville (Nova Scotia), Morden (Manitoba), Summerland (BC), and Agassiz (BC). "The results of these tests have shown that, with the exception of Ontario, all other provinces require varieties for seed production that are earlier than Mandarin in maturity. The Mandarin variety, however, has produced excellent crops of mature seed in some years in Quebec and the Maritime Provinces; at Brandon, Manitoba, and at Summerland, B.C. Generally speaking, however, there is no yellow seed variety available commercially with a sufficient margin of safety under practical farm conditions to enable the beans to fully mature with reasonable certainty at any of the above places."

Other Experimental Work: "Valuable information on varietal adaptation has been obtained each year from farmers, especially in Quebec and the Maritime Provinces, to whom we have supplied seed for small tests."

Note 2. This is the earliest document seen (Dec. 2016) that contains the term "maturity group." However the meaning is not the same as that which emerged after about 1942-1946. Address: Dominion Agrostologist, Canadian Dep. of Agriculture, Ottawa, Canada.

912. Morse, W.J. 1936. Re: Bansei soybeans and acidophilus soybean milk. Letter to Dr. John Harvey Kellogg, Battle Creek Sanitarium, Battle Creek, Michigan, June 3. 1 p. Typed, with signature on letterhead.
• ***Summary:*** Morse is sending Kellogg 12 pounds of Bansei soybeans, the type Morse found most promising for making soybean milk. "I wish to thank you for the bottle of Soy Acidophilus which one of your assistants brought to Washington a few weeks ago. I like this milk very much and am planning to use the acidophilus culture with some soybean milk." Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA, Washington, DC.

913. Kellogg, John Harvey. 1936. Re: Growing soybeans in Michigan for used as a canned green vegetable. Letter to Mr. William J. Morse, Bureau of Plant Industry, USDA, Washington, DC, June 14. 1 p. Typed, without signature (carbon copy).
• ***Summary:*** "I have your letter of June 3. The seed has arrived and it has been planted and I hope it will mature in this climate.

"We are planting this year a hundred acres of soy beans of the 78-day variety. We expect to can a large part of those beans as shell beans. We shall let part of the crop ripen and may have some surplus as seed... Thanking you for your courtesy in sending us some more Bansei seed."

914. Breeding soybeans at Hudson Heights, P.Q. [Quebec]. 1936. In: National Research Council of Canada. 1936. Proceedings of the Third Conference on Soybeans. Ottawa, Canada. 34 p. See Appendix F, p. F1-F2. Held on 30 June 1936 in the National Research Building, Ottawa, Ontario, Canada.
• ***Summary:*** Mr. Macaulay presently has about 3 acres devoted to the breeding of soybeans in Quebec. The most promising varieties have come from Russia, Siberia, Washington, DC, and Manchuria. Mr. Macaulay believes that some of his soybeans came from a Russian government experiment station in Siberia, at Blagoveshchensk (latitude 50º); it has a reputation of being very fine. Using strains derived from the Moscow seed (106-110 days), from those believed to come from Blagoveshchensk (perhaps 103 days), and from Mr. William Morse in Washington, DC (112-115 days), he hopes to develop varieties that will mature in about 100 days.

"Hybridization of soybeans is difficult because of the very small size of the flowers, and Mr. Macaulay has done no artificial hybridizing. The soybean is naturally self-fertilizing to the extent of 98 or 98½ per cent; 1½ to 2 per cent of seeds grown naturally are crossed from adjoining plants. Just how this happens is not known definitely, but it is believed to be due to the action of thrips. A number of natural hybrids have been discovered in his rows and some of these are very promising. The best are believed to be hybrids between Manitoba Brown (100 days) and the Moscow strains."

"Mr. Macaulay paid emphatic and generous tribute to the work of Mr. Dimmock at the Central Experimental Farm at Ottawa [in Ontario province, Canada]. Beginning with artificial hybrids made between the Manitoba Brown and Mandarin, Mr. Dimmock has now developed from these hybrids strains of yellow beans that are highly promising."

"Mr. Macaulay is not hopeful at present of the possibility that either at Ottawa or at his farm strains earlier than Manitoba Brown will be developed. Present indications are that a growth period of about 100 days is the minimum necessary for the plant.

"The soy bean plant also has a great future for use as hay, the more vigorous types being preferred for this purpose. The soybean may thus have a value considerably further north than the area in which it will be able to be successfully grown for grain purposes."

915. Read, Betty. 1936. The federal diary. *Washington Post.* July 11. p. X12.
• ***Summary:*** "P.H. Dorsett who is retired from the division of plant exploration and introduction in the Department of Agriculture, was honored recently for the work he did while in the Government service as a plant scientist. He was presented with the Meyer Medal for distinguished service in plant introduction, a medal awarded at intervals by the council of the American Genetic Association. The medal is named in honor of the late Frank Meyer, pioneer plant explorer of the department, who originated the fund.

Dorsett, who now lives in Beltsville [Maryland], "made his greatest contribution to the country's agriculture between 1924 and 1927 when he brought together the largest collection of soybean varieties ever made. He is being honored for that accomplishment and for his plant exploration trips in many parts of the world."

916. Thone, Frank. 1936. The soybean goes to town: Used in scores of products, from noodles and beer to steering-wheels and paint, Chinese bean shows versatility. *Science News Letter* 30(799):74-76. Aug. 1.
• ***Summary:*** Contents: Introduction. Food for recovery. Wallpaper and glue. Oil requires processing. Economical and efficient. For mixing with silage. Fifty varieties listed. A one-ingredient meal.

Under the latter heading (p. 75-76): "The beans themselves are boiled for the table, and eaten in a dozen other ways, including the succulent bean sprouts you fish for in your plate of chow-mein, and salted parched soybeans that are much like roasted peanuts. It is quite possible to make up a reasonably complete, appetizing meal out if soybeans alone.

"We are beginning to appreciate their value as food, too, in the Occident. Canned soybeans are on the market and soybean flour is at a premium among knowledgeable housewives.

"And finally there is our old friend, the soybean sauce of the chop-suey restaurants–that dark stuff in the hair-tonic bottles, that has such a tangy, salty taste. It is made by fermentation, and after proper aging is shipped to this country. That is, the cheaper kind of 'dragon's blood' comes here. The really choice varieties, aged in jars for years, with daily exposure to the sun, are for merchants and mandarins, not export."

Three photos show: (1) Two men in a field of beans. "The crop looks good: in a soybean field down south." (2) William Morse standing in front of a cupboard in his office, with many shelves well filled with soybean products. (3) The upper part of a soybean plant, showing pods, leaves and seeds. Address: Dr.

917. Fairchild, David. 1936. Award of Meyer Medal to P.H. Dorsett. *J. of Heredity* 27(8):307-10. Aug.
• ***Summary:*** "The Frank N. Meyer Medal has been awarded again by the Council of the American Genetic Association, this time to P. Howard Dorsett, a member of the group of persons who built up the Plant Introduction Service of the Department of Agriculture." Contains a good description of Dorsett's life and work. P.H. Dorsett, a son of the Great Plains, was born in Illinois 74 years ago. "He grew up in a pioneer community in which self-discipline was perhaps the most pronounced feature. He acquired those habits of vigilance, alertness and persistence, without which no farm in this country could be successfully run, at least so it was believed in the eighties [1880s]. Early hours and late hours were looked upon so constantly as the price of success that they became a fixed habit of existence... It was to this rigorous regime that young Dorsett habituated himself, and he has adhered to it throughout his career as a builder of Plant Introduction Gardens and as an Office Administrator and an Agricultural Explorer in foreign countries." He always regretted that he did not have a profound knowledge of systematic botany or even the ability to identify at sight "a large collection of trees or shrubs and give them their correct botanical names; his interest in plants was not in their names but in their behavior."

The five Plant Introduction Gardens in the USA owe their existence largely to him. "In these propagating stations millions of young plant immigrants were nursed until they had grown to a size suitable for trial by experimenters throughout the country."

"Early in his career he took up photography, and with his usual zest, perfected his own technique. Today his collection of field and studio photographs constitutes an invaluable record... He developed to its logical conclusion a system of illustrated travel reports, the bound volumes which

now cover many shelves in his library."

"Dorsett's first foreign expedition was to Brazil in 1914." In 1921 Dorsett and Fairchild went to Panama together.

"Dorsett's and my own interest in the Soy Bean as a crop for America began in the earliest days of our association in the work of Plant Introduction and his experience with it in our Gardens as an emergency crop during the World War fixed its importance in his mind.

"On his first trip to the plains of Manchuria [1924-1926], where soybeans form the staple grain crop, he was stimulated to collect all the varieties he could get his hands on, knowing that from them would come, either directly or through hybridization and selection, the future soy bean varieties of America. He sent in over two thousand strains and varieties during that expedition, and a few years later, on a second trip [1929-1931], when he was accompanied by W.J. Morse, the soy bean expert of the Department, even more were collected. This is not the place for a detailed account of Dorsett's contribution to the great soybean industry of America; it should appear in the book which I assume Mr. Morse is writing."

In 1925-26 Dorsett and his son, Jim, left their winter camp in Manchuria and joined Mr. and Mrs. Fairchild in Ceylon; they collected plants in Ceylon, Sumatra, and Java. With his tireless energy, Dorsett was one of the "Old Guard" of Plant Introduction to the USA.

A photo by S.H. Hastings shows (left to right): Dr. Hassell, zoologist and old-time friend of Dorsett's. O.F. Cook. Guy N. Collins. C.S. Scofield (tall). P.H. Dorsett, the shortest of the group, dressed all in white, wearing a bow tie and holding the medal. David Fairchild. T.H. Kearney. Walter T. Swingle.

918. LeClerc, J.A.; Bailey, L.H. 1936. Soybeans and soybean flour and the effect of storage conditions upon the composition of soybeans. *Proceedings of the American Soybean Association* p. 16-20. 16th annual meeting. Held 14-16 Sept. in Iowa.

• ***Summary:*** "In a paper read before the Soybean Association last year, we made the statement that soybeans have for centuries been the 'staff of life' of millions of Orientals. Soybeans have been their chief source of protein and a large source of minerals and vitamins. We also stated that in this country up to now soybeans have played a very insignificant role in human nutrition; that the production of soybeans in the United States amounts to less than 7% of the world production, whereas we produce 75% of the world corn crop and 20% of the world wheat; that the principal centers of soybean production in this country are Illinois, Indiana, Missouri, North Carolina, and Iowa, the first three alone producing 70% of the total seed crop; that the composition of soybeans varies largely with the locality where they are grown; that the fat content may be as low as 13% and as high as 24%; that the protein may range from 30 to 47% and that as a rule beans with high fat are low in protein. We also described various methods of processing soybeans in order to remove the objectionable beany taste."

"Most of the foods consumed by Americans are low in minerals and in vitamins. Such foods furnish more than 70% of the average American intake of 3,000 calories per capita per day, leaving less than 30% of our calories to be supplied by the so-called protective foods. Sherman claims that at least one-half of our caloric intake should consist of fruits, green vegetables, eggs, and dairy products. Hence soybean flour, being rich in minerals, rich in high quality protein, rich in fat, and rich in vitamins, might well be considered among the protective foods and given its proper place in the American diet.

"As compared with about 30 other commonly used foods (cereals and cereal products, legumes, green vegetables, potatoes, fruits, milk, butter, eggs, cheese, sugar, lard, meats and nuts) soybean flour is richer in protein as well as in minerals. It is richer in fat than any of these foods except cheese, nuts, smoked ham, butter and lard, and it is also rich in vitamins. Soybean flour, in other words, is rich in the most expensive food constituents.

"At prices prevailing last year, corn meal, potatoes and cabbage were the only foods cheaper than soybean flour. One could buy, for example, the following amounts of food constituents for 10 cents:

"Minerals: 35-50 grams in soybean flour, 14 grams in corn meal, 5 grams in milk, 2 grams in round steak, and less than 1 gram in pecans. Lard and sugar furnished none.

"Calcium: 2.5 grams in soybeans, 1.8 grams in dried beans or cheese, 0.8 gram in milk, 0.5 gram in spinach, 0.2 gram in unbolted corn meal, and 0.15 gram in white flour.

"Protein: 350-500 grams in soybeans, 200 grams in dried beans, 135 grams in oatmeal, 63 grams in rice, 31 grams in potatoes, 16 grams in peanuts, and 8 grams in pecans.

In the second half of this paper, the authors present "the results of recent research to determine the changes which take place in soybeans stored under different conditions. This investigation was undertaken for the purpose of studying the changes in the content of lecithin, sugars, soluble nitrogenous compounds and in the urease activity, but principally to note the behavior of the lecithin. Until recently lecithin has been obtained chiefly from egg yolk. Today, the chief source of this lipoid is soybean oil.

"For this study the soybeans used (mammoth yellows) were those under observation by Davidson and Morse, of the Bureau of Plant Industry. These beans were stored in sealed containers at five different temperatures ranging from 14-87º F, for more than one year. The moisture content of two lots of the beans at the time of storage was 6.4 and 18.6% respectively. Two other lots of beans with moisture content of 7.4 and 14.2% respectively, were stored for two years in

sealed tins and also in cotton bags. These were kept at room temperature.

"Our results (see Table I) indicate that mammoth yellow beans" should be stored with a moisture content of 14.2% or less, in a well-aerated place (or in bags) at ambient temperature (the lower the better). Address: Food Research Div., Bureau of Chemistry and Soils, USDA.

919. 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 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.

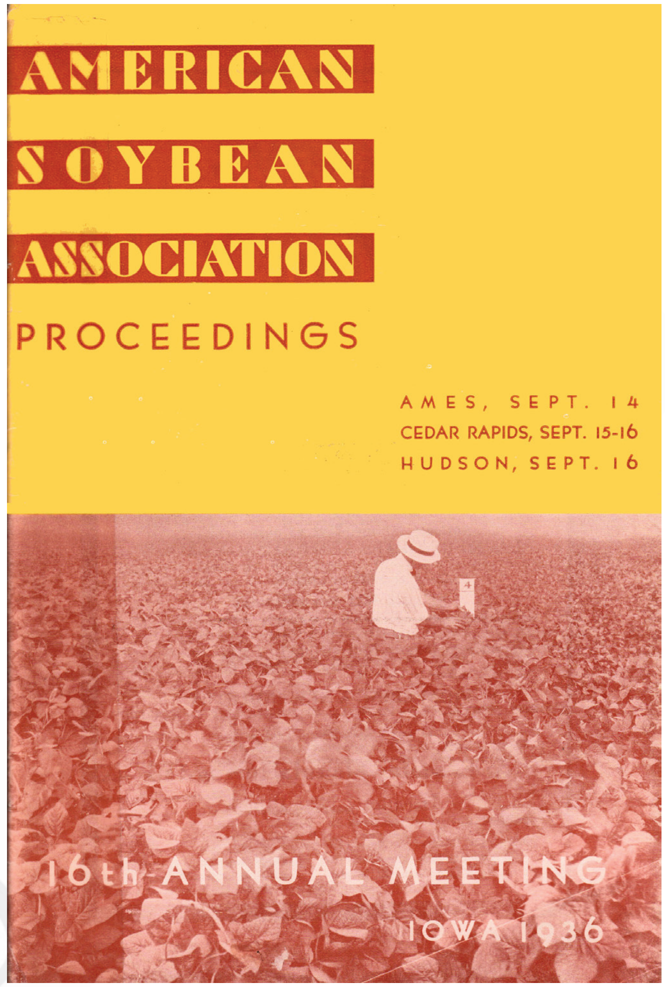
"Practically all exports of soybean cake and meal have originated in Manchuria and average about 1,375,000 tons for the five-year period 1926-31. About 70 per cent of this exportation went mainly to Japan, Chosen, and China. Cake and meal shipments to European countries went chiefly to Germany, although 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.

920. *Proceedings of the American Soybean Association.* 1936. Appreciation. Invitations. Officers of the American Soybean Association, 1935-36. p. 1. 16th annual meeting. Held 14-16 Sept. in Iowa.

• ***Summary:*** These are the proceedings of the Sixteenth Annual Meeting of the American Soybean Association, held at 3 locations in Iowa on 14-16 Sept. 1936; Ames Sept. 14, Cedar Rapids Sept. 15-16, and Hudson Sept. 16. "The publication of this bulletin of proceedings... is made possible by the cooperation and financial support of the industrial forms interested in soybeans whose advertisements appear herein... The Association and growers realize, too, that during this past marketing season, the industrial consumers of soybeans very generously supported the price of soybeans by buying in large quantities ahead of their immediate needs." Note: Two ads in these Proceedings (inside front cover, and inside rear cover) suggest that they were published before the annual meeting, given to attendees, and perhaps even sent out as (or with) invitations or promotional pieces.

"Join the American Soybean Association by sending annual dues of ($1.00) one dollar to K.E. Beeson, Secretary-Treasurer, West Lafayette, Indiana. Membership entitles one to the copies of proceedings containing much valuable information on soybeans not published elsewhere and to copies of news letters which have been sent to all members during the past year.



"Invitation to 1937 annual meeting: Dr. W.L. Burlison, J.C. Hackleman and staff at the University of Illinois extends an invitation to hold the 1937 meeting at the University of Illinois, Urbana." The 1939 meeting is being planned for Ohio.

The officers and board of directors of the Association are listed: President: Prof. E.S. Dyas (Iowa State College, Ames). Vice-President: Prof. J.C. Hackleman (Univ. of Illinois, Urbana), Secy.-Treas.: K.E. Beeson (Purdue Exp. Station, Indiana). Editor: W.J. Morse (Bureau of Plant Industry, Washington, DC). Board of directors: Prof. G.K. McClelland (Fayetteville, Arkansas), John Gray (Baton Rouge, Louisiana), J.B. Edmondson (Clayton, Indiana), Eugene Funk (Bloomington, Illinois), Thomas Gilmore (Sandersville, Georgia).

921. Slawson, H.H. 1936. Agriculture's Jack of all trades: Introducing the versatile soybean with which you may either build automobiles or run them and in which many people see possibilities for farm relief without benefit of subsidy. *Nation's Business* 24(9):24-26, 94. Sept.

• ***Summary:*** Contents: Introduction (Henry Ford will need

61,500 acres of soybeans this year). A program for soybeans (Regional Soybean Laboratory, Urbana, Illinois). Wood glue from soybeans (I.F. Laucks). Helps bread stay fresh. A twenty-year development.

Five years ago at the Univ. of Illinois soybean researchers searched the USA and Canada for commercial soy products; they collected about 100. "Today that list numbers more than 300 and the ball seems just beginning to roll."

On 1 July 1936 a systematic research program on soybeans was started at the University of Illinois at Urbana. Funded by the federal government, with 12 midwestern state agricultural colleges cooperating, an industrial research laboratory as been established in Urbana. Dr. O.E. May of USDA's Bureau of Chemistry has been placed in charge, with the "help of Dr. W.J. Morse, government scientist, who has made the study of soybeans his life work." The program will have three objectives: "1. Improvement of present industrial uses and development of new industrial uses for soybeans." 2. Research on the effects of different processes on the quality and quantity of soybean processes. "3. Facilities for testing different varieties as to adaptability for industrial use."

In 1930 a research chemist in a private laboratory developed a new method for improving the head of foam on beer–using soy flakes. "Today soybean beer flakes are being made on a commercial scale in Chicago and from there they are pouring into many of the country's biggest breweries."

In the Pacific Northwest, five new fir plywood factories (making a total of 23) have been constructed this year–because glue made from soybeans is less expensive than and superior to (incl. more water resistant) traditional plywood glues. Together with several pine plywood factories in California and British Columbia, they are using tons of the new soybean glue each day.

The initial impulse for this new industry came from automobile manufactures who complained that the plywood they were buying was not sufficiently water resistant. So the Pacific Coast Plywood Manufacturers Association sponsored a contest to find a new glue. A newcomer, I.F. Laucks, Inc., of Seattle [Washington], won with some soupy stuff that did not look like glue at all. And "today this soybean glue–its formula a trade secret–is the standard glue of the plywood industry. Mr. Laucks discusses the reasons for the success of this new glue: (1) Most important is its low cost. (2) Since soybeans are an annual crop, "production can be increased as the demand grows. This is not true of casein or blood, which are by-products of other industries more or less fixed in their production." (3) It is more uniform. (4) It is more "foolproof" than other water-resistant bases.

At Iowa State College, Dr. O.R. Sweeney is producing gasoline from soybean oil; he cracks it by heating to 350ºC using animal charcoal as a catalyst. He then distils one of the fractions. The first person to make petroleum from soybean oil was the Japanese scientist Satow, who made a calcium soap from the oil then subjected it to destructive distillation to get light, middle, and heavy grades of petroleum. Forty gallons of soybean oil yielded about 25 gallons of soybean petroleum, 33 pounds of glycerine (for use in explosives), and 480 cubic feet of combustible gas.

The U.S. paint industry was one of the first to make large use of soybeans–especially in Illinois. Soybean flour helps bread to stay fresh longer. Soybean lecithin is used by confectioners. Tanners use soybeans to increase the grease-absorbing properties of chrome leather. Textile manufacturers use it to make their fabrics soft, supple, and lustrous. It is also used by rubber makers, linoleum makers, soap makers, and sausage and wiener makers. Doctors prescribe soybean 'milk' (which is practically free of starch) for some babies and many diabetics. Even the family dog now consumes soybeans, which are less expensive than meat and make his [or her] coat sleek and shiny.

"Not half the story of this amazing development has been told here. U.S. soybean production jumped from around 5 million bushels in 1925, to 18.6 million in 1934 and 39.6 million in 1935. Illinois is the leading state.

"Almost two decades ago, when the first president of the American Farm Bureau Federation, James R. Howard, was beginning that organization's constructive efforts to aid agriculture by other means than politics, he made a remark which is just beginning to be appreciated at its full significance.

"'The surest relief for agriculture,' Mr. Howard said, 'will come from the production of new agricultural output that will go to industry rather than to the human stomach.'

"The response to that, so far as soybeans are involved, is seen in a recent government statement that at present more than 120 industrial concerns are making soybean products. They include about 35 soybean mills in ten states and a number of cottonseed mills which crush soybeans for oil and meal; 15 soybean flour mills; 20 soybean food products factories and more than 50 plants where various industrial commodities are fabricated from the magic soybean.

"It looks as if industry is beginning to know its beans."

Photos show: (1) A tractor in a field of piles of soybean hay pushing a device designed to speed the job of getting the hay to the baler. Caption: In Illinois more than 21 million bushels of soybeans were produced last year. (2) A warehouse in Manchukuo filled with piles of round soybean cakes. Two men are carrying 3-4 each on one shoulder up a wooden ramp. (3) A workman standing by a vat filled with a thick white liquid. "The first step in making auto parts is to feed the [soy] bean fibers into the rills that mix them." (4) Black auto parts grown on the farm, with a pile of some soybean powder that has not yet gone to the press. (5) "Powdered soybean fibers fed into this press come out in the form of distributor terminal plates for automobiles."

922. Lubell, Samuel. 1936. The Federal diary: Soybeans. *Washington Post.* Oct. 18. p. F6.
• ***Summary:*** A photo shows William J. Morse, "who knows more about soybeans than any white man this side of Tipperary," examining a package of noodles made of soybean flour. Behind him a vertical showcase (with many shelves) of products made from soybeans.

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

923. American Soybean Association (ASA) annual meeting, Ames, Iowa (Photograph). 1936.
• ***Summary:*** Presidentof ASA: W.J. Morse, USDA. Vice-President: F.S. Wilkins, Iowa Experimental Station and College. "At this meeting Henry A. Wallace (afterwards Secretary of Agriculture and Vice President of the United States) was a reporter for *Wallace's Farmer.* Full page.

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

924. Gray, George Douglas. 1936. All about the soya bean: In agriculture, industry and commerce. London: John Bale, Sons & Danielsson Ltd. ix + 144 p. Introduction by James L. North. Late curator, Royal Botanic Gardens, Regent's Park, London. Index. 28 cm. [19 ref]
• ***Summary:*** A comprehensive, early work on the soybean.

ALL ABOUT THE SOYA BEAN

IN AGRICULTURE, INDUSTRY AND COMMERCE

BY

GEO. DOUGLAS GRAY, M.D., C.B.E.,

Late Medical Officer to H.B.M. Legation, Peking, China
Lieut.-Colonel, Retired

WITH AN INTRODUCTORY CHAPTER BY

JAMES L. NORTH

Late Curator, Royal Botanic Gardens, Regent's Park, London

LONDON
JOHN BALE, SONS & DANIELSSON, LTD.
83-91, GREAT TITCHFIELD STREET, W.1
—
1936

Gray was a Scotch physician. Contents: 1. Introducing the soya bean. 2. The soya bean plant and its cultivation. 3. The soya bean as food: Dietetics, immature green beans, mature dried beans, soya bean coffee, soya bean chocolate, soya bean sprouts, soya bean milk, soya bean flour (incl. Berczeller flour, Soyvita bread made by Messrs. Wm. Beattie, Ltd., Glasgow), bean curd [tofu], soy (also called soya bean sauce, Chinese bean sauce, or shoyu), miso, fermented bean curd (p. 66-67). 4. Soya bean oil. 5. Soya bean trade. 6. The soya bean in agriculture.

Addenda: Soya bean products in the USA. Dieting and recipes. Statistics. India. Bibliography.

In the chapter on "Soya bean oil" we read (p. 75): "In England, the bean oil trade is carried on by the following firms:–The British Oil and Cake Mills Ltd., the ordinary shares of which are held by Lever Bros., Ltd., so that they are a branch of Unilever, Ltd.

"The Hull Oil Manufacturing Co., Ltd., Hull, now merged in the foregoing concern.

"The Premier Oil Extracting Mills, Ltd., Hull.

"Messrs. Wray Sanderson & Co., Hull.

"The Medina Refinery Ltd., Deptford, London.

"Messrs. J. Bibby & Sons Ltd., Liverpool.

"The Erith Oil Works Ltd., Erith" [Kent].

The first addendum, titled "Soybean products exhibited by the American Soybean Association" (at Washington, DC, p. 120-24) lists the following companies and each of the soy products that they manufacture: American Lecithin Corp. (Atlanta, Georgia), Archer-Daniels-Midland Co. (Milwaukee, Wisconsin), Armstrong Paint and Varnish Works (Chicago, Illinois), Battle Creek [Food] Factory (Battle Creek, Michigan), The Blanton Co. (St. Louis, Missouri), Cereo Co. (Tappan, New York), The Davies-Young Soap Co. (Dayton, Ohio), Detroit Graphite Co. (Detroit, Michigan), Eastern Health Food Stores Association (Washington, DC), Funk Brothers Seed Company (Bloomington, Illinois), Harshaw Essential Foods, Inc. (Cleveland, Ohio), Keystone Macaroni Mfg. Co. (Lebanon, Pennsylvania), Kloss, Jethro (Takoma Park, Maryland: Fresh [soybean] milk. Pumpkin pie [soybean milk and soybean flour]. Soybean cheese. Soybean bread [20% soybean flour]. Soybean buns. Soybean sprouts. Soybean cake), Laucks, I.F., Inc. (Bloomington, Illinois–home office, Seattle, Washington), Madison Food Company (Madison, Tennessee; Vigorost, Cheese [Tofu], Soybeans canned with Tomato, Soybeans canned plain, Dixie Fruit Crackers), Mead Johnson and Co. (Evansville, Indiana; Makes Sobee [Infant Formula]), Oriental Show-You Co. (Columbia City, Indiana), Paintcraft Co. (Galesburg, Illinois), Prince Macaroni Mfg. Co. (Boston, Massachusetts), Purina Mills (St. Louis, Missouri; makes Cresol disinfectant, Purina turkey and growing fattening chow, Purina lay chow, Purina egg chowder, Purina breeder egg chowder, Purina fitting chow, Purina rabbit chow, Purina chick Growena chow, Purina 34% cow chow, Purina chowder, Purina bulky cow chow, Purina 24% cow chow, Purina pig and hog chow, Protena all mash starting and growing food), Shellabarger Grain Products Company (Decatur, Illinois), Soyex Company, Inc. (Nutley, New Jersey), Staley Sales Corporation (Decatur, Illinois), The Stamford Rubber Supply Company (Stamford, Connecticut), Dr. Roy Monier, President, Board of Managers, State Hospitals (Jefferson City, Missouri), United Drug Company (Boston, Massachusetts), Vi-tone Company (Hamilton, Canada), Woolsey Paint and Color Co., C.A. (Jersey City, New Jersey), Bureau of Chemistry and Soils, Department of Agriculture (Washington, D.C.). Page 120 adds: "The exhibit also contained some 200 soybean products, mostly foods, brought from the Orient by Mr. W.J. Morse, Senior Agronomist, Department of Agriculture, Washington, DC, U.S.A." Note 1. Morse and P.H. Dorsett were in East Asia from 1929 to 1931, when they collected many samples of soybeans and soyfoods.

In the second addendum, recipes, the author notes that soy flour is widely used in diabetic diets. Two leading firms who make soy flour in England and who also incorporate it

in various products are: Soya Foods, Ltd., Rickmansworth, Herts, and Dietetic Foods Ltd. 124 Victoria St., London, S.W. 1. "The former specialize in Soyolk which is flour prepared on the principles laid down by Professor Berczeller; it is a mealy powder, fatty to the touch. The latter firm are the sole distributors in Great Britain of the well-known 'Heudebert' Dietetic Food products, a French concern which makes different kinds of diabetic breads." The following recipes are then given; * = Calls for Soyolk soy flour: Soybeans, southern style. Soybean salad. Roasted soybeans [like dry-roasted peanuts]. Soybean croquettes. Soybean soufflé. Stuffing for baked fish*. White sponge pudding*. Shortbread*. Madeira cake*. Soya soup à la Reine (uses Heudebert soya flour). Soya chocolate (with soya flour). Soya vegetable soup (with soya flour). Soya bean sprout salad.

Note 2. This is the earliest English-language document seen (Jan. 2013) that uses the term "soya bean sprouts" to refer to these sprouts. Address: M.D. (Scotch physician), C.B.E., England. Late medical officer to H.B.M. Legation, Peking, China. Lieut.-Colonel, Retired.

925. North, James L. 1936. Introductory chapter. In: G.D. Gray. 1936. All About the Soya Bean: In Agriculture, Industry and Commerce. London: John Bale, Sons & Danielsson Ltd. 144 p. See p. 1-9.

• ***Summary:*** This is the story of early attempts by Dr. North and others to grow soybeans in England. "In 1913 chance put in my hands thirteen small seeds of a variety of soya bean said to have come from North China in 1910 and to have ripened pods in Germany for two successive years. Sown by me the following May the plants grew to a height of 1½ feet and ripened seed in October. This took place at the Gardens of the Royal Botanic Society, of which I was then Curator. I was aware that of the many attempts to grow soya which had taken place in this country, all had failed, also that no others were being attempted, since it was the considered opinion of the Ministry of Agriculture and the Royal Agricultural Society that the soya bean was quite unsuited for growth here, as it required heat that would ripen maize.

"The podded beans were brought to the notice of Professor Bottomley, of King's College, and Professor Greenish, of the Pharmaceutical Society, and both considered the matter to be important. They pointed out that this country possessed no oil plant and was importing soya from Manchuria to the extent of half a million tons per annum... They advised me to increase my stock as rapidly as I could.

"The result of the first year's crop was four hundred seeds from the original thirteen seeds; the second year four thousand and the third twelve thousand. In 1917 it became a question of finding space to grow them and it was decided to have part grown by a firm of market growers at Uxbridge, Middlesex and the rest on a farm at Manningtree, Essex, belonging to Mr. C.P. Ogilvie. Both were failures." The first crop failed because the land had been too heavily manured and the seeds were sown too far apart. The second crop, sown in the middle of a field of wheat, had been eaten by rabbits. Rabbits are still a major pest for soya beans.

Since little was known about the soya bean, Mr. North tried to gain experience by sending seeds to the Chelsea Botanic Gardens, the Horticultural Society at Wisley, the Cambridge Botanic Gardens, Messrs. Sutton and Sons, Reading, and to a friend in Hampshire. But the reports received were not encouraging. "That same year I got in touch with the United States Department of Agriculture at Washington [DC], I received from it not only soya bulletins and seeds of a number of American soya varieties for trial in England, but the promise of further assistance. I owe a very great debt of gratitude to that department and to Dr. W.J. Morse, its agronomist and soybean expert, the man who, more than any other, has made the United States the soya bean centre of the world and now a growing competitor with Manchuria as world exporter.

"The results of 1917 were better than those of the previous year and in 1918 I had sufficient seed of my one variety to plant half an acre on land lent by Mr. Clark at Virginia Water. These were sown in company with 12 American varieties, half being inoculated with a nodule culture supplied by Professor Bottomley."

Following some poor years, 1921, a drought year, was the best year to date. "Accounts of my success appeared in the Press and I wrote an article which came out in the *Illustrated London News* in October. As a result many applications for seed reached me and I sent samples to over one hundred places, among others to Professor Southworth of Manitoba College, Winnipeg [Canada]. He found my variety better than anything he had had there, both for fodder and seed, but not early enough in seasons with early frost. In return he sent me seed of a brown variety 'Manitoba Brown,' a selection from a well-known American variety 'Ogemaw.'"

1922 was a wet year and at his plot and not one person to whom North had sent seed reported success. On his own plot at Chiswick, where he had twenty varieties under test, only one, "Manitoba Brown," succeeded.

"In 1923 appeared Messrs. Piper and Morse's encyclopædic work, 'The Soybean,' in America; it solved a good many of my problems and I determined to follow American practice in future. From it I learned that two-thirds of the American crop was consumed as fodder upon the farm; that every variety had a fixed time ranging from 80 to 160 days for maturing; that in industry the chief value of the bean rested upon its oil content; and that the plant possessed what is now called 'local limitations,' meaning that a variety that grew well in one place could not be depended upon at another and that in American agricultural practice it was usual to test two or more varieties before growing it as a crop. This last was particularly interesting to me because it explained the erratic behaviour of some of my varieties when

sent to other places.

"Convinced by the failure of my 1922 trials that soya was not yet ready to put forward as a crop plant, I extended my search to new sorts and with the help of friends abroad obtained many varieties from China, Manchuria, Japan, South Africa and India." North then began to specialize in short season varieties. "My friend Dr. Morse approved the plan and from then onward sent me only varieties which in America took less than one hundred days to mature... Using Manitoba Brown Soya as a standard I was able to select several varieties as early or even earlier than it." In 1930 Messrs. Sutton and Sons of Reading [seedsmen] decided to put the variety Brown C in their catalogue.

"In 1931, Mr. A.F. Secrett, a Twickenham market grower, offered the use of a piece of land at Brentford, Middlesex; it enabled me to grow on a larger scale than had been possible previously. In September the same year a photograph of the crop appeared in the *Evening News.* By chance it was seen by Sir John Davis, a Director of the Ford Motor Co. and manger of the Ford Estate at Boreham, Essex, who at the request of Henry Ford had tried to grow soya with American seed and had failed. At his request I agreed to supply acclimatized seed and to superintend its growing. All my four varieties of soya were used and under field conditions the crop was a success. From 2 acres the first year it was increased to 12 acres in 1934 and to 20 in 1935, the last two crops being grown without assistance. The Boreham trials were visited by farmers from every part of the United Kingdom and visitors from America pronounced the crops to be as good as any grown in that country. The seed was distributed in 1935 and that year saw it being grown in quantity in some hundreds of places throughout the British Isles."

A photo facing page 1 shows Mr. J.L. North standing in a field with soya bean plants which he has grown. Address: 60, Grove Park Terrace, Chiswick, London, W.4, Engalnd. Late curator, Royal Botanic Gardens, Regent's Park, London.

926. W.J. Morse at the American Soybean Association's annual meeting at the soybean breeding plots in Ames, Iowa (Photograph). 1936.
• ***Summary:*** This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

927. Hart, Scott. 1937. The Federal Diary: Wonderplant. *Washington Post.* March 7. p. E4.
• ***Summary:*** In Morse's office at the USDA's Bureau of Plant Industry, the writer saw row upon row of soybean products. Some were foods and others non-food industrial products. "At his desk across from the exhibits Morse, some-time explorer-collector, soft voiced, puffs cigarettes and says: 'Yes, it was tough going out there in China, where the soybean is more important than it looks..."

A large photo, with the caption "Soybean booster," shows W.J. Morse examining some soybeans on a table.

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004). Address: USDA.

928. *Madison Survey* (*Madison, Tennessee*). 1937. The soy bean marches on. 19(15):59-60. April 21.
• ***Summary:*** "There is a constant hum of motors in our food factory these days to supply the orders resulting from Mr. Bisalski's recent trip to Knoxville [Tennessee]. Asheville [North Carolina], Washington [DC], Philadelphia [Pennsylvania], and New York. Since eight of the twelve items appearing in the Madison Foods price list contain soy beans, the value of the soy bean as a food is naturally emphasized in the sales program. Attractive window displays, featuring the soy bean as an ingredient of eight Madison Foods, have effectively stimulated sales... The constant increase of business, which is far above the normal curve, showing recovery from the depression, is evidence of the whole-hearted acceptance of soy bean foods by the public."

"In the May issue of *Popular Mechanics* five pages were devoted to a review of the soy bean since its introduction to the United States in 1804. At that time it was grown as a curiosity..."

"A soy bean article is not complete without a mention or a picture of Madison Foods. In *Popular Mechanics* one can see the Madison soy bean foods on display. In this picture Dr.

W.J. Morse, of the United States Department of Agriculture, stands in front of several sections of display cases where only soy bean foods and other soy bean products appear.

"On the level of his left hand three Madison Food packages (Soy-Koff, Date Stix, Fruit Stix) stand like soldiers in the line of soy bean foods. Four shelves above can be singled out Vigorost, Soy Beans canned in Tomato Sauce, and one shelf below is Breakfast Crisps. Here then are seen all but two of the Madison Foods that are on display in Dr. Morse's rare collection. Soy Cheese and Kreme O'Soy Flour are there also, but they are blocked out with insertions of other types and pictures.

"For many years, Dr. Morse, who might rightfully be called the father of soy bean development in the United States, has been studying this interesting plant all over the world."

"Dr. Morse is a frequent visitor at Madison and likewise Mr. Bislaski is a frequent visitor to Dr. Morse's Washington headquarters."

929. *Popular Mechanics.* 1937. The bean that made good. 67:660-62, 120A, 122A. May.
• ***Summary:*** Photos show: (1) William Morse in his office at USDA in front of shelves of soybean food products. (2) Native 2-wheeled carts drawn by horses or mules (and widely used to carry soybeans) in front of storage silos in Manchuria. (3) "Soybeans from Japan used as green vegetables"–their pods. (4) A soybean storage yard Manchuria, with many horse-drawn wooden carts and tall cylindrical storage containers. (5) William Morse inspecting candied soybean products. (6) Two men in a hay-strewn field. (7) Boiled soybeans being crushed in a wood mortar in Japan. (8) Earthenware jars for making soy sauce in China; each is topped with a conical lid of woven bamboo. (9) Two men, possibly including Morse, examining the root systems of soybean plants.

A chart (p. 120A) is titled "Soybean Utilization."

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

930. *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.

931. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybean. *Bean-Bag* (*The*) (*Lansing, Michigan*) 20(2):12-13. July.
• ***Summary:*** This is part of an article, with the same authors and title, which first appeared in the *Yearbook of Agriculture* (USDA). 1937. p. 1154-89. For the year 1937.

932. *Washington Post.* 1937. Exhibit will show uses of soybean; trace its history. Aug. 15. p. 10.
• ***Summary:*** A soybean exhibit, open to the public, will be displayed Tuesday [Aug. 17] at the Washington Terminal, track 31, from 6 to 8 p.m.

The exhibition, housed in a special railroad car, is sponsored by the U.S. "Department of Agriculture, the American Soybean Association, the National Soybean Processors Association, and State agricultural colleges."

It will show various uses of the soybean in livestock and human consumption. One section will trace the agricultural history of the soybean in the Orient, where it has been a staple crop for centuries.

Dr. W.A. Morse [sic, W.J. Morse] of the USDA "was among the first to bring soybean seeds from the Orient to this country for experimental purposes."

933. Kellogg, John Harvey. 1937. Re: The soybean is an excellent food. Soy products made by Battle Creek Food Company. Letter to Mr. Richard Haughton, Valley Mill Farm, Great Valley Mills, Paoli, Pennsylvania, Aug. 26. 3 p. Typed, with signature on letterhead.
• ***Summary:*** Mr. Haughton wrote Dr. Kellogg on Aug. 26 that "One of your patients at Battle Creek has advised me that we should look into Soy Bean as a food." It is said to be helpful for intestinal disorders.

Dr. Kellogg replies: "You have been correctly informed. The soybean is an exceedingly useful food and ought to be widely used. It is on the whole, I believe, the most remarkable and most useful of all food products...

"If you will address a letter to W.J. Morse, Bureau of Plant Introduction [sic, Plant Industry], U.S. Department of Agriculture, Washington D.C., you will obtain a large amount of literature about the soy bean which you will find very interesting.

"The Battle Creek Food Company makes a number of products from the soy bean, among which are soy gluten biscuit, which consists of equal parts of soy flour and wheat gluten. It is extremely toothsome and the most highly nourishing of all foodstuffs with which I am acquainted." Address: Florida.

934. *Puerto Rico Agricultural Experiment Station* (*Mayaguez*), *Report.* 1937. Fifty-five varieties of soybeans were introduced. p. 48. For the year 1936.
• ***Summary:*** In the section on "Vegetable crop investigations" we read (p. 48): During the past year 55 varieties of soybeans were imported for trial through the cordial cooperation of W.J. Morse, senior agronomist of the Bureau of Plant Industry. Some of these varieties have given promising yields under tropical conditions, but it is too early to present conclusions as to the comparative merits of the different varieties, or as to the adaptability of soybeans to island conditions. Under the influence of the comparatively short periods of summer daylight, soybeans were found to blossom and mature in much less time than in the continental United States. The varieties tested blossomed from 18 to 58 days earlier and produced seed from 35 to 90 days earlier than is reported for the same varieties on the continent. Some varieties blossomed in 29 days, and some produced seed 72 days after planting at this station.

"There is an absence of oils and fats at low costs for the diet in Puerto Rico, and the extensive use of soybeans in China and Japan. to fill these dietary needs has created interest in this crop for Puerto Rico.

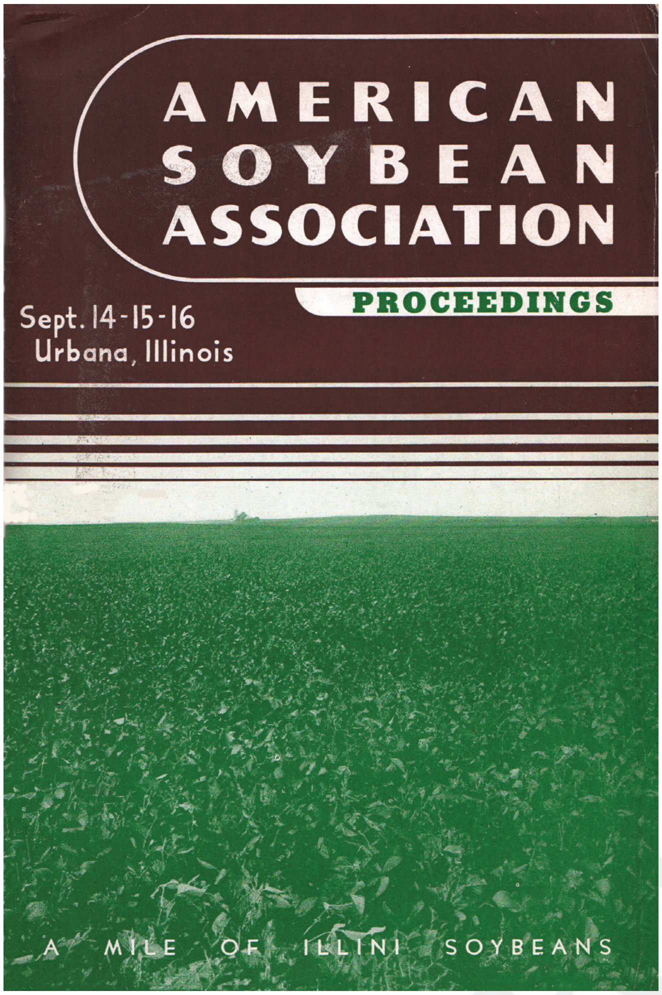
"These vegetable crop investigations were conducted by Wallace K. Bailey, associate physiologist, who was assisted in the early part of the year by Jose Beauchamp, under scientific aide."

935. American Soybean Association. 1937. Proceedings of the Seventeenth Annual Meeting of the American Soybean Association (Ad). *Proceedings of the American Soybean Association* p. 1. 17th annual meeting. Held 14-16 Sept. at Urbana, Illinois.
• ***Summary:*** See next page. "Appreciation: Our gratitude is extended to the industrial companies, whose advertisements appear herein," and to those who presented papers. "Your annual dues of $1.00 may be paid to K.E. Beeson, Secretary-Treasurer, West Lafayette, Indiana. Membership entitles you to receive a copy of the Proceedings and also News Letters which are released during the year through the office of the Secretary."

"Invitation to the 1938 Annual Meeting" in Ohio.

Officers and directors of the American Soybean Association for 1937-1938 are given. "Editor: Dr. W.J. Morse, U.S. Department of Agriculture, Washington, DC."

936. 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 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.

937. Woodworth, C.M. 1937. Recent results in soybean breeding and genetics. *Proceedings of the American Soybean Association* p. 44-48. 17th annual meeting. Held 14-16 Sept. at Urbana, Illinois.

• ***Summary:*** "Studies on the genetics and breeding of the soybean have occupied a prominent place in investigations on this crop carried on at the Illinois Station. From time to time reports have been given at various meetings of the American Soybean Association on the progress of this work and no doubt many of you are familiar with the results and conclusions. In this paper, I shall try to confine myself to some of the more recent studies, and in view of the complexity and long-time nature of certain of the problems being investigated, this should be thought of more or less as a progress report.

"New Types: In corn, wheat, and other crops, many plants have been found which lack chlorophyll, or green coloring matter, to a greater or less extent. The most extreme case is the albino which is entirely devoid of chlorophyll and lacks the ability to develop any and therefore the plant dies as soon as the food material in the seed is used up. In the soybean such a type was discovered but was lost soon afterward as all the plants died and none of the normal green plants in the same progeny proved to be heterozygous for the abnormality. Later, a variegated plant was found. Since then other chlorophyll deficient types have appeared. We have not yet had time to investigate the behavior of all these types in inheritance, but such as we have studied are recessive to the normal, reduce the vigor of the plant to a greater or less extent and are complementary with each other in such a way that when any two are crossed, the normal green type appears in F1. They have been designated by the symbols $y_{4,}$ $y_{5,}$ $y_{6,}$ $y_{7,}$ $y_{8.}$

"It should be noted here that any reduction of chlorophyll so far observed in soybeans results in a yellowish plant or leaf, not white. No true albino is known in soybeans so far as I am aware, in the sense of presenting a white appearance similar to that of albino corn seedlings. Even the abnormal plants referred to above as having been lost due to the death of the plants were yellowish and not white. Whether any true whites will ever appear I cannot say. In this connection it is interesting to observe that we have no white-seeded soybean varieties. The nearest thing to a white is a light yellow.

"Under the head of new types I should mention a plant which was found to bear practically none but one-seeded pods. It bred true for this characteristic and so we have a type which is giving us some interesting results in crosses. In addition it has a leaf shape which is different from the ordinary broad leaf shown by common soybean varieties and from the narrow leaf shown by a few types introduced from the Orient but not grown commercially in this country. In crosses between the one-seeded pod type and the narrow leaf type, the ordinary broad leaf appears in F1, thus indicating that the broad leaf in our commercial varieties is determined by at least two genes which are complementary in their action. However, it is difficult to classify the F2 plants as to leaf shape, and the inheritance of leaf shape may be even more complicated than it now appears.

"New Linkage Relationships: Linkage has been defined as the tendency for characters to stay together in inheritance; that is, to appear in the progeny in the same combinations they were in the parents more often than they would be expected to by chance. This is the same as saying that characters which are linked are borne on the same pair of chromosomes. The number of groups of linked characters, then, should equal the number of pairs of chromosomes. In the soybean there are 20 pairs of chromosomes and, therefore, there should be 20 groups of linked characters. When I say that, so far, we have worked out only four of these 20 groups, and only very incompletely at that, you will realize that we have made only a beginning in a genetic analysis of the soybean.

"A chromosome map attempts to give a picture of gene relationships in a plant much as a soil map shows the soil types present in a given area and their location and extent. Recent results have enabled us to revise the soybean chromosome map in a few particulars. Gene $d_{2,}$ (green cotyledons) was found to be linked with t (gray pubescence) with about 13 per cent crossing over. This gene is thus added to Chromosome I. It was known that there were three genes in Chromosome II; namely $p_{1,}$ (glabrousness), $m_{1,}$ (mottling on seed coat) and $r_{1,}$ (seed coat color), but the order of these genes on the chromosome was undetermined. A cross involving gene pairs r_1 r_1^o and M m enabled us to determine that the gene order should be m–p_1–r_1 or r_1–p_1–m. Finally, evidence for a fourth group was obtained in a cross involving genes p_2 (glabrousness) and de_2 (a second gene for defective seed coat). These genes were found to be very closely linked, only four cross over types being found in a population of 229 plants. Of course, the inheritance of many other genes responsible for seed and plant characteristics is known, but these characters appear to be independent, and therefore to be located on different pairs of chromosomes. There are enough genes studied and named in soybeans to fairly well fill out the chromosome map, but with the information we have at present we cannot do more than let each of these genes represent an independent group.

"Number of Seeds per Pod: With respect to number of seeds, soybean pods are of four classes: namely, one-seeded, two-seeded, three-seeded, and four-seeded. A five-seeded pod is very rare. In all my experience I have seen only three or four five-seeded soybean pods. The pods of a soybean plant may consist of all four types, one-seeded up to four-seeded. In our commercial varieties, two-seeded and three-seeded pods predominate, but one can usually find a few ones and a few fours. However, in some varieties the three-seeded class is most numerous, as in the Illini,

while in others the two-seeded class exceeds all others, as in the Ito San. In another connection I mentioned discovery of a type nearly all the pods of which are one-seeded; and recently we have secured from Mr. W.J. Morse, United States Department of Agriculture, several introductions that have a higher proportion of four-seeded pods than is possessed by any of our commercial varieties. Thus we have at our disposal for investigation of the inheritance of number of seeds per pod, a fine array of types differing in genes that can throw the balance in the direction of a lower or a higher number of seeds. This would appear to be an important character from the yield standpoint. Our investigations on this character have involved the study of a large number of crosses and the classification of an enormous number of pods. Many crosses have been carried as far as the F3 generation. The inheritance of the character is complex and what we have so far discovered about it is far from the final word, but I will give you a few results and conclusions without burdening you with too much detail.

"Number of seeds per pod is a quantitative character and like all such characters is complicated in inheritance. The F1 of crosses between low and high are usually intermediate, though oftentimes near the low parent. In F2 segregation occurs so that the whole range between the two parents is covered. There is rarely, however, a plant which is lower than the low or higher than the high, a phenomenon we call transgressive segregation. Further evidence of segregation was obtained by testing certain F2 plants located in various points in the F2 range by their F3 progeny. Then the value of the F2 parent plant was correlated with the mean of the F3 progeny and correlations of +.449 ±.131, +.521 ±.088, +.653 ±.075, and +.683 +.0609 were obtained for four different crosses. These values indicate that individual F2 plants tend to transmit to their progeny their particular pattern or design with respect to number of seeds per pod, and on the basis of this relationship, one could select F2 plants at one or the other end of the distribution range with fair assurance that the offspring will be very much like the parent. But the most extreme F3 progenies varied around the same mode as the parents and further selection has not tended to produce anything better or worse than the parents. To date, therefore, we have not been able by crossing to produce types with higher number of seeds per pod than the types we now have.

"Number or Percentage of Abortive Seed: It is a matter of common knowledge that many soybean pods contain one or more abortive or undeveloped seeds. These may range from a small bit of tissue–a mere vestige of a seed–to seeds almost half-grown. The reasons for lack of development are not thoroughly understood. It is believed that fertilization of the egg cell occurs, initiating embryo development, and then food material is cut off at an early to late stage, resulting in a so-called abortive seed.

"This is believed to be, in the main, a non-genetic character, but soybean varieties are found to differ in the percentage of abortive seed when grown under the same conditions. An interesting fact is that certain parts of the pod contain abortive seed more frequently than other parts. For example, the end of the pod nearest the point of attachment to the plant contains the greatest number of abortive seeds; the other end, the least. Of course, many pods are found with all seeds abortive, and many with none. We have here, then, a form of sterility which is more or less common among soybean varieties, and which certainly reduces the yield of seed." Continued. Address: Dep. of Agronomy, Univ. of Illinois, Urbana.

938. *Burlington Free Press and Times.* 1937. 350 farmers attend demonstration of soy bean reaping in Addison: Witness combines at work and hear Dean J.L. Hills, Prof. W.J. Morse, Chief of Federal Soy Bean Activities, and Prof. R.G. Wiggans of Cornell University, discuss values of high protein forage crop. Joseph Winterbotham presides. Oct. 5.
• ***Summary:*** Contents: Introduction. Speakers. Soy bean and alfalfa cousins. Plant close in rows. 1937 soy bean yield. Combines work best. Combine at work.

Photos show: (1) Joseph Winterbotham. (2) Prof. W.J. Morse. (3) Prof. R.G. Wiggans. (4) Dean J.L. Hills. (5) A combine mowing soybeans on the Scott farm in Addison.

939. Morse, W.J. 1937. Green vegetable soy beans. *Good Health* (*Battle Creek, Michigan*) 72(10):299. Oct. Reprint of Morse 1935c.
• ***Summary:*** Reprinted from: *Proceedings of the American Soybean Assoc.* 1935, p. 44-45. This article was originally titled "Green Vegetable Soybeans." Address: USDA, Washington, DC.

940. 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 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. 2013) 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 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].

941. 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].

942. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybeans: Appendix–Table 4. Soybean varieties: Origin and varietal characteristics (Document part). *Yearbook of Agriculture* (*USDA*) p. 1154-89. For the year 1937. See p. 1187-89.

• ***Summary:*** This table lists 101 named soybean varieties; for each is given the place and date of introduction or origin, days to mature, flower color (pink or white), pubescence color (gray or tawny), and seed characters (coat color {black, black (dull), brown, green, olive yellow, straw yellow, plus combinations such as black and brown}, germ color {green, yellow}, hilum color {black, brown, pale to brown, yellow, yellow to brown}, seeds per pod {2-3 or 2-3-4}, seeds per pound {ranges from 1232 for Hokkaido to 9950 for Barchet}), uses (dry-edible beans, forage, green-vegetable

beans, grain).

For example, the first variety listed is Agate. Origin: Introduction, from Japan. Year: 1929. Days to mature: 90. Flower color: Purple white. Pubescence color: Tawny. Seed coat color: Straw yellow + brown. Germ color: Yellow. Hilum color: Brown. Seeds per pod: 2-3. Seeds per pound: 2816. Use: Green vegetable beans.

The following varieties are listed alphabetically. All varieties are introductions from East Asia unless otherwise noted. (* = green vegetable; ** = dry edible): Agate*, A.K., Aksarben, Arlington, Arksoy, Avoyelles (Selection by Gray, Louisiana, 1932), Bansei*, Barchet, Biloxi, Black Eyebrow, Cayuga, Chame*, Chernie, Chestnut (Selection by Arlington Experiment Farm, 1907), Chiquita, Chusei*, Columbia, Creole, Delnoshat (Selection by York, Mississippi, 1925), Delsta (Selection by York, Mississippi, 1925), Dixie (Selection by Arlington Experiment Farm, 1914), Dunfield, Easycook**, Ebony, Elton, Fuji**, George Washington (Selection by Clapp, Virginia, 1921), Georgian, Goku*, Habaro, Haberlandt**, Hahto*, Hakote*, Harbinsoy (Selection by Arlington Experiment Farm, 1922), Hayseed, Herman (Selection by Herman, North Carolina, 1915), Higan*, Hiro*, Hokkaido*, Hollybrook (Selection by Wood, Virginia, 1902), Hongkong, Hoosier, Hurrelbrink (Selection by Hurrelbrink, Illinois, 1902), Illini (Selection by Woodworth, Illinois, 1921), Ilsoy (Selection by Smith, Illinois, 1913), Ito San, Jogun*, Kanro*, Kingwa (Selection by Garber, West Virginia, 1921), Kura*, Laredo, Lexington (Selection by Arlington Experiment Farm, 1907), Mammoth Brown (Selection, North Carolina, date unknown), Mammoth Yellow, Mamredo (Selection by York, Mississippi, 1925), Manchu, Mandarin, Mandell (Selection by Cutler, Indiana, 1926), Mansoy (Selection by Arlington Experiment Farm, 1915), Medium Green, Merko, Midwest, Mikado (Selection by Parsons, Indiana, 1905), Minsoy (Introduction, from France, 1910), Monetta, Morse, Mukden (Selection by Arlington Experiment Farm, 1920), Nanda*, Nanking, Norredo (Selection by unknown person, date unknown), Ogemaw (Selection by Evans, Michigan, 1902), Old Dominican, Oloxi (black seeded; Cross by Wilds, South Carolina, date unknown), Osaya*, Otootan, Ozark, Palmetto, Pee Dee (black seeded; Cross by Wilds, South Carolina, date unknown), Peking (Selection by Arlington Experiment Farm, 1907), Pine Dell Perfection (Selection by Grisenauer, Virginia, date unknown), Pinpu, Rokusun*, Sato*, Scioto (Selection by Park, Ohio, 1925), Shiro*, Sooty (Selection by Arlington Experiment Farm, 1907), Sousei*, Southern Prolific, Soysota (Introduction, from Italy, 1910), Suru**, Tarheel Black, Toku**, Tokyo**, Virginia (Selection by Arlington Experiment Farm, 1907), Waseda* (Selection by Arlington Experiment Farm, 1907), White Biloxi (Selection by York, Mississippi, 1925), Wilson, Wilson-Five (Selection by Arlington Experiment Farm, 1912), Wisconsin Black (Selection by Wisconsin Experiment Station, 1898), Yelredo (Cross by Wilds, South Carolina, date unknown), Yokoten.

Note: This is the earliest document seen (June 2013) that mentions the soybean varieties Agate, Oloxi, Pee Dee, or Yelredo. It is also the earliest that describes the Haberlandt as a "dry edible" soybean variety. Address: 1. Senior Agronomist; 2. Assoc. Agronomist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry [USDA, Washington, DC].

943. 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 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 (July 2014) that contains the term "Union of Soviet Socialist Repeblics" 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].

944. *Unknown newspaper.* 1938. Yellow soybean urged for South: Louisiana farmers advised to change variety for better results. Jan. 27.

945. Morse, W.J. 1938. Re: Sending new soybean varieties to Cuba. Letter to Ing. Antonio Portuondo, Agricultural Experiment Station (*Estacion Experimental Agronomica*) at Santiago de las Vegas, Cuba, Jan. 28. 1 p. [Spa]*
• ***Summary:*** Morse is sending the experiment station 2 ounces each of 10 different soybean varieties. Cuba is apparently interested in using soybeans for human foods. Address: U.S. Dep. of Agriculture, Washington, DC.

946. Clapper, Raymond. 1938. Soy bean offers potential solution to surplus crop problem: Col. Knox's sponsoring of versatile agricultural product brings to light possibilities of industrial utilization of products of soil as means of diverting acreage from non-paying basis; present political campaign predicted in Bible.
• ***Summary:*** A rectangular portrait photo shows Raymond Clapper.

947. Löbbe, Henrique. 1938. A soja [The soybean]. *Boletim do Ministerio da Agricultura, Rio de Janeiro* 27(1-3):63-66. Jan/March. English-language summary in Herbage Abstracts. 1939. 9(1-4):21. March. [Por]
• ***Summary:*** This article, published by the National Department of Plant Industry, notes that soybean trials in Brazil were initiated with Manchurian varieties in March 1921 at the Campo de Sementes de Sao Simao, in the state of Sao Paulo. These were continued in 1927 with 48 varieties from the USA, and a cross of two of the latter (Tarheel Black x Aksarben) has given an agrotype, Artofi, with a very high oil content. Ten years of agricultural experiments have shown the climate and soil of Brazil to be exceptionally well suited to the cultivation of soybeans. The Department is ready to advise farmers to grow this crop. Address: Assistente Chefe, Departamento Nacional da Producao Vegetal, Servico de Fomento da Producao Vegetal.

948. Piper, Charles V.; Morse, William J. 1938. The velvetbean. *Farmers' Bulletin* (*USDA*) No. 1276. 21 p. May. Revised.
• ***Summary:*** "Revised by W.J. Morse, senior agronomist." Contents. Description. History Species and varieties. Soil preferences. Rotations. Fertilizers. Inoculation. Preparation of the seedbed. Time of seeding. Methods of seeding. Rate of seeding. Cultivation. Harvesting. Threshing. Yields of velvetbeans. Utilization of velvetbeans. Velvetbeans as meal. Velvetbeans as hay. Velvetbeans as silage. Velvetbeans as pasture. Velvetbeans used for soil improvement. Velvetbeans as a smothering crop. Feeding value of velvetbeans. Velvetbeans as human food. Enemies.

In the section titled "Rotations" (p. 8-9) soybeans are mentioned (p. 9). Address: 1. Agronomist in charge; 2. Agronomist. Both: Div. of Forage Crops and Diseases. Bureau of Plant Industry.

949. Ridgway, Frank. 1938. Day by day story of the experimental farms: Soy beans for table. *Chicago Daily Tribune.* June 15. p. 24.
• ***Summary:*** "Five varieties of the vegetable type of soy beans to be raised for sale are being planted on the Tribune's Du Page county farm this week." They are Bansei, Jogun, Shiro, Fuji, and Funk's Delicious. The original seed for the first 4 varieties was brought to the USA by W.J. Morse who is in charge of the USDA's soy bean investigations. Note: Du Page County is just west of Chicago; it lies along the west border of Cook County, whose county seat is Chicago.

"Vegetable varieties of soy beans have been successfully grown in the farm's test plots during the last two years. They have been found to be valuable additions to the home and truck garden." The beans, which resemble lima beans, are picked green when they are easily shelled.

"Make tasty dishes: To pave the way for this undertaking the [Tribune's] farm manager, working in coöperation with Chicago [Illinois] hotels, restaurants, grills, and tea rooms, made table tests of the soy beans raised in the test plots at the farm last summer. Chefs and customers in many of these public eating houses were enthusiastic about the beans. They were relished when cooked the same way as old fashioned butter beans or lima beans are prepared." They can also be served "baked, sauted [sautéed] in butter, succotash style, chili con carne, and candied."

950. Morse, W.J. 1938. Soybeans in the Southern States. *Proceedings of the American Soybean Association* p. 45-48. 18th annual meeting. Held 12-14 Sept. at Wooster and

Columbus, Ohio.
• ***Summary:*** "American-grown soybeans were first crushed for oil on a large scale during the latter part of 1915 by a few cottonseed oil mills in North Carolina. A shortage of cotton seed and a surplus of soybean seed were the principal factors in arousing interest in the processing of the soybean. During the season of 1916-17 no domestic beans were crushed, owing to the extremely high price of seed, but some Manchurian seed destined for a European country was sold to cottonseed oil mills in North Carolina and South Carolina and was processed by both expeller and hydraulic mills. The oilmeal produced by these mills was used largely by manufacturers of fertilizers. At that time feed manufacturers were hesitant in changing their formulas to include a product in which there was doubt concerning future supplies.

"The expansion in the processing of soybeans for oil and oilmeal, most of which has taken place within the past three years, has been the chief factor in attracting popular interest to the soybean and its uses. Most of the seed production, as previously stated, has been in Illinois and other North Central States, and soybean processing mills are largely concentrated in this region. At present about 50 mills are crushing soybeans in the United States; only 9 of these are located in the Southern States, 7 of which are in North Carolina and southern Virginia." Address: Bureau of Plant Industry, USDA, Washington, DC.

951. 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 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 (July 2013) that mentions the soybean varieties Aoda or Sioux. Address: Bureau of Plant Industry, USDA, Washington, DC.

952. Wiggans, R.G. 1938. Soybeans in the Northeast.

Proceedings of the American Soybean Association p. 33-37. 18th annual meeting. Held 12-14 Sept. at Wooster and Columbus, Ohio.

• ***Summary:*** "Soybeans in the northeastern United States have not reached and probably never will reach the importance they have attained in the corn belt. This actuality or realism does not prevent a manifest interest in the crop, neither does it mean that soybeans may not become of considerable consequence in the area, and that possibly with the proper varieties, cultural methods, and utilization they might attain such proportions as to have an economic influence on the production in the corn-belt.

"Northeastern agriculture is conservative, based on diversification, and with a few exceptions can not be considered a one-crop agriculture. Furthermore, in general it is a region of small fields unadapted to the use of large farm machinery. For these and other reasons it can hardly be expected to be able to compete successfully with the great agricultural areas to the west and south.

"Through the initial stages of introduction, experimental trials, and development and expansion in production during the past decades, the Northeast has not been entirely asleep. Although largely outside of what has been and probably will continue to be the main producing sections, this large border or transitional area may in the end become a part of the soybean belt. Such has been the agricultural history of other crops introduced into new environments. With increased knowledge of the crop, improved varieties, and repeated experiments, the border areas of production are continuously changing. What was once the frontier area becomes absorbed and the frontier is driven back. The maturing of corn at 48 degrees north latitude on the Gaspe Peninsula and at 56 to 60 degrees in Sweden, as well soybean in southern England at 53 degrees and in southern Sweden at 56 degrees, may be cited as examples of this fact. The above-mentioned material is at present in the experimental plantings at Ithaca, New York. Many other examples might be given.

"It is reasonable, however, to conclude in the beginning that with climatic restrictions, small units of tillable land, unsuitable machinery, lack of adapted varieties, cultural idiosyncrasies, uncertain utilization of the crop and long distances from cash markets for surpluses or for the main crop, all suggest that the northeastern area can not be expected to compete on an even basis with the more favorably situated agricultural sections. A logical supposition, based on the experiences of many farmers in the area over a long period of time and the limited experiments made on a scientific basis by investigators, would be that soybeans in the Northeast offer the greatest promise as a forage crop.

"I assume that this and Dr. Morse's paper are supposed to give a picture of the border areas of soybean production, a task which becomes difficult because of a lack of published information, an absence of statistical reports, a wide diversification of conditions, and an inadequate fund of direct information.

"The interest of the farmer in the Northeast in soybeans as a possible home-grown addition to his limited high-protein animal food supply is of long standing, but the interest of the general public has been manifest only since the tremendous increase in production in the corn belt and the publicity in connection with the use of the crop in industry. The manifestation of these interests appears in the increased correspondence of agronomists at all of the agricultural experiment stations, more bulletins with a wider distribution, large numbers of articles in the popular press, exhibits at agricultural gatherings, and in numerous other ways. Steece (1937) lists 21 active projects on soybeans at 8 state experiment stations in the area, involving studies on culture, breeding, and utilization. The United States Department of Agriculture has seen fit to report in 1937 production in 5 of the 11 states in the area, two more than previously. The active cooperation of the United States Department of Agriculture with the experiment stations in the Northeast and a conscious effort to introduce varieties which might logically be expected to be adapted, has stimulated the efforts of station workers.

"In considering soybeans for the Northeast, the climatic conditions are among the factors of greatest importance. The climate of the higher elevations in West Virginia is similar to a considerable acreage of agricultural land in Pennsylvania, and even to the more favorable conditions in New York. Maryland offers a climate not too different from those prevalent in the regions of concentrated production. The valleys of southern and central Pennsylvania also offer fairly favorable environments for soybeans. New Jersey, Connecticut, and Rhode Island are likewise favored as compared to New York in general and the remaining New England states. In the northern areas longer days, cooler nights, higher humidity, and shorter seasons in general introduce limiting factors to soybean production as well as to the production of many other crops.

"The soils in the Northeast offer no particular difficulty to the production of soybeans, in fact, the fertility in general is such as to indicate the great need for increased legumes. Generally, the addition of phosphorous gives a favorable response in increased yields, and soybeans should seldom be grown without the addition of phosphate in some form.

"The idiosyncrasies of the soybean crop seem to be greater as the border-line areas are approached. The cultural needs of soybeans in the Northeast are the same as in the central area of production, but each necessary factor becomes of the utmost importance and may easily be the limiting one. The following illustrations may be given:

"1. As fertility decreases inoculation becomes more and more essential. In the larger part of the Northeast there is absolutely no chance for the soil to have been inoculated previously. The value of reinoculation probably is greater

under such conditions.

"2. Depleted organic matter and heavier clay soils make necessary greater care in the depth of seeding.

"3. The necessity of fertilization places an added responsibility on the farmer in order to prevent the toxic effect of direct contact of the fertilizer with the seed.

"4. Time of planting becomes more important because of the necessity of utilizing every possible available day for growing the crop to the stage of maturity desired.

"5. The rate of seeding fortunately offers little difficulty provided there is an even distribution and the competition with weeds is successfully eliminated. The soybean plant has a surprising power of adjustment to space, provided the space is free to be occupied.

"6. Weeds, including grass, present an even greater problem in the Northeast than in the central area of production. (I know you will not agree with me on this point, but I am willing to argue the issue.) The essential reason for this is universally recognized in the fact that soybeans at best grow rather slowly during the seedling stage, and that the best growth is secured under warm conditions, both day and night. These ideal conditions are seldom present in the greater part of the area under discussion, and never present early in the season. Thus, conditions less favorable for soybeans are at the same time more favorable for some of their greatest competitors. All growers recognize the futility of attempting to produce soybeans in active competition with weeds early in the life cycle of the soybean plant. Therefore, weed control becomes absolutely necessary if a reasonable crop is to be expected. Probably the best way to handle this situation is to do the cultivating before seeding. Since seeding can not be too much delayed in the Northeast, some form of cultivation capable of eliminating most of the competing plants, and at the same time leaving enough soybean plants to form a desirable stand, becomes a necessity. Successful production of soybeans is next to impossible without cultivation. The later the planting the less cultivation is essential." Continued. Address: Cornell Univ.

953. Hunter, J.E. 1938. The general analysis of soybean oil meal. 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. 10-11. Oct. [5 ref]

• ***Summary:*** "Soybean oil meal has long been recognized as a valuable feed for livestock. Soybean oil meal is valuable because of its protein of high biological value, its fat content (Meissl and Boecker {1} in their studies found soybean oil meal to contain no free fatty acids and to consist almost entirely of neutral triglycerides), its impressive list of carbohydrate materials, its inorganic constituents, its vitamin content, and its content of phosphatides and enzymes.

"Volumes have been written on the analysis of soybean seeds. The composition of soybean oil meal has been generally quite closely standardized, the fat content of the meal being the chief variant. The fat content varies somewhat with the processes of manufacture, the expeller and hydraulic meals containing more fat than solvent processed meal. Morrison (2) gives the general composition of soybeans and soybean oil meal as follows:"

Table 1 gives the composition of soybeans, soybean oil meal made by hydraulic or expeller process, and soybean oil meal made by the solvent extraction process.

"Morrison also presents the following mineral and fertilizing values:"

Table 2 gives the calcium, phosphorus, nitrogen, and potash content of soybean meal made by the three different processes described above.

"Piper and Morse (3) in a series of analyses showing the composition of Old Process soy cake and meals, indicate the following variation in composition" [table 3]:

Moisture–from 7.59 to 17.37%
Protein–from 40.56 to 44.65%
Fat–from 5.04 to 8.77%
N.F.E.–from 21.2 to 34.04%
Ash–from 4.90 to 6.59%
Fiber–from 3.58 to 6.95%

Note: N.F.E. is "nitrogen free extract" which is carbohydrates, not including fiber.

"It must be remembered that these figures from Piper and Morse were from determinations made prior to 1923, and undoubtedly show a much wider variation than can be found today.

"An interesting table showing the moisture, protein, ether extract, and ash content of soybeans and soybean oil meal is given by Wilgus, Norris, and Heuser (4) as follows:

Table 4 (the largest of the 4) is based on has 8 columns: (1) Sample No.: there are 9 samples. (2). Process: using the Expeller, hydraulic, and solvent extraction process. (3) Soybean material: Either soybeans or oil meal. (4) Per cent moisture. (5) Per cent protein. (6) Per cent ether extract. (7) Per cent ash. (8) Soybean variety: Illini, Manchu, and Black Ebony–plus some mixtures of two of these.

"The soybean contains several enzymes. Piper and Morse (3) cite references to investigations reporting the presence of urease, diastase, lipase, peroxidase, and a protease of the peptoclastic type. Frey and Schultz (5) indicate that a bleaching enzyme is present in the soybean which makes it an especially valuable agent for bleaching carotene in wheat flour. Heating the soybean above 50ºC. inactivates this enzyme, however, and it is therefore not present in properly-cooked soybean oil meal." Address: USA.

954. American Soy Bean Association. 1938. 16th annual meeting (leaflet). 1 p. Single sided. Undated.

• ***Summary:*** This leaflet indicates the location and menu for the 16th annual meeting of the American Soy Bean

Association. The meeting was held in the Crystal Ballroom of Hotel Montrose, Cedar Rapids, Iowa. The menu included: "Salted soy nuts, cream of tomato soup, fruit cocktail, beef tenderloin steak, browned potatoes, string beans, soy Parkerhouse rolls, butter, apple, celery and egg salad, Vi-Tone ice cream, cake." The leaflet also lists the stores from which the soy products were purchased: "La Sierra Industries, Ontario, California; Madison Foods, Madison College, Tennessee; Petersen Bakery, Cedar Rapids, Iowa; Milqo Limited, Vi-Tone Company, Hamilton, Ontario, Canada; Hutchinson Ice Cream Company, Cedar Rapids, Iowa."

Note: The Vi-Tone Company of Canada made soymilk in malted and chocolate flavors. Ice cream was probably made from that soymilk for this occasion. We have no evidence that Vi-Tone ever made a commercial ice cream from their soymilk.

955. Cardon, P.W. 1938. Moo-oo! (says the soybean).
• ***Summary:*** "Moo-oo! (says the soybean) / Moo-oo–and how! / I ain't a bovine / Ama cow! / Ain't got horns / Hoofs ain't split, / Ain't got bag / Nary a tit! / But milk flows / From podded bean–/ Rich in fat / and vit-a-meen! / Nutty flavor / Babies coo-oo! / Which is why / I moo-oo and moo-oo!" Address: Chief, Div. of Forage Crops and Diseases, USDA.

956. Cattell, James McKeen; Cattell, Jaques. eds. 1938. William Joseph Morse. In: American Men of Science: A Biographical Directory, 6th ed. 1938. New York: The Science Press. 1608 p. See p. 1011.
• ***Summary:*** "6809 Fifth St., N.W., Washington, D.C. Agronomy. Lowville, N.Y., May 10, 1884. B.S., Cornell, '07. Asst. agrostologist. bur. plant. indust, U.S. Dept. Agr., 07-08, agronomist, 08-26, senior agronomist, 26-29, agricultural explorer, Japan, Korea, Manchuria and China, 29-31, senior agronomist, div. forage crops and diseases, 31- Soc. Agron.; Am. Soy-Bean Asn. (president, 1923. 1925, 1932); Bot. Soc. Wash. Soybeans; cowpeas; velvet beans; pigeon peas; oriental legumes." Address: USDA, Washington, DC.

957. *Courier*. 1938. Find green soybeans edible: Six varieties found to have special merit; suggest treatment like lima beans.
• ***Summary:*** Contents: Introduction. Treated like lima beans. Six 'very good' varieties. Unusual nutritive values. Geography limits use. Morse furnished seed.

958. Fairchild, David. 1938. The world was my garden: Travels of a plant explorer. New York, NY: Charles Scribner's Sons. xiv + 494 p. Assisted by Elizabeth and Alfred Kay. Illust. Index. 25 cm.
• ***Summary:*** This wonderful book, an autobiography of David Fairchild (1869-1954), also tells the story of the early days of the USDA and its Section of Foreign Seed and Plant Introduction, and of the pioneering work with plant introduction to the United States. It contains about 207 black-and-white photos, mostly taken by the author. One of these (p. 472A) shows Howard P. Dorsett (standing) and David Fairchild (seated), who "spent twenty happy years in close association, trying to increase the number and improve through introductions the quality of the fruits and vegetables of the United States."

Contents: 1. Background. 2. Kansas. 3. I enter government service. 4. I meet Barbour Lathrop and reach Naples [Italy]. 5. Breslau, Berlin, and Bonn [Germany]. 6. Java ho! 7. The Lathrop-Fairchild odyssey begins. 8. The Cannibal Isles (Incl. Hawaiian islands). 9. American interlude (in 1897 his father resigned as president of Kansas State College of Agriculture after the wave of Populism engulfed the college). 10. The West Indies and South America. 11. Cotton in Egypt. 12. Across the Java Sea. 13. From Finland to Dalmatia. 14. Land of the Pharaohs. 15. Malta, Tunis, Algiers, and Spain. 16. England, America, and west to the Orient once more. 17. The Persian Gulf and Bagdad [Baghdad. Note: Iraq was established in 1921 out of former Turkish territory]. 18. A glimpse of Saïgon [Saigon] and a long stay in Japan. 19. I visit Luther Burbank and circumnavigate Africa. 20. I meet Alexander Graham Bell. 21. A grand tour of these United States. 22. Mostly personal. 23. Washington, Madeira, and "In the Woods." 24. Baddeck, Nova Scotia. 25. Mostly aviation. 26. Lacquer and wild wheat. 27. Aaron Aaronsohn and Joseph Rock. 28. More plants, introduction gardens, and Mr. Bell. 29. Florida in 1912. 30. Monsters of the backyard. 31. The flowering cherry trees are planted in Washington. 32. Quarantine increases and war [World War I] begins. 33. Seeds from Afghanistan. 34. The plains of Canada. 35. The war and dried vegetables. 36. The Allison Armour expeditions. 37. Aloha.

In 1889 Beverly T. Galloway, head of USDA's Division of Plant Pathology, brought David Fairchild, age 19, to Washington, DC, to join five plant pathologists who were working in attic rooms of the old red brick department building. P. Howard Dorsett, Galloway's Wisconsin classmate, soon joined the group. Soon shy and scholarly Walter T. Swingle, Fairchild's Kansas State classmate and close friend since their student days in Germany, arrived with his growing library of agricultural references in 5 or 6 languages. Seeking an opportunity to learn about the flora of foreign countries, Fairchild accepted a Smithsonian fellowship to study entomology in Naples, Italy, and resigned from the USDA. Fairchild's pioneering work with plant introduction traces its roots back to late 1893. On board a ship, the young plant pathologist met Barbour Lathrop, a wealthy San Francisco gentleman who later took him on an extended tour of the Pacific and showed him fruits, grains, and ornamental plants that could be valuable in America. In 1895 Lathrop gave Fairchild the money to begin his study of the plant treasures of the tropics. Returning to the USA in

P.H. Dorsett (L) and David Fairchild (R)

Personnel of the Section of Plant Pathology in the early 90's:
Joseph James David Fairchild Theodore Holm Beverly T. Galloway Merton B. Waite Walter T. Swingle P. Howard Dorsett

1897 (with Mr. Lathrop), after an absence of 4 years, David Fairchild knew exactly what he wanted to do with his life. He visited his parents in Manhattan, Kansas, and learned that a wave of "Populism" (resembling Bolshevism) had caused his father to resign as president of the college (p. 105). In August 1897 he reached Washington, DC–without a job. James Wilson, the Secretary of Agriculture, firmly believed that "what agriculture needed most was more knowledge." "The idea of plant introduction as a government activity was germinating in other minds besides Lathrop's and mine" (p. 106). Secretary Wilson's first act after taking office had been to send N.E. Hansen to Russia in search of cold-resistant cereal grains and fruits for America's great plains. Swingle has recently presented a paper on introducing subtropical plants to Florida.

Fairchild and Swingle conceived a plan to divert $20,000 dollars of the funds appropriated for the wasteful Congressional Seed Distribution Service (which was already spending several hundred thousand dollars a year) in order to finance a section for the specific purpose of introducing new, useful, and carefully selected crops into the United States. He enthusiastically presented the idea to Secretary Wilson, who approved the plan and asked him to organize the new Foreign Seed and Plant Introduction Section (p. 107). Housed on the fifth floor under the eaves of the old Department of Agriculture building and staffed by one teenage secretary, it became a reality when Congress passed the revised appropriation bill in July, 1898.

"In 1899, all that existed of the Department of Agriculture was housed in an ugly old building with a mansard roof topping its red-brick walls. It was situated in a park south of Pennsylvania Avenue, just beyond one of the most disreputable quarters of the city" (p. 18).

In 1916 David and Marian Fairchild purchased a piece of property located in Coconut Grove on Biscayne Bay, Florida; they named it The Kampong. On the property was a very old stone barn, a huge stone entrance gate, and many fine old tropical trees (p. 452-53, 456A, 472C). A Kampong is a Malay word (first used in English in 1844) meaning "a native hamlet or village in a Malay-speaking country."

Good photos show: (1-4) Members of the USDA Section of Plant Pathology taken in the early 1890s: Walter T. Swingle, Joseph James, David Fairchild, Theodore Holm, Beverly T. Galloway, Merton B. Waite, and P. Howard Dorsett (p. 26A-B). (5) Barbour Lathrop and David Fairchild in the cabin of a boat, off Sumatra, Christmas, 1895. (6) The uniform of a worker at Mr. Suzuki's nursery in Tokyo, Japan. The back is decorated with large Chinese characters. (5) Fermentation vats with conical bamboo covers in a soy sauce factory at Ichang (I-ch'ang or Yichang), a city in west Hupeh

/ Hubei province in Central China (p. 256F, probably taken by Frank N. Meyer in 1917). (6) page shows "A prolific Soy Bean plant ripe for harvest" and loaded with pods (p. 256F). (7) David Fairchild (seated) and Howard Dorsett (standing), each in two-piece suits, by at a desk, examining various fruits (p. 472A). Address: USDA.

959. Fairchild, David. 1938. A long stay in Japan: Encounters with soy beans, tofu, soy sauce, and green soy beans in the pods (Document part). In: D. Fairchild. 1938. The World Was My Garden: Travels of a Plant Explorer. New York, NY: Charles Scribner's Sons. xiv + 494 p. See p. 258-59, 327-28. Assisted by Elizabeth and Alfred Kay.

• ***Summary:*** In 1902 at Kusafuka, Japan, Fairchild visited the home of Mr. Tsuboi. He had "considerable difficulty digesting the raw fish and seaweed, but became very fond of the egg dishes, the bean cheese or 'tofu,' and the universal soy sauce... But the dish which I afterward served in Washington [DC] was a delicate variety of the soy bean. The young, flat, rather hairy pods–much smaller than the lima bean–are boiled in salted water and served in the pod in a little lacquer bowls. I enjoyed opening the pods and taking out the delicate green beans, which have a pleasant, nutty flavor. Some Americans complain that it takes too long to empty the pods, and of course there is no reply to such an objection" (p. 258).

Japanese "cuisine is conspicuous for the absence of gravies, for which they substitute a sauce made from the soy bean by a complicated process of fermentation. Almost every meal includes boiled rice, often served with delicate, soy bean curds [tofu]... and pretty bits of colored soy bean candy" (p. 259).

Note: This is the earliest English-language document seen (April 2013) that uses the terms "soy bean curds" to refer to tofu.

"From Mr. Tsuboi's delightful home, we journeyed to a branch experiment station at Anjo where there were fields of the chief agricultural crops of the country. The soy beans particularly interested me, as in 1898 I had imported both beans and some soil from a Tokyo soy bean field. Waite [Merton B. Waite, of the USDA Section of Plant Pathology] and I discovered that root nodules could be induced on soy bean plants by growing them in Japanese soil, but, when they are grown on new soil, they will not develop the nodules unless the soil is inoculated. In Virginia, Maine, Michigan, and Kansas, a general interest in the soy bean and its possibilities had developed among the experiment station workers, although it was only used as cattle food.

"I hope that a book will be written describing the vast soy bean industry which has developed in America since those early beginnings, and the important part played by the varieties introduced by Frank Meyer and later by W.J. Morse and P.H. Dorsett. Morse has devoted the best years of his life to a careful and penetrating study of the soy bean, and he should receive the full measure of credit for his contributions to an industry now measured by millions of acres under culture in America each year" (p. 259).

After Fairchild was married, he and his wife, Marian, started a garden by their home in Maryland, about 10 miles outside of Washington, DC. A delightful Japanese peasant boy names Mori served as their gardener. In the garden: "We grew soy-beans as a vegetable and had to endure the criticism that they took too long to shell (p. 327-28).

A photos show: Mr. Tsuboi, an authority on bamboo, enjoying his dwarf plants in charming porcelain bowls and trays (p. 256D). A prolific soy bean plant with many hairy pods (p. 256F). Address: USDA.

960. *Sunday Courier* (*Urbana, Illinois*). 1938? Soybean experts meet at U. of I. (Photo caption).

• ***Summary:*** This photo shows Jackson L. Cartter, W.J. Morse, H.E. Marston, and W.L. Burlison looking at a document. The lower caption reads: "Soybean specialists from 12 North Central states are attending a three-day work planning conference of the U.S. Regional Soybean laboratory at the University of Illinois which ended Friday. Pictured above are, left to right, Jackson L. Cartter, senior agronomist of the laboratory here; W.J. Morse, soybean specialist of the department of agriculture, Washington [DC]; H.E. Marston, representing the agricultural research administration of the department of agriculture, and Dr. W.L. Burlison, head of the U. of I. department of agronomy."

961. 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 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."

962. Lloyd, J.W.; Burlison, W.L. 1939. Eighteen varieties of edible soybeans: Their adaptability, acceptability, culture and characteristics. *Illinois Agricultural Experiment Station, Bulletin* No. 453. p. 385-439. March.

• ***Summary:*** This is the most complete and interesting report on this subject published up to this time. "The original stock of most of the varieties of edible soybeans included in these studies was supplied by W.J. Morse, Bureau of Plant Industry, U.S. Department of Agriculture, who has inspected the growing crops every year and given many helpful suggestions... The Department of Home Economics has supplied valuable data on a number of points and prepared the directions for shelling and cooking the green soybeans given at the back of this bulletin" (p. 383).

The authors use the two terms "edible soybeans" and "vegetable-type soybeans" repeatedly and interchangeably to refer to these soybeans which are especially adapted to use as human food. By contrast "field types" are used for manufacturing oil or industrial products, or for forage. The edible or vegetable types can be consumed in either of two forms: (1) As "green soybeans" or "green shelled beans," or (2) as "dry mature soybeans" or "dry, ripe soybeans," or "dry soybeans."

Contents: Introduction. Distribution of seed for tests. Results of the cooperative tests: Reports from home gardeners, state institutions, market gardeners, and canners. Range of adaptation: Northern and southern United States, East and Middle West, Illinois reports concerning adaptation, comparison of adaptability in Illinois and other states. Performance of 18 varieties at Urbana: Relative earliness of different varieties, duration of edible period, agronomic characters, yields of dry beans, blossom, pod, and seed characters, yields of shelled green beans. Market qualities of the green soybeans. Protein and fat contents of the green soybeans. Characteristics of the 18 different varieties: Very early–Giant Green. Early–80494, Bansei, Fuji. Midseason–Illini, Hokkaido, Jogun, Willomi, 80490-1, 89162, 84979, 87617. Late: Illington, Imperial, 87606, Funk Delicious, Emperor, Higan (p. 401). One other variety (Kura, p. 387) was not tested. Varieties recommended. Method of culture: Time of planting, preparation of seedbed, distance and depth of planting, equipment for planting (a beet-and-bean drill pulled by two horses), inoculation of the seed, tillage. Damage from rabbits and grasshoppers. Harvesting green soybeans. Harvesting, curing, and threshing ripe soybeans. Summary and conclusions. Directions for shelling and cooking green soybeans.

While the University of Illinois Department of Home Economics was doing palatability studies on vegetable-type soybeans, the agronomists were doing a parallel set of studies from 1935-1938 on yields, cultural practices, time to mature, and suitability for home and market gardeners. In the spring of 1936, four varieties were available for distribution: Fuji (81029), Higan (80475), Willomi (81044-1), and Hokkaido (85666); packets of three of these were sent to 197 persons. Their 11 most recommended vegetable-type soybeans contained an average of 40.7% protein on a dry weight basis (range 36.4–42.9%) and an average 100-seed weight of 28.0 gm (range: 21.2–31.9 gm). From the 100-200 interested home gardeners who were sent trial seed packets each year came a very positive response. The vegetable-type soybeans were considered high yielding and resistant to drought. "Several gardeners liking the soybeans because they were available for use as a fresh vegetable at a season of the year when vegetables in the home garden are likely to be scarce." But above all the gardeners reported that "Fresh soybeans had a satisfying flavor" (p. 390): "They were delicious... We like them better than peas or beans... I served soybeans to all guests this summer and most everyone liked them... Everyone who tried them said they were splendid... We have never eaten beans as good... The beans were delicious to eat and were universally liked by my family and guests. In fact it took persuasion to leave any for seed." Other representative comments from the hundreds printed in the report include: "I think the vegetable soy will soon become a standard vegetable... I think it is only a question of time until these beans are very popular.

Reports from market gardeners were also positive: "I put some of the soybeans on our sales counter and found that about 80% of the people who tried the beans once came back for more." In a large grocery store in Chicago directions for shelling and cooking the green beans were furnished with each purchase and over 1,200 lb were sold the month. Canning companies reported that certain varieties made "a very fine canned product, the appearance being very good and the flavor excellent."

Soon interest was widespread, with 3,000 requests for seed from all states, Hawaii, and 7 foreign countries. Outside of Illinois, good results were obtained from cooperators in Minnesota (Le Sueur), Wisconsin (Burnett county), Idaho (Kamiah), Oregon (Florence, Dundee), Washington (Kennewick, Vader), Montana (Bozeman), New Mexico (Valley Ranch), Colorado (Edgewater, above 5,000 feet), South Carolina, Arkansas, Kansas, and Texas (p. 394-96).

At the end of 1939 reports were received back from 810 people who had been sent seeds of vegetable-type soybeans that spring; 80% reported success in growing a good crop and 70% were enthusiastic about their quality as a green vegetable.

Yields of green soybeans in the pods were roughly 218 bu/acre, while yields of shelled green soybeans averaged

6,350 lb/acre (range 7,100 for Giant Green to 6,000 lb for Willomi). Green soybeans weigh, on average, 2.44 times as much as after they are allowed to dry. It takes an average of 10.8 minutes to shell 1 lb of pods. Lloyd and Burlison rated 6 of the green vegetable soybeans as having a quality rating (flavor, texture, and appearance) of very good: Hokkaido, Jogun, Willomi, Imperial, Funk Delicious, and Emperor (p. 419).

Concerning harvesting green soybeans: "For commercial canning, green soybeans could be harvested and handled with the equipment usually employed in the handling of the Henderson Bush lima for canning" (p. 435).

Tables show: (1) Relative earliness of the 18 varieties grown at Urbana, Illinois, 1934-1938. For each variety for all 3 years gives the number of days to blooming, number of days to edible condition, and number of days to maturity. (2) Duration of edible period of 13 varieties of soybeans grown at Urbana, Illinois, 1937-1938. The duration was shortest for the earliest varieties (10-11 days) and longest for the latest varieties (17-20 days). (3) Agronomic characters of 18 varieties of soybeans grown at Urbana. For each variety for 5 years gives the height of plant at maturity (inches), average height, lodging, and shattering. Illini was the only variety with no shattering. (4) Acre-yields of dry beans from 18 varieties of soybeans, Urbana, 1934-1938. Illini had the highest 5-year average yield (33.6 bu/acre), followed by Bansei (3.05 bu/acre). (5) Temperature and rainfall during growing months for soybeans, Urbana, 1934-1938. Months: May to Sept. (6) Yields of soybean seed from multiplication plots, 14 varieties, Urbana, 1938. Illini had the highest yield, 39.3 bu/acre. (7) Blossom, pod, and seed characters of the 18 varieties of soybeans tested. For each variety gives: Color of blossom. Color of pubescence. Color of seed. Color of hilum. Shape of seed. Weight of 100 dry beans (an average figure, computed from the weights of these beans for the years 1934 thru 1938). (8) Weight of 100 dry soybeans, 18 varieties, Urbana, 1934-1938. Gives weights for a sample of each variety for most of 5 crop years, plus the average. The varieties with the largest seeds were Hokkaido (31.88 gm) and Funk Delicious (31.65 gm). (9) Weights and shelling percentages of 7 varieties of green vegetable soybeans, Urbana, 1936. Gives for each variety: Weight of 100 pods of green beans, weight of shelled beans from 100 pods, shelling percentage (average 55.0; range 59.5–49.7), average number of beans per pod (range: 1.62–2.24), weight of 100 green shelled beans (range 55.8–84.2 gm), and ratio of weight of 100 green shelled beans to weight of 100 dry beans (average 2.44 to 1). (10). Yields of green soybeans shelled for canning, 1937 (Reported by canning company for 6 varieties). Giant Green had the largest yield, 7,100 lb/acre. Average 6,350 lb/acre. (11) Market qualities of the 18 varieties of green soybeans tested at Urbana: Color of pods toward close of edible period, size of pods, size of green beans, weight of shelled beans from 100 grams pods, shelling time for 1 pound of pods (by hand; average 10.8 min), quality rating. (12). Protein and fat contents of the mature soybeans of the 18 varieties tested at Urbana, crop of 1938 (water-free basis). Protein averaged 40.73% (range 38.5–44.13). Fat averaged 20.47% (range 18.12–22.42).

Note 1. This is the earliest English-language document seen (June 2013) that uses the term "vegetable-type soybeans" or that has the term "edible soybeans" in the title.

Note 2. This is the earliest document seen (Aug. 2013) that mentions the soybean variety Emperor. Address: 1. Chief in Olericulture; 2. Chief in Crop Production. Both: Urbana, Illinois.

963. William Morse (Photograph). 1939.

• ***Summary:*** This digital photo, dated 1930s, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

964. Delwiche, E.T. 1939. Extending the soybean belt northward. *Proceedings of the American Soybean Association* p. 22-26. 19th annual meeting. Held 11-12 Sept. at Madison, Wisconsin.
• ***Summary:*** "The extension of soybean culture northward in Wisconsin was started in 1906. At that time the author was

assigned the job of helping in the introduction of suitable crops for the extreme northern part of the state, the section bordering on Lake Superior. One of the problems to meet was to find an annual legume crop suitable for hay making, a crop that the new settler could plant in the spring, and realize a crop of hay from it. It was not hard to find such a crop for the heavy clay types of soil, for on such land field peas supplied the supplement. But, for the sandy belt,... the problem was not so easy." A long list of potential crops was compiled. "The first trial, made in the summer of 1906, indicated very clearly that of all these, soybeans gave the best indication of being adapted as an annual hay."

"Five years of work carried on continuously at the Iron River Substation, some sixteen miles south of Lake Superior, sufficed to work out the essential cultural requirements of the soybean crop, and to give a good idea of the kind of varieties suited." Ito-san [Ito San] and Early Black were found to make good hay.

"In 1909, some fifty selections were made with a view to finding out the best adapted type. These were planted at the Spooner Branch Station in 1910, some sixty miles south of Iron River and in the heart of the sandy belt... The strains selected out of Early Black produced well." The two best strains were No. 1 and No. 25. The pedigree No. 1, because of its being a better seed producer, was finally selected and is the strain now known as Wisconsin Black." As "early as 1913, four acres of Pedigree No. 1 (so-called Wisconsin Early Black) were put in at the Ellis Junction Station."

"At this time cooperation was begun with the U.S. Department of Agriculture, and seed was obtained from W.J. Morse... In 1914, fifty new varieties were obtained from the U.S.D.A. and added to the test at Spooner. Weather conditions favored the ripening of most of these. Selection work out of these strains of soybeans was begun at that time. My records show that about that time centers for the culture of this valuable crop were established in Burnett, Washburn, Portage, and Marinette Counties. Prof. George M. Briggs, who came as county agent in Burnett County, took up the good cause and gave a strong impetus to the production of soybeans in Burnett County, and won for himself an enviable reputation in the rapid expansion of the crop.

"Varieties that showed evidence of value for the north were Wisconsin Black, Black Eyebrow, and two strains of the Mandarin soybean." Wisconsin Early Black also survived several years of cold weather. Other varieties mentioned: Manchuria, Medium Green, and Mammoth Yellow.

Note: This is the earliest document seen with the term "soybean belt" in the title. Address: Wisconsin.

965. 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)," 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.

966. Morse, W.J.; Beeson, K.E.; Wing, D.G. 1939. Resolutions. Officers. *Proceedings of the American Soybean Association* p. 3.

• ***Summary:*** "The following resolutions were presented to and passed by the American Soybean Association at its twenty-first Annual Convention held at the University of Wisconsin, Madison, Wisconsin, September 11 and 12, 1939.

1. Appreciation is "extended to the Univ. of Wisconsin, Professor G.M. Briggs, and all others who assisted in making this annual meeting such a pleasant and educational affair.

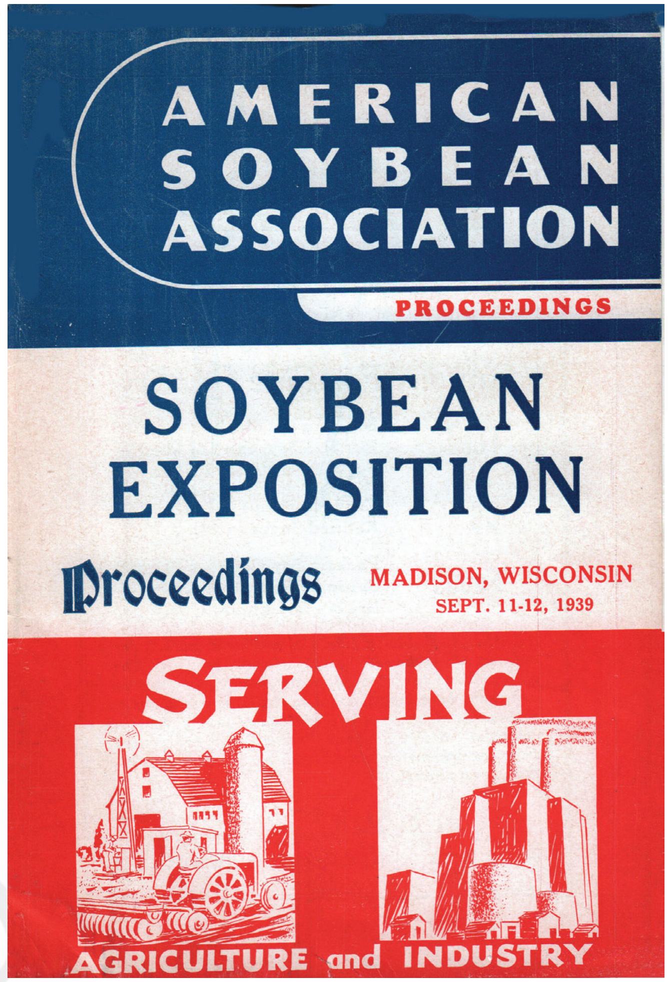
"2. Approval and appreciation of the efforts of the legislative committee of the Association in cooperation with the Domestic Fats Conference to protect and further the production of domestic fats and oils until such production reaches our domestic requirements.

"3. The development and use of vegetable soybeans has been given real impetus by the excellent research publications of the University of Illinois and by the pioneering work in processing and merchandising the green vegetable soybeans by Wisconsin canning companies. Similar activity in the field of human food products by many industries constitute a development that is much appreciated.

"4. The continuing interest of the Pennsylvania Railroad, expressed by the activity of its agricultural agent, Mr. Russell G. East, in again circulating its soybean exhibit in cooperation with the American Soybean Association, is deeply appreciated.

"5. Appreciation of the efforts of the United States Regional Soybean Industrial Products Laboratory, extension workers, commercial laboratories, National Chemurgic Council, state experiment stations, and agricultural colleges toward the development of various phases of the American soybean industry.

"6. The financial support of a sympathetic industry



which makes possible the annual proceedings of the Association is gratefully acknowledged.

"7. The financing of the activities of the Association on behalf of soybean producers can only be met by an equitably distributed cost to all soybean producers. The directors and officers of the Association are hereby given authority to consider plans for the collection of .1 cent per bushel on all soybeans processed, and to carry out such plans as may be entered into to make such collection possible.

"Officers for the year 1939-40 are: President–G.C. McIlroy, Irwin, Ohio. Vice-President–J.W. Hartz, Stuttgart, Arkansas. Secretary-Treasurer–J.B. Edmondson, Clayton, Indiana." Address: 1. Chairman [American Soybean Assoc.].

967. 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, 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.

968. Winter, Floyd L. 1939. Edible soybeans for quick freezing? *Quick Frozen Foods* 2:11, 40.
• ***Summary:*** "Soybeans may be roughly classified into two groups: (1) field type, (2) table or edible type. The field type is used mainly for industrial purposes such as plastics and oil

for paints, also to a lesser extent for animal food. Although this type can be used for human food it is usually not very palatable to American tastes unless converted into a different form through some processing method.

"Many Varieties: The edible type includes the strains and varieties whose seeds are used mainly as human food. The seed can be used in the green or immature stage in similar fashion to green shelled beans. Mainly through the efforts of William J. Morse of the United States Department of Agriculture many varieties of edible soybeans have been introduced into this country during the last ten years... The major portion of the work has been conducted by the University of Illinois... Certain varieties of soybeans not only are palatable but compare favorably with peas, lima beans, and navy beans in composition of food elements as well as in caloric value. The edible soybeans exceed peas and lima beans in protein content. Forty per cent of the dry bean weight is protein, which is twice the protein content of lima beans and four times that of eggs. This probably accounts for the fact that the soybean has long been known in the Orient as 'poor man's meat.' The edible soybean is an excellent source of readily available iron and calcium.

"New in This Country: The edible soybean is comparatively a new food in this country... It is known in certain sections of the country (especially the Midwest) that the bean can be grown with ease in the home garden and that the green shelled bean when cooked makes a very pleasing dish. It is also known that the bean can be canned in the green stage and that the product is very acceptable. It may be predicted that there will be an increasing amount of edible soybeans preserved in the green state especially when the public becomes acquainted with this product." Address: PhD, Director of Research and Breeding, Associated Seed Growers, Inc.

969. U.S. Senator John Bankhead painting Frank Tenton's boat with soybean oil varnish, Potomac River Basin (Photograph). 1939.
• ***Summary:*** Front row–left to right: W. Donovan, H.T. Herrick, Senator John H. Bankhead II (Alabama, uncle of Tallulah Bankhead, American actress), W.J. Morse (tallest in photo).

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

970. Jackson L. Cartter (L) and William J. Morse (R) seated at a desk in the U.S. Regional Soybean Industrial Products Laboratory (Urbana, Illinois) (Photograph). 1939? Undated.
• ***Summary:*** In 1936 Cartter helped to organize the U.S. Regional Soybean Industrial Products Laboratory at the University of Illinois (Urbana, Illinois). It was founded April 1936. He became the first director of its agronomic division and was placed in charge of the soybean breeding program for the 12 midwestern states; he studied the soybean's oil and protein composition, and served as director of the laboratory until his retirement in 1965.

This digital photo, with caption, was sent to Soyfoods

She completed the first year of high school. She was born in the District of Columbia. She lived in the same house in 1935. She was not employed. She worked in the home. She had no wages. Because Edna was enumerated on line 76, additional details were solicited from her. These are: Her father was born in Virginia; her Mother was born in Virginia. Her native language was English. Her occupation was housewife. She had one marriage at age 27. She had one child over 14 years of age.

Margaret C. Morse. Daughter. Age 18. Attended college 1 year. She was born in Washington, D.C. She lived in the same house in 1935. She was not employed but was in school. She had no income.

Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

971. Schoffelmayer, Victor H. 1940. Research will bring soybeans to Texas, scientists declare. *Dallas Morning News* (*Texas*). Jan. 22.
• ***Summary:*** Photos show: (1) A man standing in a soybean field in Arlington, Virginia. (2) William Morse holding a box of black miso. (3) A farmer on a combine in Illinois. Address: Agricultural Editor of The News.

972. U.S. Department of the Interior, Census Office. 1940. William J. Morse, Edna (his wife), and Margaret (their daughter) in the 1940 U.S. Census in Washington, DC. Washington, DC. Aug. 9-10.
• ***Summary:*** State: District of Columbia. Incorporated Place: Washington, D.C. Supervisor's District 1; Enumeration District 212. Enumerated on August 9 -10, 1940.

House number (address)–6809 5th Street. 257th Household enumerated. Owned home valued at $10,000.

William J. Morse. Head of household. White. Male. Age 56, Married. He has not attended school since March 1, 1940. He completed his 4th year of college. He was born in New York and lived in the same house in 1935. It was not a farm. He was employed for wages during the week of March 24-30. He was not employed in Public Emergency. He was not seeking work during the previous year. He worked 39 hours a week as an Agronomist for the Agriculture Department. He worked as a government worker. He had worked 52 weeks and had an income of $6,000 with no other outside income.

Edna S. Morse. Wife. Female. White. Age 56. Married.

973. *Detroit News.* 1940. Soy bean hoard feeds Nazi army. Aug. 19. p. 23, col. 5.
• ***Summary:*** Dr. [sic] W.J. Morse, senior agronomist at USDA, arrived yesterday at the Dearborn Inn [Dearborn, Michigan] for the twentieth annual meeting of the American Soybean Association. Noting that soy beans are being used extensively to feed Germany's fighting forces, he said that Germany had imported about 40 million bushels a year from Manchuria for several years before the war started and is using soy flour as a major source of protein, fats, and carbohydrates needed by its military forces.

G.G. McIlroy (Irwin, Ohio), president of the association, said soybean production in the USA has increased from about 50,000 acres in 1907 to about 11 million acres in 1939, "but edible varieties have formed a negligible percentage of the whole. The beans are grown here primarily as cattle feed for their oil content."

974. Lloyd, J.W. 1940. The rise of edible soybeans. *Proceedings of the American Soybean Association* p. 59-62. 20th annual meeting. Held 18-20 Aug. at Dearborn, Michigan. [1 ref]
• ***Summary:*** "Although the field-type soybean was introduced into the United States from the Orient a number of years ago, the vegetable-type was unknown in America until after the exploration trip in China and Japan by Dr. [sic] W.J. Morse, which extended from February, 1929, to

February, 1931. The seed samples of many varieties were sent back to Washington by Dr. Morse and were planted at the Arlington Experiment Station [Virginia] in 1930 and 1931. Seed developed from these plantings was distributed for trial to various State Experiment Stations in the spring of 1934. The Illinois station had its first contact with the vegetable-type soybeans that season, and started a series of field and palatability tests including many varieties... Other midwestern experiment stations that have been giving attention to the vegetable-type soybeans are Indiana, Ohio, and Iowa."

The results of the Illinois tests were first published in March 1939 in Illinois Bulletin No. 453. "In this bulletin and in press notices concerning it, the announcement was made that small packets of vegetable-type soybeans for trial planting would be furnished upon request, as long as the available seed supply lasted. The response was a perfect deluge of requests for seed... Special interest was manifested in the vegetable-type soybean as a food suitable for diabetics, and many stated that they wished to grow the crop for that purpose. By the end of May [1939] seed had been sent to 2,096 persons–all who had made requests up to that time. Requests were received from 46 of the 48 states, from Hawaii and the District of Columbia, from 5 provinces of Canada and from 6 other foreign countries.

"At the end of the 1939 season, reports were received from 810 persons to whom seed had been furnished that spring. Almost 80 percent of those persons reported success in the production of the crop, in spite of drouth, grasshoppers, rabbits, and other hazards. Approximately 70 percent of those who succeeded in growing the crop were enthusiastic about its table quality as a green vegetable... While tests by correspondents were limited mostly to the use of the soybeans as a fresh vegetable, a number reported successful canning of the product for winter use, while others allowed the beans to mature and reported them as highly satisfactory when used like navy beans." One company "is reported to have canned eight carloads of the finished product last year. Experimental work in canning and freezing of green soybeans is in progress on a comprehensive scale at two eastern experiment stations this season."

The Bansei variety is said to be especially well suited to the making of soybean milk. Yellow-colored varieties are said to make a superior grade of soybean flour. "The chief objection to the soybean as a home-garden or market-garden vegetable is the difficulty of shelling the beans by hand... Perhaps progress would be made in popularizing this product if the Oriental method of serving were adopted. This involves cooking the beans in the pods and letting each guest do his own shelling. Some Americans have tried this method and are well pleased with it. It involves more leisurely eating and would be especially appropriate at a banquet table."

"Previous to the spring of 1940, seed of vegetable-type soybeans was practically unobtainable by the general public. It was not offered under variety names by a single seedman so far as I am able to learn. Last spring, however, at least six seedsmen announced several varieties in their catalogs or price lists, and seeds were sold to a large number of planters."

Note: This is the earliest English-language document seen (April 2013) that uses the term "field-type soybean." Address: Univ. of Illinois, Urbana.

975. Morse, W.J. 1940. Soybeans around the world. *Proceedings of the American Soybean Association* p. 72-74. 20th annual meeting. Held 18-20 Aug. at Dearborn, Michigan.

• ***Summary:*** The areas where soybean production has recently increased are the East Indies, Rumania, Austria, Bulgaria, Czechoslovakia, and Yugoslavia. "Soybean production in the Danube Basin in 1939 amounted to approximately 5 million bushels. The acreage in Bulgaria, Hungary, Rumania, and Yugoslavia increased more than 60% in 1940, this being attributed to the activities of two German companies which distributed selected seed and inoculation culture, and contracted in advance for taking the entire production at increased prices. The Greek government planned extensive cultivation of soybeans in 1940, providing for importation of seed, requiring compulsory cultivation of the crop, and the purchase of the entire crop from farmers at remunerative prices. In addition to their attempts to establish

the crop, extensive investigations have been carried on in the research laboratories of government agencies and private industries of many countries in the development of new food and industrial products from the soybean and its by-products, oil and oil meal."

The increase in production has been largely due to the development of adapted soybean types through introduction, selection, and hybridization. "Soybean breeding programs have been carried on extensively in Germany, Russia, Netherland Indies, Rumania, Japan, Manchuria, South Africa, Canada, and some of the Balkan countries, and to a lesser extent in Sweden, England, Holland, France, Italy, Poland, Australia, India, and the Philippines."

"The outbreak of hostilities in Europe and the resulting interference with the flow of Manchurian soybeans into European markets brought about a rather critical situation to the producers in that part of the Orient. Moreover, Manchurian authorities on November 1, 1939, set up a soybean monopoly whereby the government purchases all soybeans for sale, fixes the price, and makes all export sales... Soybean exports from Manchuria for the first 8 months of the 1939-40 marketing year amounted to approximately 24 million bushels as compared with 59 million bushels for the corresponding period last season. Exports to Europe during the 8 months of this season were estimated at about 4 million bushels as compared with actual exports of 32 million bushels for the same months in 1938-39. About one million bushels were exported this year to Germany via Trans-Siberian Railway, and over 2.5 million bushels to Europe by sea, a major portion of which went to Italy.

"With practical cessation of direct shipments to European countries, Japanese and Manchurian officials began concentrating on the development of new industrial outlets for soybeans. The process of making usable protein from soybean material as a substitute for imported milk casein has been widely studied by government and industrial agencies in Manchuria and Japan. At present the principal ways in which soybean protein is substituting for milk casein are as glue for wooden articles, furniture, veneer, plywood, etc., paper sizing, as the adhesive element in insecticides and water paints, and as material for artificial wool and plastics. In 1938 more than 22 million pounds of soybean glue were used. A few Japanese companies have industrialized the manufacture of protein on rather an extensive scale. In Japan only one firm is reported to be producing soybean plastics, and these are not entirely satisfactory. Soybean fiber, or casein fiber as it is known in Japanese trade circles, is manufactured exclusively by one concern which sells its products to a spinning firm for making into yarn and cloth. The present capacity of the factory is about 22,000 pounds per day although actual daily production is said to be only about 13,000 pounds. The fiber known as 'Silkool' has not yet been exported. The domestic prices range from 33 to 35 cents per pound.

"A sample of 'Soyalex' recently received from Japan was said to contain not less than 60% pure lecithin. This new soybean product may be used in making butter, chocolate, for dressing of leather, making of shoe polishes and toilet foods such as face creams and soaps, for cooking, making noodles and macaroni, and in the preparation of valuable chemicals."

A portrait photo shows W.J. Morse.

Note 1. This is the earliest document seen (Jan. 2000) concerning the cultivation of soybeans in Sweden.

Note 2. This is the earliest English-language document seen (Dec. 2004) that uses the term "soybean fiber" to refer to spun soy protein fiber used like a textile fiber. Address: USDA Bureau of Plant Industry, Washington, DC.

976. Sept. 5–Claude R. Wickard (D), Indiana, becomes U.S. Secretary of Agriculture under President Franklin D. Roosevelt (1933-1945) (Important event). 1940.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

977. LeClerc, J.A. 1940. Re: Soy sauce. Letter to Mr. E. Bradley Fairchild, P.O. Box 2, Manila, Philippine Islands, Dec. 10. 1 p. Typed. [1 ref. Eng]
• ***Summary:*** "Dear Sir: I have been requested by Mr. W.J. Morse, of the Bureau of Plant Industry, to send you such information as we have on the preparation of soy sauce by the use of hydrochloric acid.

"Is is my understanding that most of the soy sauce made in this country at the present time is produced by the modern process of using hydrochloric acid for the conversion of protein rich material such as gluten, soybean pressed oaks, etc. This process can be completed in about two days, whereas the old process used in China requires from six months to two years. Furthermore, the new process is much more sanitary. On a laboratory scale we have made soy sauce in this way as follows:

"Take 15 grams of wet gluten and 80 cc of 3.7% HCl [hydrochloric acid] (1+9). This is heated in an autoclave at 20 pounds pressure for 3 to 4 hours. The digested material is then concentrated to one-half its volume and neutralized with an alkali, or rather almost neutralized. This is then filtered and the product thus obtained is similar in most respects to soy sauce." Address: Senior Chemist, Agricultural Chemical Research Div., USDA.

978. *New York Times.* 1940. Augustus Staley, manufacturer, 73: 'Father of the soy bean in United States' headed $20,000,000 company in Decatur, Illinois. He succumbs in Miami. Dec. 27. p. 20.
• ***Summary:*** Augustus E. Staley was born in Julian, North Carolina. In his youth, he sold tobacco and groceries. The only formal education he received was in a country school,

yet he later "became head of the largest soy bean processing plant in the United States."

Mr. Staley, after becoming aware of the great demand for starch, started his own starch packing plant. In 1909 he purchased the old Wellington Starch Company in Decatur, Illinois, and for many years starch was his main product.

In the early 1920s he became interested in soy beans as a commercial crop and by mid-1922 encouraged central Illinois farmers to plant the crop. "Today it is one of the major farm crops in the United States."

"He is known throughout the industry as the 'father of the soy bean in the United States,'

Note: This claim that A.E. Staley was widely known as the "father of the soy bean" is doubtful; that distinction usually goes to William J. Morse of the USDA.

979. Lloyd, J.W. 1940. Range of adaptation of certain varieties of vegetable-type soybeans. *Illinois Agricultural Experiment Station, Bulletin* No. 471. p. 77-100. Dec.
• ***Summary:*** Contents: Introduction. Range of successful culture in Illinois. Successful culture in cool climates (of collection A–Giant Green, Bansei, Fuji, Willomi): Upper Mississippi Valley and the Northwest, New England, Iowa and South Dakota, performance at high altitudes. Performance of varieties in collection B (No. 80494, Jogun, Illington, Imperial): Central Illinois, Indiana, Ohio, Pennsylvania, Nebraska, Connecticut, Missouri, and New Jersey. Performance of varieties in collection C (Giant Green, No 80490-1, Emperor, Higan): Kansas, Missouri, Eastern states bordering the south (Kentucky, Tennessee, Maryland, Virginia, West Virginia), Southern States (North Carolina, South Carolina, Georgia, Arkansas, Texas), California, and Arizona. Performance in Canada and other outlying regions. Acceptability of vegetable-type soybeans. Demand for seed. Place in vegetable industry. Summary.

A map of the United States (p. 83) shows "Areas reporting successful growth of vegetable-type soybeans." Table 2, titled "Performance of four varieties of soybeans (Collection A) in cool climates, 1939" (p. 85) gives figures summarizing 265 reports (218 of which–82%–were successful) from the following states: Colorado, Idaho, Iowa, Maine, Massachusetts, Michigan, Missouri, Montana, Nebraska, New Hampshire, New Mexico, New York, North Dakota, Oregon, Pennsylvania, South Dakota, Utah, Vermont, Washington, Wisconsin, Wyoming. Page 96 adds: "The vegetable-type soybeans were grown successfully in eleven California counties, distributed from Tehama in the north to San Diego in the south, and including both interior and coast regions... For the most part, the crops were grown under irrigation. One grower in Ventura county commented: 'They [vegetable-type soybeans] are now our favorite vegetable for fall, and I only wish they were a year-round crop... At the Agricultural Experiment Station at Tucson, Arizona, eight varieties... were grown under irrigation at an elevation of 2,400 feet. Planted June 12, all the varieties made satisfactory yields, Illington, No. 80490-1, and Emperor being especially prolific."

"A few observations on the range of adaptation of vegetable-type soybeans were included in Bulletin 453 of this Station, 'Eighteen Varieties of Edible Soybeans,' published in March, 1939. These observations were based on reports received from persons to whom seed had been distributed during the years 1935 to 1938 inclusive. The publication of this bulletin and press announcements regarding it contributed to the manifestation of a widespread interest in vegetable-type soybeans and resulted in the receiving of requests for seed from every state in the Union except two. There were also requests from five Canadian provinces and six foreign countries other than Canada. Persons living in 90 of the 102 Illinois counties requested seed.

"In response to these requests a total of 1,880 lots of seed were sent out from Urbana; 216 requests from the southern states were referred to W.J. Morse, of the U.S. Department of Agriculture, Washington, D.C., who had seed of varieties presumably better adapted to the South.

"The seed furnished most of these correspondents consisted of four packets, each containing approximately 100 seeds. Four varieties were represented, covering the season from early to late so far as possible with the seed available and with due consideration to the climatic conditions in the different parts of the country to which the seed was sent."

In Canada, early varieties were tested at St. George, Ontario; Central Experimental Farm, Ottawa; Barrington Passage, Nova Scotia; Bogot, Manitoba; Swift Current, Saskatchewan; Sea Island County and Westminster, British Columbia; Grand Falls, Newfoundland (49º north latitude, approximately. Planted in June, "the plants made a luxuriant growth but had not yet blossomed when killed by frost on Aug. 26). Varieties were also tested at Chihuahua, Mexico at 6,000 feet, and Honolulu, Hawaii.

Results based on reports received from 810 persons to whom samples of vegetable-type soybeans were sent in the spring of 1939: Had success in growing the crop: 78.8%. Liked the table quality 68.8%. Considered it a promising crop: 66.7%. Saved some seed for planting in the future: 76.5%. Main complaints: Difficulty in hand-shelling the green beans, and the readiness with which the mature beans shatter from the pods.

Note: This is the earliest document seen (Jan. 2010) concerning soybeans in Newfoundland province, Canada, or the cultivation of soybeans in Newfoundland. This document contains the earliest date seen for soybeans in Newfoundland, or the cultivation of soybeans in Newfoundland (June 1939). The source of these soybeans was the University of Illinois.

980. United States Department of Agriculture (USDA). 1940.

Revolution in soybeans (News release). [Washington, DC]. 2 p.
• ***Summary:*** "Farm flashes. For broadcast only." "A look at the newer commercial varieties of soybeans now available to farmers–and a look at the records of the past year on yields of seed and of percentage of oil–reveals a virtual revolution in the soybean industry. And that revolution in a very short time.

"W.J. Morse–the soybean man in the U.S. Department of Agriculture who brought in from the Orient most of the parent stock of most of the soybeans now grown in the United States–Well, Morse, give us these facts.

"First, as to yield of seed. Back in 1924 (and that was only a short 16 years ago)–Do you know the average for the whole country in 1924?–Well, only about 11 bushels to the acre. Even Illinois averaged only about 12 bushels. But today–Well, in 1939, the average for the entire country was up to nearly 21 bushels to the acre–and Illinois was well above 24 bushels.

"Then, take the way the breeders have bred up the percentage of oil. Remember how dry those beans were in the early '20s. Even the two leading oil varieties of a few years ago–the Mid-West [Midwest] and the Itosan [Ito San]–yielded only 5 or 6 percent. But take the oil content of one of our leading varieties today–the Dunfield. The oil runs 20–21–22 percent.

"There you have about a doubling of the yield of seed–and about four times as much oil."

In the northern states, "four varieties account for the biggest part of commercial acreage. They are the Illini, leading in Illinois and also important in Ohio and Iowa. The Dunfield, leader in Ohio and Indiana, and also important in Illinois. The Mukden, leader in Iowa and important in Michigan. And the Manchu, leading variety in Minnesota and Michigan, and important in Iowa."

In addition to those four leaders, other important varieties include the Mandel, Scioto, Mingo, and Seneca. Address: USA.

981. Strayer, George M. 1941. American Soybean Association convention to be held Sept. 15 and 16 in Des Moines, Iowa [Editorial]. *Soybean Digest.* Jan. p. 6.
• ***Summary:*** Strayer writes of his early recollections: "I might almost say that soybeans and I grew up together. My first remembrance of them was back in the days when Dr. W.J. Morse was putting out small samples of increases from his importations. We planted them in a small patch of popcorn, pulled them by hand, and threshed them out with a flail. The intervening years have taught me many things about the crop.

"One of them is concerned with the vague idea which many persons have concerning the uses which are being made of soybean meal. Nation-wide publicity has been given to soybean plastics. Everything from automobiles to plane fuselages to radio cabinets to jewelry is being made from soybeans, if you can believe the stories. We would like to believe all of them. Yet, according to the best available figures less than one-half of one percent of the 1939 soybean oilmeal production went into those plastics. Less than five percent of the nation's total soybean oil meal went into uses other than livestock feed. Glues, human food, plastics, core molds, and all the other industrial used are included there.

"Probably no other one farm product has so many potential commercial uses as the soybean oilmeal. Commercial production of it in this country is relatively new. The development of new uses requires time–assurance of a steady source of supply, and assurance of a supply as a relatively stable price. We hope–and expect–that soybean oilmeal will be used in increasingly larger quantities in industry. Until that time arrives we must reconcile ourselves to the fact that the soybean oilmeal market lies on the farm." Address: Secretary, American Soybean Assoc., Hudson, Iowa.

982. Monahan, James. 1941. Little honorable plant. *Elks Magazine.* Feb. p. 14-17, 45-48.
• ***Summary:*** An overview of the soybean in America. Discusses industrial uses of soybeans as in glues, paints, varnishes, and plastics, the USDA Regional Soybean Industrial Products Laboratory at Urbana, Illinois, the very important work of William J. Morse, presently senior agronomist at the USDA Bureau of Plant Industry (Morse began work at USDA in 1907 under Charles Vancouver Piper), the use of the flakes of soybean meal in brewing to give beer more body and a sturdier, creamier "collar" of white foam, the work of Henry Ford in developing large-scale industrial uses of soybeans, soybean trading on the Chicago Board of Trade, food uses of soybeans (such as green-shelled soybeans, soybean flour, the Soyburger, and soybean bread). Contains 7 photos.

983. Morse, W.J. 1941. Early Chinese disagreed on planting time: Modern problem troubled early experts too, reviews of ancient Chinese literature reveal. *Soybean Digest.* March. p. 5, 11.
• ***Summary:*** The following translations of extracts concerning the Ta tou, or soybean, are from the Chih Wu Ming Shih T'u Kao, translated by M.J. Hagerty, USDA, May 1917.

"In the earliest written records, writers on various agricultural problems gave plenty of advice as to the proper time to plant 'Ta tou' of 'Shu' (soybeans). The best time of planting given by these ancient agricultural writers was usually based on the based on the position of some of the heavenly bodies or nature's signs of spring similar to those used by the American Indian in planting corn or beans."

"In one of the oldest writings, Calendar of the Hsia dynasty [Note: This is a section in the *Dadai liji* (Ritual

of the Elder Tai) (100 AD)] we find: 'In the fifth month when we see the planet Mars in its zenith in the Heart constellation, then it is time to plant the Shu, or bean.'

"The Hsiao Ching (Book of Filial Piety) says: 'Red soil is suitable for the Shu. This bean is a staple crop which may be stored and kept to provide against famine and is easily made suitable for food. In ancient times it was used as a food in times of scarcity. Count the number of persons in the family and plant five acres for each person. This is a fundamental rule in farming. In the third month about the time when the seed pods appear on the elm trees, and after a rain has fallen, the uplands may be planted with Ta tou seed. The soil should be fine and free from lumps of earth. Seed of the Ta tou may be planted within twenty days of the summer solstice (June 21) with assurance that it will bud and grow. The best results are obtained when the earth has not been plowed too deeply. The Ta tou thrives best when planted evenly and not too closely.'

"The Shuo Yuan (Anecdotes from Ancient Chinese History) [Shuoyuan, Garden of discourses, 20 BC] has the following: 'In the summer season when the planet Mars is in its zenith, we may plant the Shu, or bean.' These writers all say that the Shu, or bean, should be planted in the fifth month while the Nung Sang Chi Yao [Nongsang jiyao, Fundamentals of agriculture and sericulture, 1273 AD] quotes the Chi Min Yao Shu [Qimin yaoshu, 544 AD] and says that the Ta tou should be planted in the spring following the planting of the grain. That which is to be harvested late in the season can be planted in the fifth or sixth month. When planted in the fifth or sixth month additional seed should be sown.

"Li Shih-chen writes: 'The Ta tou may be planted in the second month during the period when the constellation Orion is in the heavens. At this time when the apricot blossoms are abundant and the fruit of the soft mulberry is red, the Ta tou may be planted, this being the best season for planting. In the southern part of China, the Ta tou is planted before and after the Spring Grain Festival and in the time of the summer solstice (June 21) the plants are covered with clusters or pods.'

"From Chi Min Yao Shu (Important Rules for the People to Gain their Living in Peace) [Qimin yaoshu, 544 AD] we learn: 'In the spring season the Ta tou is planted after the grain. Between the tenth an twentieth days of the second month is the proper time for the first crop. Use eight pints of seed. Between the first and tenth days of the fourth month is the proper time to plant the third crop. Use one peck and two pints of seed. A late crop may be obtained by planting in the fifth or sixth month. Naturally the harvest will be late according as the seed is sown late. The beans which have ripened of the crop planted in the autumn may be harvested, but these are few as the stems grow densely and yield but few beans. The seeds should be planted deeply because the nature of the bean is strong and the stems of the roots will in this way get plenty of moisture. Ta tou thrives best when the climate is warm. If the land is not plowed in the fall then the soil will not be moist.'

"Fan Sheng-chih's Chih Shu [10 BC] states under the heading of 'Method of cultivating the Ta tou': 'Dig holes for seeds about six inches deep and about two feet apart. In one acre, 1680 holes should be made for planting seed. When these holes are all made each should receive a pint of good manure mixed with earth, and filled. When about to plant the seed, irrigate each hole with three pints of water. Sow three seeds to each hole and spread the earth over the hole, but not very thick, using the hand to pat it down, bringing the seeds and earth in mutual contact. When the seed has germinated and grown five or six leaflets, the plants should be cultivated with a hoe. When the soil becomes dry, irrigate, using three pints of water to each hill of beans. One man can take care of five acres up to the time of fall harvest. Each acre planted with seed will yield 35.5 bushels of seed.'

"As to time of planting, this same writer advises: 'In the third month when the elm tree is bearing its seed pods and after a rain, the Ta tou may be planted on the elevated fields. Within 20 days after the summer solstice (June 21) the seed also may be planted. The late variety is planted in the fifth month at the latest.'"

Photos show: (1) Planting soybeans on ridges in Manchuria, using a plow drawn by two mules; the seed is scattered by hand. (2) A Chinese farmer planting soybeans by hand. Address: USDA Bureau of Plant Industry, Washington, DC.

984. Van Deman, Ruth; Kadderly, Wallace. 1941. Soybeans and vitamin B-1. Radio broadcast. NBC. National Farm and Home Hour. April 1.

• ***Summary:*** Soybeans are an excellent source of Vitamin B-1–"the B-1 everybody's talking about." This fact was discovered by Dr. Lela Booher, who is in charge of the nutrition laboratories at USDA's Beltsville Research Center in Maryland. She got her "garden varieties of soybeans" from William Morse, "the soybean man" at USDA.

Kadderly hopes that listeners will "have a chance to grow the new table varieties of soybeans in the garden this summer."

Van Deman replies: "The fresh green soybeans are delicious, we think–and just as easy to cook as fresh limas. The soybeans have a richer, more nutty flavor than any other members of the bean family."

Kadderly: "There seems to be something about Vitamin B-1 that generates drive–energy–the power to produce."

Van Deman: "You're right. That's why vitamins and nutrition are part of our defense program." Address: 1. Bureau of Home Economics; 2. Office of Information Both: USDA.

985. Morse, W.J. 1941. Shanghaied... a super food. *Soybean*

Digest. July. p. 4-5, 10. [10 ref]
• ***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 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 (Aug. 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.

986. Morse, William J.; Baker, John. 1942. Soybean production. Radio broadcast. NBC. National Farm and Home Hour. March 2. 5 p. transcript.
• ***Summary:*** "Baker: Soybeans are one of those oil crops vital to our war effort. Since the war in the Pacific has virtually cut off our normal source of fats and oils in the Far East, farmers of the United States are being asked to raise more soybeans this year, than they've ever raised. The farm production goal is set at 9 million acres for 1942–more than half again as many soybeans as were planted last year. And last year broke all records for soybean production. We've asked William J. Morse from the Bureau of Plant Industry to join our Farm and Home Hour gathering today so we might talk over some of the things involved in raising all these soybeans. Just *how* are we going to get this increased production, Mr. Morse?

"Morse: Well–the main thing is plant more soybeans.

"Baker: I suppose many farmers will plant soybeans for the first time this year.

"Undoubtedly. And I think many farmers will want to know what's involved in raising soybeans."

The rest of the discussion concerns the basics of soybean cultivation. Address: 1. Agronomist, Bureau of Plant Industry; 2. Office of Information. Both: USDA.

987. Dies, Edward J. 1942. Soybeans: Gold from the soil. 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:*** A landmark popular book and a good description of the pioneering period of soybean production and processing in the United States.

Contents: 1. A certain man of science (William Morse and Dr. C.V. Piper). 2. Vignette from antiquity (how the soybean vine saved a caravan in China besieged by bandits). 3. Birth of an industry (U.S. soybean crushing). 4. The big drive starts (A.E. Staley, Glidden, Central Soya, Buckeye Cotton Oil Co., Drackett Co., ADM, Allied Mills, Ralston Purina, Spencer Kellogg and Sons, Swift & Co., Shellabarger Grain Products Co. Standard Soybean Mills, Iowa Milling Co.). 5. Breeding new types (Burlison, Hackleman). 6. Scientists commend product (oil and meal). 7. Lakes of oil. 8. In the field of industry (U.S. Regional Soybean Industrial Products Laboratory, and Henry Ford). 9. Listening post for soy (NRRL at Peoria). 10. Whims and price turmoil. 11.

Milk for the tots of China (Dr. Harry Miller). 12. Soys in the home garden ("the vegetable soybean for table use," "garden varieties of soybeans," "green soybeans," "green vegetable soys," "vegetable type soybeans," "edible varieties"). 12. Americanizing soy foods (mainly about soy flour and improving its taste for use during World War II). 14. Little bean, what now? Appendix: Chronology of the soybean (27 entries). Bibliography. Dies was born in 1891.

Illustrations and diagrams show: (1) Principal centers of U.S. soybean production (p. 19, map). "Almost 90 per cent of all soybeans 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. (2) Principal centers of U.S. soybean processing (p. 20, map). Discs of different size show the various centers. Since Illinois produces 52% of the harvested soybeans, central Illinois is the center of soybean processing [crushing] in the USA. "Total processing capacity in late 1942 exceeded 100 million bushels for the regularly established soybean processing plants." (3) Diagram of uses of the soybean (p. 68).

Chapter 2, "Vignette from antiquity" begins: "Even when the Pyramids were being built, three hundred years before the Tower of Babel, and twelve centuries before Solomon fashioned his temple, the soybean was hoary with age. The earliest writings on the subject go back to the period of the Pyramids.

"But of the science of soybean growing you will find no recorded beginnings in the musty tones [sic, tomes] of oriental history. No book reveals the name of the inquisitive oriental who in the misty long ago began sowing the seeds, harvesting the beans, pounding them into a mash for cooking and eating, and probably boring his friends no end with tales of their merit. There is no record depicting this unsung hero's foresight in saving the seed of the magic plant against next year's hunger. Likely as not he was a crude dreamer who fumbled his hunches and accomplished little in a lifetime of wrestling with the problem of proper cultivation.

"Oriental literature of a later date contains much about the plant but of its origin as a food product again there are only legends.

"A choice vignette from antiquity on the initial use of soybeans runs something in this fashion. Long, long ago, far back in the dim past, a caravan pulled out of an eastern China town. It consisted of a number of merchants and their servants... The caravan was bound for a distant inland settlement intent upon disposing of its valuable wares." After trading in the north, the caravan headed home, "now laden with gold, silver, and choice furs received in payment for the merchandise. Suddenly at dusk on a day when the caravan was still far from home it was surrounded by bandits who had learned of the rich prize at hand. Merchants and servants took quick refuge in a rocky defile easy of defense. Here they were besieged day on day until their scanty provisions ran low and starvation seemed inevitable. At length a servant whispered to his master and pointed to a vinelike plant bearing some sort of legume. No one could recall having seen such a plant before but all were touched with the pinch of hunger. So with grave doubts the men pounded the beans into a thick flour, mixed it with water, and made coarse cakes. Upon these cakes the caravan survived, and with renewed strength fought off the foe until help arrived. And, so the legend goes, from that day forth the miracle bean became the staff of life in China." Note 1. This story of the caravan besieged by bandits in China is a longer and embellished version of the tale first dreamed up and told by H.W. Galley in *Soybean Digest* (Dec. 1940).

"True or false, the story has lived through the ages.

"For the first written record of the soybean one must turn to 'Materia Medica,' written by Emperor Shen-nung in 2838 B.C. It describes many plants of China including that of the soybean, but even the name is clouded with antiquity. In the early Chinese history the name 'Shi-yu' [sic] and the 'Ta-tou' were applied to the soybean. These names probably antedate the first authoritative records of the plant."

Dies then discusses Engelbert Kaempfer, Linnaeus, and Moench.

"Then in 1804 a Yankee Clipper ship in full sail glided down the coast of China searching for ports for a return cargo. Not sure of the length of the return journey, the captain ordered several bags of soybeans tossed into the hold as a reserve food supply. And thus did the first soybeans enter America. Little was done about the soybeans then.

Note 2. This is the earliest document seen (June 2003) that further embellishes the myth of the "clipper ship" with phrases like "glided down the coast of China" or "ordered several bags of soybeans tossed into the hold"– all supposedly in connection with the introduction of the soybean to the United States. This is also the earliest document seen (Aug. 2000) that compares the age of the soybean with that of the pyramids (in Egypt; the oldest and largest was built for Khufu at Giza in the 26th century B.C.), the Tower of Babel (in Babylon [today's Iraq]), or Solomon's Temple (in today's Israel), arguing that the soybean was much older than all of them.

"James Mease of Pennsylvania first mentioned in American literature shortly after this importation that the soybean was adaptable to Pennsylvania and should be cultivated" (p. 9).

In Chapter 3 (p. 14) Dies notes: "The first soybeans processed in this country were imported from Manchuria in 1911 and sold to Herman Meyer who had a small crushing plant in Seattle, later called the Pacific Oil Mills. From the raw material he produced the two chief products–soybean oil meal for livestock feed and soybean oil, selling the latter locally for industrial use. The meal was advertised and sold as 'Proteina,' a high-protein feed. The venture did not last for any considerable period; a few years later Meyer passed

away." Note 3. This is the earliest document seen (May 2010) that mentions Herman Meyer.

"Soybeans grown in this country were first processed by the Elizabeth City Oil and Fertilizer Company at Elizabeth City, North Carolina. W.T. Culpepper, now postmaster at Elizabeth City, was manager of the new mill, started in 1912. The first domestic soybeans were crushed for commercial purposes there in the late fall of 1915. It was a small operation."

Note 4. This is the earliest document seen (May 2010) that mentions W.T. Culpepper.

"At that time, most of the soybeans were grown in North Carolina, and the Winterville Cotton Oil Company at Winterville, North Carolina, purchased expellers for processing purposes, and these operated on soybeans for a limited period. Still another mill, operated by Havens Oil Company at Washington, North Carolina, crushed thirty thousand bushels of beans as an experiment in 1916"

"'My uncle, Jonathan Havens,' says J. Havens Moss, 'was the first to plant soybeans in this section, devoting considerable acreage to the mammoth yellow [Mammoth Yellow] type which grew and matured splendidly from the very start. Its value to the land was obvious'" (p. 14-15).

Note 5. This is the earliest document seen (Aug. 2016) which mentions that Havens Oil Co. crushed soybeans as early as 1916.

Note 6. On the first page of the copy owned by Soyfoods Center is a signed inscription, in dark blue ink, which reads: "With kind regards to Russell East, who has done much on behalf of the soybean–Edward Jerome Dies."

Note 7. Only minor changes were made on about 13 pages of the revised edition published in March 1943. None of the statistics in the many tables were been updated, and the bibliography was not changed. Address: USA.

988. Dies, Edward J. 1942. A certain man of science (Document part). In: E.J. Dies. 1942. Soybeans: Gold from the Soil. New York, NY: The Macmillan Co. 122 p. See Chap. 1, p. 1-5. April. 21 cm.

• ***Summary:*** This chapter focuses on William Joseph Morse, C.V. Piper (his mentor at USDA), and soybean pioneers in the United States. Morse was born in 1884 around Lowville, New York, the son of John Baptist Morse. On June 20, 1907 Morse was handed his degree at Cornell University. Two days later he reported for duty at the Bureau of Plant Industry, within the U.S. Department of Agriculture, Washington, DC. There he was assigned to work under Dr. C.V. Piper, "a man of intense enthusiasm and vision, a plant scientist of superior talent. Young Morse was placed in charge of forage crop investigations at Arlington Experimental Farm in Virginia, where a dozen or so distinct types were being nurtured. Dr. Piper became his constant companion there on Sundays, evenings and at other odd times, talking, dreaming, painting word pictures of a future agricultural economy in which the little bean would play a tremendous role.

"'Young fellow,' he used to say, '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.'

"In some strange way Dr. Piper seems to have turned a switch in the heart of young Morse and created there a strong desire to see through to the final act the colorful and exciting drama of the soybean.

"And so for thirty-four years, heedless of material gain or personal honor, shy, modest, but with the repressed intensity of a crusader, Bill Morse has carried with steady hand the lamp lighted by Dr. Piper. By the irony of fate Piper the Prophet passed away without tasting the joy of full success that came from their joint labors."

In the early years, interest in the new crop ebbed and flowed. Most saw it as an oriental curiosity; few believed it would become a major crop.

Morse began writing factual articles about the soybean; "he started talking with farmers and to other scientists; he made a journey through the South as early as 1914, when soybeans were grown principally in eastern North Carolina, to study the feasibility of cottonseed mills launching a soybean crushing industry, and found the time too early.

"But the army of Morse disciples grew, his desk at the Forage Crops division became an official clearing house of information, and in 1919 [sic, Sept. 1920] there was formed the American Soybean Association and Bill Morse served as president for three terms, helping to unify and direct a new and more forceful crusade of research and experimentation. He wrote and published more than forty official government bulletins, made hundreds of addresses, inspired scores of agrarians, research experts, plants scientists and industrialists to new endeavors, and brought in from distant lands more than ten thousand samples of soybeans, including those gathered in the two years (1929-31) as an agricultural explorer for the government.

"So the work of Bill Morse, the agreeable, easy-going Senior Agronomist, runs like a bright thread through the whole tapestry of soybean development in the western world."

"Bill Morse would be the first to cry out against any implication that credit for the amazing development be given to one or two men. True, he has only lighted the way with indomitable courage and persistence. There have been many helpers–the brilliant Burlison, the persistent, thorough Hackleman of the University of Illinois, Beeson and Ostrander of Indiana, Delwiche and Briggs of Wisconsin, Wilkins of Iowa, Park of Ohio, Wiggans of Cornell [New York], and [C.B.] Williams of North Carolina–all top-flight in their respective fields, and Barr of the Department of Agriculture with his research in commercial grades.

Then there were the real pioneers among the growers–in

Illinois, John T. Smith and W.E. Riegel; in Ohio, Elmer and E.F. (Soybean) Johnson, and G.G. McIlroy; in Indiana, J.B. Edmondson, the three Fouts brothers, and the late Charles Meharry, charming, lovable enthusiast who sometimes stirred fires that had begun dying out at the universities. All were close friends and co-workers of such early processors as I. Clark Bradley, the late A.E. Staley, whose life story is closely associated with the soybean, and E.D. Funk. All of them made their early contributions–important contributions–to the birth of a new industry, a hundred million dollar annual industry that has changed the Midwest landscape..."

"Prophet Piper dreamed the dream and saw the miracle bean as 'gold from the soil.'

"Crusader Morse helped make the dream come true."

A table (p. 5) shows soybean acreage, yield, and production from 1924 to 1941. 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. Address: USA.

989. Dies, Edward J. 1942. Soys in the home garden (Document part). In: E.J. Dies. 1942. Soybeans: Gold from the Soil. New York, NY: The Macmillan Co. 122 p. See Chap. 12, p. 83-89. April. 21 cm.

• ***Summary:*** This chapter is about green vegetable soybeans and vegetable type soybeans. "If the second World War is a long one the vegetable soybean for table use is expected to make its initial appearance in home gardens of many states. It might even have considerable influence on the nation's diet. In the food division of the general war program the soybean holds a place of importance."

The easiest and most direct way for most Americans to contact the soybean is through home gardening. "Progress of the garden varieties of soybeans has been encouraging. The vegetable type was unknown in this country until Explorer Bill Morse planted the imported varieties at Arlington Experiment Station [Virginia]. In 1934 seed from these plantings was distributed to a number of agricultural experiment stations. The work of testing for performance and palatability was begun by state agricultural experiment stations in Illinois, Indiana, Ohio and Iowa. Funk Bros. Seed Co. did constructive research work."

"Seed of the vegetable type was difficult for the public to obtain until early 1940. Now seed is featured in a number of catalogs. A list of growers may be obtained upon request from state universities in the soy belt."

"There are several promising edible types with a varied range of maturity of from eighty to one hundred and thirty days. For home gardens three or four varieties of different lengths of maturity should be planted to provide green soybeans over a continuous period. Of these varieties, Bansei, No. 80494, and Fuji are early. Willomi, Hokkaido, Aoda, Jogun, and No. 80490-I are mid-season. Illington, Imperial, Funk Delicious, Emperor, and Higan are late."

"It would be difficult as yet to determine the most desirable varieties of vegetable soybeans. In a general way, for the extreme North the Sioux, Agate, and Green Giant are most suitable. For the Corn Belt or middle section of the country the Hokkaido, Kanro, and Aoda are recommended. For the South the Nanda, Seminole, and Rokusun.

"For use as a green vegetable, or for canning, the pods should be picked before the soys have reached full size and before there is any tendency to turn yellow... Pods can be shelled easily if placed in boiling water for one minute. Incidentally, some ingenious housewives reported to experiment stations that they had evaded the task of shelling garden soys by hand. They simply adopted the oriental method. This means cooking the beans in the pod and letting each guest do his own shelling. It adds a leisurely touch to the luncheon or dinner. The fingering is no more objectionable than that involved in eating a burr artichoke salad." "Green vegetable soys may be prepared in the same manner as other garden beans, including lima and navy beans."

"In the directory of the National Canners Association, 1940 edition, ten companies are listed as canners of vegetable soybeans. An association was organized, with the head of one of these companies, W.L. Schroeder, Hortonville, Wisconsin, as president. Up to 1940 the largest annual production of a single canning company was eight carloads.

"Wisconsin has shown considerable leadership under the scientific direction of Professor G.M. Briggs, University of Wisconsin, in the development and the actual marketing of vegetable soys. Dr. J.B. Park of Ohio State University has carried on highly important research work. It is unfortunate that more of the findings have not been published.

"A relatively small number of the vegetable type variety is well adapted to canning. Experience still is so limited that there is some disagreement among the experts. However, promising varieties for canning include the Aoda, Bansei, Funk Delicious, Rokusun, and Willomi.

"Ford Motor Company was reported to have planted enough acreage of the Bansei variety to yield about two hundred thousand cans of green vegetable soys in 1941. The entire pack was to be used in the company commissary and stores."

Note: This is the earliest English-language document seen (June 2009) that contains the term "garden soys," which is used to refer to green vegetable soybeans. Address: USA.

990. 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.

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.

991. Burlison, W.L. 1942. Soybeans. Paper presented on Aug. 21. 7 p. 28 cm.
• ***Summary:*** It is not known to what group or where Prof. Burlison presented this paper, which begins: "Almost overnight the midwest has boomed as an 'arsenal' of food and oil for the United Nations, and it has done it with one of Japan's own crops–the soybean.

"Today, less than a year after Pearl Harbor, precious war material is being rolled out in a record crop of more than 14 million acres of soybeans, most of which is concentrated in five or six midwestern states. Out of those beans will come four and a half million tons of oil–oil for explosives, for food, for paint and varnish for U.S. fleets and oil medicines."

"If agriculture has any miracles, this is one of them, and only the midwest could have done it. Science, fertile fields, big farms and power machinery, coupled with the cooperation and pioneering spirit of industry and of organized agriculture, have made a major industrial and wartime crop out of what was once little more than a curiosity and a luxury. Even until just recently it was just 'cattle and hog feed,'"

In 1804 soybeans were first grown in the United States in Pennsylvania. In 1829 Thomas Nuttall tried growing the soybean in a botanical garden in the eastern United States.

"Midwest 'pioneers' mentioned along with Morse as champions and sponsors of this 'wonder' crop are Profs. W.L. Burlison, J.C. Hackleman and C.M. Woodworth, of the University of Illinois; Illinois farmers such as the late Charles L. MeHarry [sic, Meharry], John T. Smith and W.E. Riegel; Profs. W.A. Ostrander and Keller Beeson, of Purdue University; Fouts Brothers, on whose Indiana farm the American Soybean Association was organized; Johnson Brothers, Ohio farmers [Edward Franklin "Soybean" Johnson (1889-1961), and Elmer Solomon Johnson (1879-1920) of Stryker, Ohio], and I.C. Bradley, pioneer processor of soybeans.

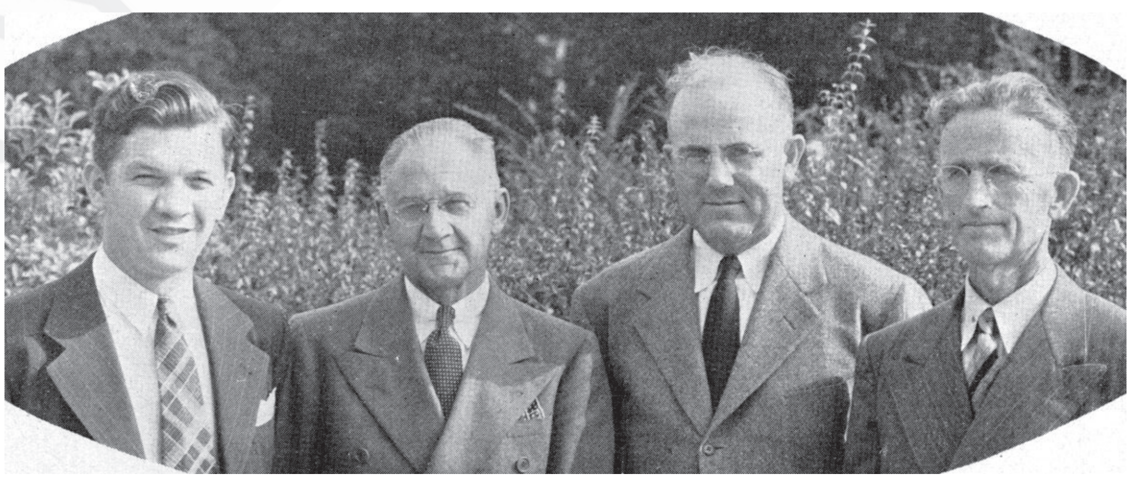
"As a result of their pioneering efforts single farmers in Illinois are now growing more soybeans than were grown in the entire United States 40 or 50 years ago. Alfred and Eugene Knight, for instance, have 1,040 acres in soybeans on the 1,800-acre tract they are farming near Fithian, Illinois. They have 700 acres planted in rows for cultivation and weed control, and 480 acres in a single field. At one place on their land there are beans for a solid mile."

J.E. Johnson, manager of the Knight farms, is vice-president of the American Soybean Association, chairman of the Illinois Farm Chemurgic Council, and a member of the board of directors of the Illinois Crop Improvement Association.

"As recently as 1909 only 2,000 acres of soybean were reported in the census figures for the whole of the United States, and most of these were grown for hay and feed." "All this has meant a sweeping diversification of midwest agriculture."

Location: Univ. of Illinois at Urbana Archives, Department of Agronomy Subject File, Record Series 8/6/2, Box 18. Folder: Soybeans. Address: Urbana, Illinois.

992. *Soybean Digest.* 1942. Soybeans for freedom: Report



22nd convention. Sept. p. 4, 6.
• ***Summary:*** "Seldom does an organization achieve a program of such outstanding merit as that of the American Soybean Association Convention which closed at Purdue University September 17.

"Attendance was good despite transportation difficulties, and all branches of the industry were well represented. Accommodations for the Convention at the Purdue Union were excellent. To say that there was never a dull moment is to state the case negatively.

"American existence is being transformed before the hurricane of war. Many old ways of thought, processes and products are quickly cast aside. Others, such as the soybean, are rushed to the front. An insignificant crop not many years ago, today the bean takes equal rank with cotton as the chief domestic source of oils.

"Yesterday the soybean was a stranger in the American diet, but today, due to the impending animal protein shortage, the industry will have to provide large quantities of high quality protein foods for human consumption, as well as feeds for livestock rations. This was the picture the speakers unrolled before the convention.

"The present importance of the soybean explains why the U.S. Department of Agriculture was willing to send so many of its aces to the convention at so critical a time. Possibly of most significance was the panel on 'Soybeans in Human Food' led by A.M. Dickson of the Agricultural Marketing Administration.

"Mimeograph Copies: So great was the immediate demand for copies of the papers given at the convention, that the Digest has prepared mimeographed copies of all speeches. These may be obtained from *The Soybean Digest,* Hudson, Iowa, at the cost of 10c each, or a complete set for $1.80.

"Following is the list of papers available:

"Soybean Oilmeal and the War, Lyman Peck, Soybean Nutritional Research Council.

"Soybean Oilmeal in Wartime Economy, D.J. Bunnell, Central Soya Co., Chicago.

"Soybean Research at the Northern Regional Laboratory, H.T. Herrick, Director, Peoria.

"Making the Public Protein Conscious, Dean H.J. Reed, Purdue University.

"Soybean Oilmeal in Poultry Feeding, Prof. C.W. Carrick, Purdue University.

"Soybeans as Human Food, A.M. Dickson, Agricultural Marketing Administration, Washington [DC].

"A Message to Soybean Growers, H.A. Olendorf, Soy Flour Association, Chicago.

"Recent Work of the Bureau of Home Economics on the Use of Soybean Products as Food, Dr. Louise Stanley, Bureau of Home Economics, Washington [DC].

"Soybeans in the Lend-Lease Program, Donald S. Payne, Agricultural Marketing Administration, Washington [DC].

"Soybeans in Mineral and Vitamin-Enriched Bread, Dr. J.A. LeClerc, Bureau of Agricultural Chemistry and Engineering, Washington [DC].

"Soybean Products in Food Manufacture, A.A. Levinson, the Glidden Company, Chicago.

"The Place of Soybeans in Advancing World Nutrition, M.L. Wilson, Director of Extension, Washington [DC].

"Growth Promoting Values of Proteins in Various Flours, Dr. D. Breese Jones, Bureau of Agricultural Chemistry and Engineering, Washington [DC].

"Soybeans in the Army Diet, Col. Rohland A. Isker, U.S. Quartermaster Corps, Chicago.

"Soybeans in the Food-for-Freedom Program, C.C. Farrington, Commodity Credit Corporation, Washington [DC].

"Soybeans from the Practical Farmer's Viewpoint, J.B. Edmondson, Clayton, Indiana.

"Protein Feeds in the Western Range Country, L.F. Mollin, American National Livestock Association, Denver.

"Soybeans Around the World, Dr. W.J. Morse, Department of Agriculture, Washington [DC].

"Many of these papers appear, in somewhat abbreviated form in some cases, in this issue of the Digest. Others will be published in later issues. Watch for them.

"Officers Reelected: 'This being no time to swap horses,' as Jacob Hartz, chairman of the nominating committee expressed it, all officers and directors of the American Soybean Association, were renominated and reelected at the Convention, from 'Dave' Wing down.

"The officers:

"David G. Wing, President. Mechanicsburg, Ohio.

"J.E. Johnson, Vice President. Champaign, Illinois.

"George M. Strayer, Secretary. Hudson, Iowa.

"J.B. Edmondson, Treasurer. Clayton, Indiana.

"The directors:

G.G. Mcilroy, Irwin, Ohio.

"Ersel Walley, Fort Wayne, Indiana.

"Howard Roach, Plainfield, Iowa.

"Stuart Ormsby, Belleville, New York.

"John Dries, Saukville, Wisconsin.

"Jacob Hartz, Stuttgart, Arkansas."

A large horizontal oval photo shows: "The elected officers. Left to right: Geo. M. Strayer, secretary. Hudson, Iowa; J.E. Johnson, vice president, Champaign, Illinois; David G. Wing, president, Mechanicsburg, Ohio; and J.B. Edmondson, treasurer, Clayton, Indiana."

993. *Washington Post.* 1942. Died: Morse, John B. Nov. 5. p. B12.
• ***Summary:*** "On Tuesday, Nov. 3, 1942, at his residence, 4224 38th st. nw., John B. Morse, beloved husband of Lena K. Morse, father of William T. [sic, J.] and Gladys H. McHenry Morse. Services at the S.H. Hines funeral home,

2901 14th st. nw., on Thursday, November 5, at 1 p.m. Interment Fort Lincoln Cemetery."

Note: John was born in 1863; his wife's maiden name was Lena B. Kirschner (lived 1863-1943).

994. *Scientific American.* 1942. Miracle beans: Long called "The Cow of China," the soybean is now invading almost every field of endeavor. 167(5):216-18. Nov.

• ***Summary:*** This article begins: "America in general has just begun to 'discover' the widely varied possibilities of the soybean. Henry Ford makes steering wheels of it, midwestern farmers look on it as a promising money crop, diet and health practitioners are starry-eyed about its protein, calcium, and iron content... the little bean is a capital meat substitute; that coffee, cheese, candy, salad oil, lubricating oil, printer's ink and celluloid and glue, airplane bodies and rubber substitutes are made from it. It's good for cattle–good for dog food and linoleum and paint and rayon panties, good for explosives, good for building bone and muscle in fighting men. It's a fine forage crop and, like alfalfa, it will enrich the soil.

"But five years from now, when the present war has made the soybean as familiar an institution in America life as cellophane and synthetic rubber, it will be well to remember that the 'discovery' of today was known to the Chinese thousands of years before the birth of Christ. The emperor Shen Nung speaks of it in his "Materia Medica," written in 2838 B.C. Whole ages before this... a legend was current which had been handed down in northern China and Manchuria to the present day, telling how man first became acquainted with the soybean.

"A caravan of merchants, says the legend, was homeward-bound, loaded with gold after a successful trading expedition, when it was attacked by bandits. Taking shelter in an easily defended ravine, the traders held off the attackers for several days until their food ran low. Starvation threatened–until one of the servants returned to camp with a sack of beans he had found on a vine-like plant which the animals were eating. They mashed up these beans to a paste with a little water and baked them–and on this crude biscuit the famished men regained enough strength to hold off the attackers until help arrived.

"The Chinese have looked on the soybean as their staff of life for ages." Many have never tasted milk except that from the soybean, which costs one-fourth as much as cows milk. "Long it has been called the Cow of China. The Orient uses the bean not so much as a vegetable as for making cheese [tofu], [soy] sauce, bread, and meat substitutes. For thousands of years it has been the basic protein food in Manchuria, China, Korea, Japan, and the Malay Peninsula.

"Soybeans first came to America in 1804 on a clipper ship whose Yankee master had ordered several bags tossed in the hold in case his provisions ran low."

William J. Morse, now senior agronomist at the USDA, worked for 34 years "with the quiet fervor of a missionary to bring the miracle bean prominently into the agriculture of this country."

In 1929 some 9 million bushes of soybeans were grown in the USA, increasing to 91 million bushels in 1939. The soybean is now America's fourth largest cash grain crop; "we grow as much as Manchuria. The cow of China has become a hundred-million-dollar American industry.

More than 75% of America's soybean oil goes into food products; most of the rest goes into paint, lacquers, and soaps. About 95% of the soybean meal is fed to livestock; the remaining 5% is used to make plastics, flour for baking, glue, fertilizer, dog food, breakfast cereals, macaroni, baby foods, reducing diets, and diabetic foods.

Discusses (at great length) the work of Henry Ford and Robert Boyer with soybeans, including soy fiber (which has the potential to replace wool), Ford's suit made of 25% soybean fiber, plastic parts in cars, the car of the future with a plastic body over a tubular steel framework (it will weigh only 85% as much as 1942 models did), and his solvent extraction system.

Note: This is the earliest document seen (March 2014) with the term "Cow of China," referring to the soybean, in the title.

995. Oveson, M.M.; Hubbard, Leon V.; Hoskinson, R.B. 1942. Report of the Sherman Branch Experiment Station, Moro, Oregon 1941. Moro, Oregon. See soybeans, p. 91-98.

• ***Summary:*** "In the spring of 1941, 35 varieties of soybeans were obtained from W.J. Morse of the Department of Agriculture, Washington, D.C. These 35 varieties were seeded in two series of single 16 foot nursery rows two feet apart on May 6, 1941. Good stands were obtained from all of the varieties seeded...

"The early varieties were ripe by September 16, the medium early varieties by late September and the late varieties October 29... The yields ranged from 1.4 bushels per acre for Hahote, a very late variety, to 9.6 bushels per acre for F.P.I. No. 68488, a medium early variety."

Contains 5 photos and 3 tables. Address: 1. Superintendent; 2. Research Asst.; 3. Sr. Agricultural Aid.

996. Christy, Arthur E. ed. 1942. ERROR! The Asian legacy and American life. New York: The Asia Press.

• ***Summary:*** No 1942 ed in OCLC, MELV, LOC 2003/05, But hundreds with 1945 ed. See chapter by Walter T. Swingle Mentions early introduction of soybeans to America by Benjamin Franklin. For details, see the 1945 edition. Address: USDA.

997. Löbbe, Henrique. 1942. Cultura da soja no Brasil. 6a ed. [Culture of soybeans in Brazil. 6th ed.]. Rio de Janeiro, Brazil: Serviço de Informaçao Agrícola, Ministerio da Agricultura. 35 p. 23 cm. 4th edition, 1939, 33 p.; 7th ed.,

1945, 74 p. [Por]
• ***Summary:*** Contents: History (in East Asia, Europe, and the USA). Markets. Soybean trials in Brazil (from March 1921 at Campo de Sementes de Sao Simao). Letter dated 28 Sept. 1926 from W.J. Morse of the USDA to Dr. Henrique Lobbe (after Lobbe's visit with Morse to Arlington Farm [Virginia], Morse sent Lobbe one ounce each of 51 varieties of named American soybeans, plus 17 varieties of cowpeas). Table showing the 48 varieties of soybeans tested at Sao Simao in 1927, with the dates of planting, germination, flowering, maturation, and harvest, days to maturity, resistance to pests (*vagens*), height of the plant, and yield (in grams). Botanical description. Nomenclature (in Brazil the soybean is called "soja," "feijao China," "ervilha oleaginosa do Japao," "feijao Japones," and "fava da Mandchúria"). Varieties (divided into 5 groups from very early [80-90 days] to late [130-150 days]). Green manure. Climate and soil. Chart showing products of the soybean (from Piper & Morse, *The Soybean* 1923). Preparation of the soil. Inoculation with bacteria. Sowing. Chemical fertilizer. Things to be careful of during cultivation. Diseases and pests. Harvest and yield. Cost of cultivation. Use as forage. Chemical composition of the seeds. Oil. Cake. Use as a food for humans: Hahto and Easycook, soy sauce, soymilk and tofu (*leite e queijo de soja*), use in diabetic diets, soy flour. Address: Brazil.

998. *USDA Bureau of Agricultural Economics, Extension Flier.* 1942. Soybean oil and the war: Grow more soybeans for victory. No. 5. 4 p. (BAE-EXT Flier-5).
• ***Summary:*** "Uncle Sam needs soybean oil–more soybeans than the farmers of America have ever produced–to win the war. We must replace a billion pounds of fats and oils cut off by far in the Far East. Then, too, our Allies have asked us to send them a billion pounds or more of fats and oils this year...

"One way you can do your part is by growing more soybeans. The Secretary of Agriculture has asked America farmers to grow at least 9 million acres of soybeans for harvest as beans–10 million if possible–as compared with less than 6 million acres harvested last year."

"What will all this soybean oil be used for? Most of it will go into food–into salad oils, cooking fats, and oleomargarine." Much will also be used "for paints and varnishes to protect ships, guns, tanks, and planes. Some of it will go into soap. Soybean oil is even used in making glycerine for explosives to blast the enemy."

"The Federal Government has promised to support the price of soybeans grown for oil this year because of their importance as a war material. Right now, prices of soybeans grown for oil are the highest they have ever been, or almost twice the average price received by growers in recent years."

Photos show: (1) Soybeans pods and seeds. (2) A farmer disking a field with a tractor. "Soybeans grow where corn grows." (3) A tractor pulling a combine. "Combines harvest soybeans best." (4) A scientist pouring a bucket of soybeans into a hopper. "Beans are crushed into oil." (5) William Morse of the USA standing in front of many shelves filled with food products made from soybeans. "Soybeans have many food uses." (5) Two farmers standing in a field of soybeans, looking at the roots of uprooted plants held by one man.

Note: This is the earliest document seen (March 2003) that describes the use of government policies in the USA (support prices) to promote soybean production. Address: USDA.

999. Science Service, Columbia Broadcasting System. 1943. Adventures in science. Radio broadcast. WJSV. Washington DC. 1:30 to 1:45 PM. Jan. 1. 6 p. transcript.
• ***Summary:*** "Adventures in Science is brought to you each week by Columbia–with Watson Davis, Director of Science Service."

"Davis: Our guest for today is Dr. W.J. Morse, of the Bureau of Plant Industry of the U.S. Department of Agriculture. Dr. Morse is Uncle Sam's specialist on soybeans and he is going to tell us about some of the uses of this important crop. Dr. Morse, just what is a soybean?

"Morse: The soybean is commonly referred to as the 'Wonder Bean' or the 'Miracle Bean.' It is rapidly becoming one of the most valuable, if not the most valuable, of China's gifts to the people of the Western World.

"Davis: I understand the soybean has an extraordinary and almost unbelievable number of uses.

"Morse: I consider it the most remarkable of all plants." "The soybean is very much in our news these days and it is said, seemingly with truth, that a country growing soybeans provides food for its people, its cattle, and its guns.

"The soybean is grown to a greater extent in oriental countries than in any other part of the world. China, leading in acreage, consumes all of her production while Manchuria, known as the 'Land of the Soybean,' was a close second until 1942 when the United States with a record acreage and production took second place. In Manchuria, the soybean is grown chiefly as a cash crop, being processed for oil and meal to a large extent. In normal times the beans, oil, and meal enter largely into international trade, Germany being one of the principal customers."

1000. *Chicago Daily Tribune.* 1943. A line o' type or two: Little honorable plant. Feb. 26. p. 12.
• ***Summary:*** An outline of the history of the much-mentioned soy bean:

"2838 B.C.–The Chinese emperor Shen Nung described it in a medical treatise and assigned to it 300 pharmaceutical properties. He called it 'Little Honorable Plant.'

"1804–A ship captain or a missionary brought a small lot of the beans to the United States. They were planted chiefly in a few acres of North Carolina, and seem to have

been regarded merely as a garden curiosity for the next 50 years."

1854–Commodore Perry brought soy beans to the USA from Japan. They were distributed to U.S. citizens by the commissioner of patents.

1907–The USDA began to boost the soy bean and W.J. Morse, a farmer's son who had just graduated from Cornell Univ. [New York], was chosen to adapt it to American soil.

1917–There are now 50,000 acres of soy beans in the USA.

1922–The A.E. Staley Manufacturing Co., Decatur, Illinois, adds a soybean crushing mill to its corn products plant.

1935–5 million acres are planted to soy beans, yielding 40 million bushels. About half the crop came from Illinois.

1939–In March, the soy bean (futures) becomes the highest priced commodity per bushel sold on the Chicago Board of Trade.

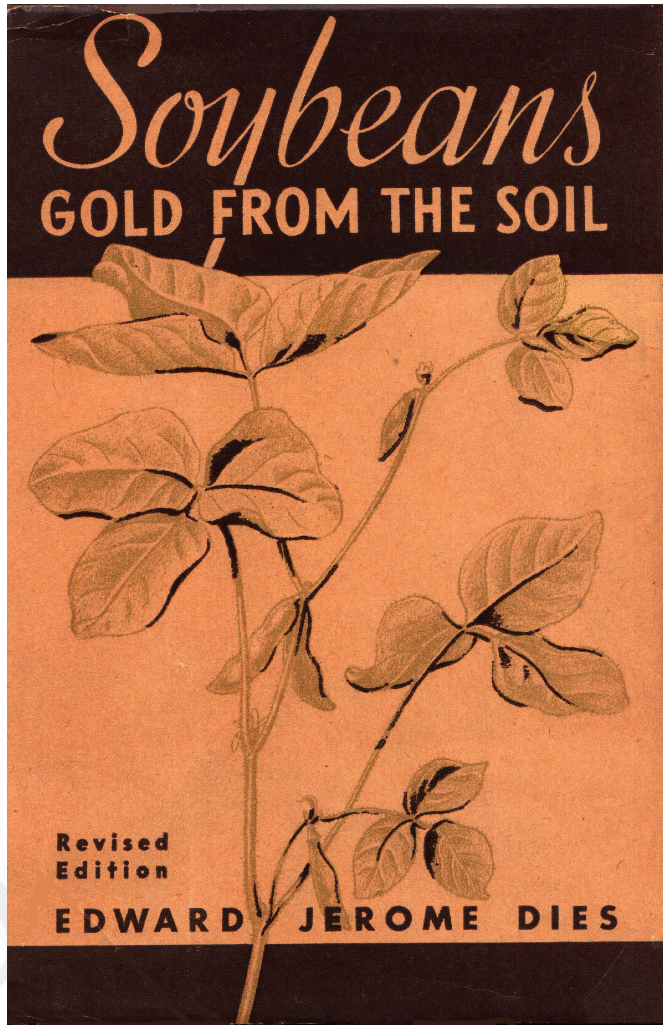
1001. Dies, Edward J. 1943. Soybeans: Gold from the soil. Rev. ed. New York, NY: The Macmillan Co. 122 p. March. Index. 21 cm. First published in April 1942. [205 ref]
• ***Summary:*** This revised edition is very similar to the first edition published in April 1942. Minor changes have been made on the following pages: 20, 28, 70-73, 84-85, 90-94, 121-22. None of the statistics in the many tables have been updated, and the bibliography is unchanged. Address: USA.

1002. *Washington Post.* 1943. Obituaries: P.H. Dorsett, agricultural scientist, dies. April 2. p. 9B, col. 4.
• ***Summary:*** "Palemon Howard Dorsett, 80, who for more than 45 years was associated with scientific work with the Department of Agriculture, died yesterday [1 April 1943] at a Washington nursing home after a long illness. A resident of Beall Station, Prince Georges County, Maryland, for 23 years, Mr. Dorsett moved to 121 Allison Street Northwest, about a year ago. He held the Meyer Medal for distinguished service in plant production [sic, introduction] awarded to him in 1936 on behalf of the Council of the American Genetic Association. The medal was named in honor of Frank Meyer, who lost his life in 1919 on a Government expedition in China.

"Greatest contribution to American agriculture made by Dorsett was between 1924 and 1927, when he was instrumental in bringing together the largest collection of soybean varieties ever made. In order to make the collection, two expeditions were made to China.

"Dorsett was also credited with three expeditions to Brazil and the West Indies to obtain new varieties of plants. Through these trips he brought to the United States valuable citrus varieties and many rare ornamentals.

"Only survivor is a sister, Mrs. Ellen W. Husmann of Washington. Funeral services will be held at 2 p.m. tomorrow at the Warner Pumphrey funeral home, 8434



Georgia Avenue, Silver Spring, Maryland. Burial will be in the Rockville Union Cemetery."

1003. *Soybean Digest.* 1943. This needs clarification. Aug. p. 1.
• ***Summary:*** "That two governmental agencies headed in the same department should be working at such cross purposes as to encourage soy flour production and then ban its use in bread would be funny if it were not so alarming to the industry. After years of constructive work by Dr. W.J. Morse, Dr. J.A. LeClerc, Dr. Louise Stanley, of the Department of Agriculture, by Donald S. Payne of the War Food Administration, and after years of experimentation, introductory work, processing and merchandising by the soy flour manufacturers, the Pure Food and Drug Administration suddenly discovers that soy flour is an adulterant!!! And rules that it can not be used in bread except as a bleaching agent, and then in quantities of less than one-half of one percent.

"A year ago Colonel Isker told us what the army thinks of soy flour. Dr. D. Breese Jones told us that rats fed 15 percent of soy flour grew four times as fast as rats fed only pure wheat flour. Lend-lease uses huge quantities of

soy flour for shipment to our allies. The Office of Foreign Relief and Rehabilitation (which has charge of feeding the peoples of conquered territories) plans to use even larger quantities of soy flour. The War Food Administration has announced that 12 times the 1942 volume of soy products will be available for use on the home front this coming year, in such items as bread and pastries. But now the Pure Food and Drug Administration collides head-on with the rest of the government in ruling that if soy flour is used in bread it is no longer bread!

"Perhaps the ruling was not an intentional thrust at soy flour. Perhaps it needs clarification. It is getting attention! I And we have asked for an official explanation at the Cedar Rapids War Conference [in Iowa]. It may prove to be one of the highlights of the meetings."

1004. *Washington Post.* 1943. Died: Morse, Lena K. Sept. 28. p. B7.
• ***Summary:*** "On Monday, September 27, 1943, at her residence, 4224 38th st. nw., Lena K. Morse, wife of the late John B. Morse, and mother of William J. and Gladys H. Morse. Services at the S.H. Hines Co. funeral home, 2901 14th st. nw., Wednesday, September 29, at 11 a.m. Interment Fort Lincoln Cemetery."

1005. American Soybean Association. 1943. Soybeans go to war: Program of American Soybean Ass'n War Conference (Leaflet). [Hudson, Iowa]. 2 panels each side. Each panel: 21 x 14 cm. Sept.
• ***Summary:*** This leaflet gives the program for the "War Conference" held by the ASA from 5-7 Sept. 1943 at the Hotel Montrose in Cedar Rapids, Iowa.

"Sunday, Sept. 5.

2:30 p.m. Committee Meetings, Soybean disease–Corn room. Nominations.

"6:00 p.m. Board of Directors Meeting–Parlor D.

"8:00 p.m. Annual business meeting–Ballroom.

"9:00 p.m. 'Soybeans and the Orient'–Dr. H.W. Miller, International Nutrition Laboratory, Mt. Vernon, Ohio.

"Film strip–'Soybean production, improvement and utilization'–K.E. Beeson, Purdue Univ. [West Lafayette, Indiana].

"Informal discussion and open meeting.

"Monday, Sept. 6.

"9:00 a.m.–Ballroom. David G. Wing, Pres. American Soybean Association, presiding.

"'What the soybean means to Iowa'–Harry Linn, State Secretary of Agriculture.

"'Bureau of Plant Industry's soybean program'–Dr. W.J. Morse, Senior Agronomist, Bureau of Plant Industry, Washington, DC.

"'Development and distribution of new soybean varieties'–Dr. J.L. Cartter, Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"'Regional Laboratory's study of soybean diseases'–Dr. W.B. Allington, Assistant Plant Pathologist, U.S. Regional Soybean Lab., Urbana, Illinois.

"'Problems of processing green soybeans'–H.R. Schultz, Standard Soybean Mills, Centerville, Iowa.

"'Soybean industry as seen by a grower'–Walter McLaughlin, Decatur Farm Management, Inc., Decatur, Illinois.

"General discussion.

"1:15 p.m. Ballroom. Hotel Montrose.

"'You're in the oil business now!'–Lamar Kishlar, Chairman, Soybean Nutritional Research Council, St. Louis, Missouri.

"'The federal grading standards need revision'–G.H. Iftner, Director, Grain Marketing, Illinois Agricultural Association, Chicago, Illinois.

"'Commodity Credit Corporation's 1943 soybean price support and marketing program'–J.H. Lloyd, Ass't Regional Director CCC, Chicago, Illinois.

"'The 1943 soybean oil meal distribution program'–O.D. Klein, AAA [Agricultural Adjustment Agency], Washington, DC.

"'Soybean research at the Northern Regional Research Laboratory'–Dr. W.H. Goss, Senior Chemical Engineer, NRRL, Peoria, Illinois.

"'The Ohio early variety campaign'–S.D. Hollett, Swift & Company Soybean Mill, Fostoria, Ohio.

"'Explanations of Pure Food & Drug Administration rulings'–Speaker to be announced." Address: [Hudson, Iowa].

1006. Morse, W.J. 1943. Some agronomic results of the U.S. Regional Soybean Laboratory. *Soybean Digest.* Sept. p. 8, 28.
• ***Summary:*** "The original work program of the laboratory involving agronomic, genetical, physiological, and pathological investigations has been somewhat modified for the period of the war emergency. The physiological and purely genetic problems are being postponed, while greater emphasis is being placed on the development and distribution of adapted varieties of superior quality, improved cultural methods, and the study and control of diseases for the maximum production of feed, food, and industrial products under varying conditions of soils, climate and farm practices. Thus the laboratory program for the war emergency period includes the following objectives:

"1. To determine the effects of varietal, soil, and climatic factors, and cultural and production methods on the growth, yield, and composition of soybeans.

"2. To develop by breeding through selection from hybrids and other material, supported by data from chemical analyses, varieties of soybeans of superior quality for industrial purposes.

"3. To study methods of control for the most serious

soybean diseases and the possibilities of developing strains highly resistant or immune to these diseases.

"The laboratory, as heretofore, continues its headquarters at Urbana, Illinois, where the University of Illinois has furnished ample greenhouse, storage, office, and laboratory space to meet all special requirements. In view of the fact that soybean diseases are increasing in prevalence and are threatening production in some of the heavy producing areas, a full-time plant disease specialist has been added to the laboratory staff. As it is impossible for one man to give detailed attention to the disease problems in all producing states, the possibility of conducting disease studies with the plant pathologists of the 24 cooperating states is being explored.

"One of the main objectives of the Laboratory and cooperating agencies is to develop improved varieties and strains of soybeans for commercial and industrial utilization. In order that new strains developed through cooperative breeding work can be evaluated more rapidly and accurately, six varietal groups have been established and designated as Uniform Test Groups I, II, III, IV, V, and VI. Group I includes varieties for the northernmost part of the north central states having approximately the maturity of Mandarin, the groups gradually increasing in length of season to Group VI that contains the late varieties for the southern part of the cotton belt. In the north central states uniform nursery tests are being maintained at 24 different locations and in the southern states at 54 locations in cooperation with state experiment stations and special cooperators."

Note 1. This is the earliest document seen (Dec. 2016) that mentions "Uniform Test Groups" or that gives them any of the following numbers: I, II, III, IV, V, or VI in connection with soybeans.

Note 2: This is the earliest document seen (Dec. 2016) that contains the term "uniform nursery" or the term "uniform nursery tests."

"At these various places, varieties and strains are being studied for desirable agronomic characters and disease susceptibility and the seed analyzed to discover promising chemical characteristics. Varieties or strains proving of outstanding value are distributed more widely for further testing for yield and general economic value. New strains found to be superior are increased by the state experiment stations, given a name, and distributed to farmers in the area to which the variety is best adapted.

"Some of the agronomic accomplishments of the laboratory to date may be of interest and are summarized briefly as follows:

1. Developed and released through cooperation with state experiment stations the Boone, Chief, Gibson, Patoka, Earlyana, and Lincoln varieties–high-yielding yellow-seeded types of high oil content adapted to a wide range of soil and climatic conditions–for industrial purposes.

"2. Developed and distributed to cooperating plant breeders a large amount of hybrid material for further testing and selection.

"3. Showed that chemical composition, yield, and general agronomic desirability are characters of the greatest value in developing superior types.

"4. Showed by a survey of soybean diseases that certain diseases are increasing in prevalence and are a distinct menace to production in many of our large seed-producing areas.

"5. Proved by date-of-planting studies that late varieties at a particular location yield proportionately less than early varieties when planted at a later date.

"6. Showed by extensive studies that the chemical constituents of the same variety grown under different climatic conditions differ markedly.

"7. Showed that rate of planting has no effect on composition of the seed but does affect yield.

"8. Published numerous technical and practical reports and bulletins to assist plant breeders and processors in their respective fields.

"9. Showed that fertilizer treatments applied to several soil types in the north central region did not have any marked influence on composition of soybean seed. Treatments applied to soils of low productivity, however, did result in significant increases in yield.

"10. Showed by physiological research that varieties grown at warm temperatures produced seed that were higher in protein. ash, and calcium content, but lower in sugar content. The iodine number of oil was lower also under warmer growing conditions."

Photos show: (1) A portrait photo shows W.J. Morse. (2) The large, modern "solvent extraction bean plant of Honeymead Products Co." in Cedar Rapids, Iowa. Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA, Washington, DC.

1007. Morse, W.J. 1943. Soybean variety registered, I [Boone]. *J. of the American Society of Agronomy* 35(9):834-35. Sept.

• ***Summary:*** Gives details on the soybean variety Boone (Reg. No. 1). "The first variety of soybean for registration under a cooperative agreement between the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S. Dept. of Agriculture, and the American Society of Agronomy was submitted by Dr. W.C. Etheridge of the Missouri Agricultural Experiment Station."

"Boone is a pure line selection from P.I. 54563-3 made by the Missouri Agricultural Experiment Station At Columbia, Missouri, in 1930. P.I. 54653-3 originated from a selection made by W.J. Morse in 1922 from P.I. 54563, received from Jungchiangko, Manchuria, in 1921.

"The selected strain, now named Boone, first distributed in 1935, is commercially grown on a moderate scale in central and southern Missouri."

"P.I. refers to plant introduction number given by the Division of Plant Exploration and Introduction."

One table shows the yields of Boone, Manchu, and Illini each year from 1937 to 1941. A second table compares the yield of Boone, Scioto, Illini, Dunfield, and Manchu at three locations in Missouri. Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA, Washington, DC.

1008. *Soybean Digest.* 1943. 250 attend the War Conference: Cedar Rapids, Iowa, Sept. 5-7. Sept. p. 6-7, 34.
• ***Summary:*** "Resolutions on soy flour and margarine. Announcement of government's marketing programs. Speeches by Miller, Spry, Morse, Schultz, Kishlar, Iftner, Lloyd, Klein, Goss, Hollett, Rhoades and Berger in this issue. Food and Drug Administration not represented.

"The War Conference or 23rd annual convention of the American Soybean Association, at Cedar Rapids, Iowa, September 5-7, brought 250 growers handlers, processors, governmental agents and other representatives of the soybean industry together for sessions that were highlighted by announcement of governmental soybean marketing and oil meal distribution programs, by resolutions condemning the Pure Food and Drug Administration's soy flour ruling and urging the repeal of federal taxes on margarine, and by thorough discussions of many other aspects of wartime problems confronting soybeaners.

"The annual dinner held the evening of September 6 featured delicious soy foods in addition to old-fashioned Iowa cornfed beef. A large share of the crowd stayed over until the next days for the tours of Cedar Rapids processing plants, which included the soybean mills of Honeymead Products Co. and Cargill, Inc., and in addition the Quaker Oats Co. mill and the corn processing plant of Penick & Ford [see photos of mills, Honeymeade p, 8 and Cargill p. 9].

"As suggested by speaker Walter Berger, all of us hope that the day is not far distant when the soybean get-together will be filled with jovial stories, laughter and the hilarity of old times. But not this year. This is war. The conference was a serious occasion.

"For president, J.E. Johnson, Champaign, Illinois, succeeded David G. Wing, Mechanicsburg, Ohio, who has headed the organization efficiently for the past two years, while Johnson has served as vice-president. Howard Roach, Plainfield, Iowa, was elected vice-president. George M. Strayer, Hudson, Iowa, and J.B. Edmondson, Clayton, Indiana, were reelected secretary and treasurer respectively.

"John Dries, Saukville, Wisconsin; Jacob Hartz, Stuttgart, Arkansas; and Ersel Walley, Fort Wayne, Indiana were reelected directors. New members to the board were Wing, the retiring president; Walter McLaughlin, Decatur, Illinois; John Sand, Marcus, Iowa; and Roy Monier, Carrollton, Missouri.

"G.H. Banks, Osceola, Arkansas was chairman of the committee on nominations, Howard Roach on resolutions.

"The *Digest* is fortunate in being able to carry all formal speeches given at the Conference, many of them virtually complete, in this issue. Report of Secretary, 1942-43 Fiscal Year:

"I will not attempt this evening to give you a detailed report of the operations of the American Soybean Association during the past year. Those of you who are readers of the Soybean Digest are familiar with what has taken place. I would like to review the main projects which have been carried on during the year and to give my evaluation of them.

"There has been greatly renewed interest in the food uses of soybeans and soybean products during the past year. Many new products have been offered on the commercial market. Because of the curtailment of supplies of many products, manufacturers have been looking for new lines. A large amount of attention has been focused on soybeans and soybean products by popular magazine articles. The inquiries received in the central office as a result of these have required a large amount of time for replies. Hectic Year

"The past marketing year has probably been the most hectic in the history of the American Soybean Association. The acreage of beans was the largest, by almost twice, ever produced in this country. The. extremely early frost created problems never before experienced. That frost together with operation under the governmental purchase programs taxed the ingenuity of the entire industry.

"One of the most important jobs confronting the American Soybean Association during the year was that of urging Commodity Credit Corporation and governmental grading officials to make adjustments in their grading program to allow for frost or green damage and enable the producer to receive the actual valuation of the bean, rather than the valuation established by previously determined irrelevant standards. One the editorial pages of *Soybean Digest* we consistently pointed out the necessity of adjusting the CCC program to allow for current developments. In the year which has intervened most all of our suggestions have been followed, in all or in part. Soybean growers have been consulted in the planning councils and have had a part in the development of the 1943 marketing program for soybeans.

"During the winter and early spring months we consistently expressed the importance of proper inoculation of soybeans in order that we might produce the greatest number of bushels on limited acreage with the limited labor supplies available. AAA officials and inoculation manufacturers tell us that the demand for soybean inoculation in 1943 was far above that of any previous year. The yields should be likewise.

"Severe Standards:

"Feeling that the standards which were established for the marketing of the 1942 crop of beans were still too severe on matters of green damage and field damage, we advocated revision of those standards. The 1943 program which will be announced here at this meeting includes the revision of discounts for both green damage and field damage. We feel this to be one of our outstanding accomplishments of the year and this was possible only through the cooperation of such agencies as the Illinois Agricultural Association, the various state extension services and agronomy departments and CCC.

"At the present time we have on our hands one of the most serious battles with which we have ever been confronted. For some unknown reason the Food and Drug Administration of the Federal Security Agency has ruled that soy flour can not be used in bread in excess of ½ of 1 percent. Many bakeries have been using greater percentages than this with marked success. Many industries, because of the emphasis upon balanced foods and the shortage of protein supplies, have been considering the use of soy flour.

"This field is one which is just now opening up and which shows promise of providing huge markets for soy flour both during and after the war. *However, the Food and Drug Administration must be prevailed upon to change their ruling or we may as well cross this major market for soybeans off our list.* The fight has only begun, and it may demand the assistance of the entire American Soybean Association membership before it is finished. The members of the board of directors have been extremely busy contacting members of Congress and governmental agencies concerning this ruling.

"A year ago I informed you that we had turned our advertising solicitation over to the Ewing Hutchison Company in Chicago. The lineage of advertising carried during 1943 has been greater in every issue than during the previous year. The September issue, carrying the reports of this convention, will have twice as many pages of advertising and will be twice as large as any issue of the *Digest* we have ever published. It appears that if governmental curtailment of paper supplies does not hit us too hard we should be in a position to continue during 1943-44 with increasingly large schedules. We have been very pleased with our relationships with the Ewing Hutchison Company.

"The Problem

"The big problem confronting the American Soybean Association is the same as that which has confronted it in each of the last several years–adequate membership. To truly represent the soybean growers of America we should have the major proportion of them among our membership. Last year I told you that an active paid membership of 25,000 growers was not an impossibility. If we are to be an effective organization we must work out some plan to increase the membership solicitation plan which will enable the American Soybean Association to represent all soybean growers and thus be influential in its accomplishments. We must provide sufficient members to finance that type of program. The 1943-44 year is the one in which that plan should he formulated and carried through.

"Respectfully submitted, Geo. M. Strayer, Sec'y American Soybean Ass'n.

"Business Meeting:

"Minutes, of the Annual Business Meeting of the American Soybean Association, September 5, 1943

"The meeting was called to order in the Ballroom of Hotel Montrose at Cedar Rapids, Iowa, at 9:15 p. m. by President Wing. Secretary, Geo. M. Strayer, introduced by the president, made series of announcements concerning the next day's convention activities, read his annual report and the financial statement. The minutes of the last annual meeting, held at Purdue University on September 16, 1942 were read and approved.

"President Wing complimented Mr. Strayer upon his handling of the Association's affairs during the year just ended, including his editorship of the *Soybean Digest.*

Mr. Banks, chairman of the nominating committee, submitted a slate of officers for the next year as follows: President, J.E. Johnson; Vice President, Howard Roach. Secretary, Geo. M. Strayer; Treasurer, J.B. Edmondson. Continued:

1009. Pincus, J.W. 1943. Russia needs soybean seed! *Soybean Digest.* Oct. p. 7.

• ***Summary:*** "The soybean is not a new crop in Russia. It has been grown extensively in the far eastern province near the Pacific coast, north of the Amur River, and close to Manchukuo. It was also grown in the northern Caucasus. The Soviet government took a special interest in this crop and tried to extend its growth in the northern Caucasus and in some parts of the Ukraine. Several years ago they imported new varieties such as Illini from the U.S., and several varieties from Manchukuo. A number of experimental farms devoted exclusively to variety testing, and other experiments with soybeans have been established. In Moscow, there is the Soybean Institute where extensive research on that particular seed is carried on.

"During my trip to Russia a few years ago, I visited one of these stations in the northern Caucasus and one near Kharkhov in the Ukraine. There I witnessed one of the most interesting and thorough experiments with soybeans that has ever come to my attention. While in Moscow in 1931, I was invited to a dinner given by the Soybean Institute. This meal consisted exclusively from soup to nuts of soybeans. Milk, coffee, roast, cheese, and various desserts were made from this seed. It is easy to see why the soybean has become one of the most important seeds during the present period of embattled Russia.

"Soybeans were included among the seeds requested

by Russian agricultural authorities. Particularly desirable were early maturing seeds. However, the early frost in Wisconsin, Minnesota, and North Dakota last fall prevented the shipment of these seeds, despite the good intentions of a number of growers. However, several carloads of early maturing soybeans were purchased from Canada.

"In addition to these commercial seeds, Russian agricultural authorities have appealed for new varieties of soybeans for experimental planting. Among those that we were able to send last year were Cayuga, furnished by the Cornell Experiment Station. We have also obtained quite a collection of new varieties through the courtesy of Dr. W.J. Morse, of the U.S.D.A.

"Plea for Help: I am taking this opportunity to ask the readers of *The Soybean Digest* and members of the American Soybean Association to inform us what kinds and what quantities they would be in a position to contribute after the harvest in the fall of 1943. We would also appreciate their letting us know approximately when these will he ready for shipment. We shall then notify you in due time as to how to pack, and where to ship. Russian War Relief will pay all transportation expenses and furnish seamless bags, labels, and tags. Labels and tags contain the name and address of the contributor, the kind of seed contributed and its germination. It is placed inside every bag of seed and the tag is attached to the outside bag.

"When he contributes, every soybean grower can be sure that he is doing his bit to help the Russian people in their gallant fight. We feel sure that he will he glad to have an opportunity to express his appreciation for the courage and fortitude of our Russian allies.

"Address: Russian War Relief, Inc., 11 East 35111 SL, New York, N.Y."

1010. *USDA* (*magazine*). 1943. Soybean bureaucrat: W.J. Morse. Nov. 13. p. 3.
• ***Summary:*** Gives a brief history of Morse's work with soybeans for the USDA. "The name of William J. Morse is destined to be linked permanently with one of the most amazing food plants introduced into the United States, the soybean.

"'We are ignoring one of the very best food plants in the world,' he has been saying over and over again, in person and in print, for nearly 30 years, it being a trait of good bureaucrats to 'prove all things; hold fast to that which is good.' It required World War II to vindicate Bill's judgment, but we are now witnessing a rapid acceptance here of the soybean as a first-class human food."

"Morse came to the Department directly after getting a B.S. degree from Cornell [Univ., Ithaca, New York] in 1907. Ever since, he has been connected with what is now the BPISAE Division of Forage Crops and Diseases. He soon became enthusiastic over the possibilities of the soybean.

"For more than 30 years he was been testing varieties.

He made an extended trip to the Orient to bring back sorts that appeared likely to prove of value to this country. As a result, he has become the outstanding national authority on the soybean. Particular credit is due him for bringing about its use as a human food in the United States, and for providing the varieties of soybeans needed industrially.

"Morse's reputation in this field, coupled with his known ability to cooperate effectively with fellow workers, led to his supervision over the research activities conducted on soybean improvement and production at the U.S. Regional Soybean Laboratory, Urbana, Illinois. This national recognition came as no surprise to his fellow workers, who have long appreciated his outstanding qualities as a man, as well as his ability as a research worker."

A photo shows William Morse standing in front of a many floor-to-ceiling shelves filled with soy products (for details see 1936 photo).

This digital photo was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1011. Morse, W.J.; Stuart, W.M., Jr. 1943. Vegetable varieties of soybeans. Washington, DC: Div. of Forage Crops and Diseases, Bureau of Plant Industry, USDA. 6 p. Nov. [12 ref]
• ***Summary:*** Contents: Introduction. Nutritive value of the soybean. Classification of varieties as to use and maturity (very early is 100 days or less; very late is 161 days or more. The two types by use are "green vegetable" and "dry edible"). Soil and climatic adaptations. Preparation of the seedbed. Fertilizers and lime. Inoculation. Time of seeding. Method, rate, and depth of seeding. Cultivation. Harvesting and shelling green vegetable beans. Harvesting and threshing mature beans. Utilization: Shelled green soybeans, mature soybeans. Enemies of soybeans. Seed supplies of vegetable varieties. Publications.

"About 10 years ago agricultural explorers in the Orient collected more than 100 varieties of soybeans that were used solely as green vegetable or dry edible beans. The term 'vegetable varieties' has been applied to such edible types

to distinguish them from varieties grown for other purposes. These varieties, differing in size, shape, and color of seed and ranging in maturity from 85 to 165 days, have been under test for the past 8 or 9 years at various experiment stations throughout the United States and its insular possessions.

"In extensive tests of the cooking quality and composition of the green and dry soy beans made by the Federal Bureau of Home Economics and by the Departments of Home Economics of various agricultural colleges and experiment stations, the vegetable varieties have proved to be much superior to the field varieties in flavor, texture, and ease of cooking. Some varieties have also been judged superior for the manufacture of bean milk, flour, and other food products."

"Classification of varieties as to use and maturity." "The recommended uses and classification as to the length of growing season of the following vegetable varieties are based on observations made at Arlington Farm: [Arlington, Virginia]: A table shows:

Very early (100 days or less): Green vegetable: Agate, Giant Green, Hidatsa, Sac, Sioux. Dry edible: Giant Green, Sac.

Early (101-110 days): Green vegetable: Bansei, Chusei, Etum, Goku, Kanro, Kanum, Waseda. Dry edible: Bansei, Chusei, Etum, Goku, Kanro, Kanum, Waseda.

Medium Early (111-120 days): Green vegetable: Emperor, Fuji, Hakote, Hiro, Hokkaido, Jogun, Kura, Osaya, Sato, Shiro, Sousei, Suru, Tastee, Toku, Willomi, Wolverine. Dry edible: Emperor, Fuji, Hokkaido, Jogun, Osaya, Sousei, Suru, Toku, Willomi, Wolverine.

Medium (121-130 days): Green vegetable: Funk Delicious, Hahto, Illington, Imperial. Dry edible: Funk Delicious, Illington, Imperial.

Medium late (131-140 days): Green vegetable: Aoda, Chame, Higan, Rokusun. Dry edible: Easycook, Higan, Rokusun.

Late (141 to 160 days): Green vegetable: Edsoy, Green and Black, Jackson, Jefferson, Nanda. Dry edible: Edsoy, Jefferson, Nanda.

Very late (161 days or more): Green vegetable: Cherokee, Seminole. Dry edible: Seminole.

"In general, the method of planting vegetable soybeans is practically the same as that of field varieties except that they are always planted in rows far enough apart to permit cultivation. Three feet has been found a satisfactory distance between rows, although the very early varieties may be planted in 2-foot rows."

Note: To see refinement in Morse's thinking, compare this with a similar article written about two years earlier: Morse, W.J. 1941. "Shanghaied... a super food." *Soybean Digest.* July. p. 4-5, 10. Address: 1. Senior Agronomist; 2. Asst. Agronomist. Both: Div. of Forage Crops and Diseases, USDA, Washington, DC.

1012. Hochbaum, H.W. 1943. Shall we plant soybeans in the Victory Garden? In: U.S. Food Distribution Administration, War Food Administration, ed. 1943. Soybeans and Soya Products. Program for Meeting of Interdepartmental Nutrition Coordinating Committee. 25 p. See p. 7-8. Dec. 7. • ***Summary:*** "One of our aims in the Victory Garden Program is to encourage more people to plant the kinds of vegetables that are of greatest value in protecting health, and which at the same time are fairly easy to grow. Now some of the vegetable varieties of soybeans fill this need admirably, and everything should be done to encourage greater plantings by home gardeners. Soybeans are easily grown, they yield well, and they are rich in food value. The fresh green soybeans are very rich in vitamin A, especially the varieties that are deepest green in color. They are also a very good source of thiamine (vitamin B-1), and a good source of riboflavin (vitamin G) The fresh green soybeans are very rich in vitamin A" and thiamin, and are a good source of riboflavin (vitamin G [sic, vitamin B-2]) we are told in Leaflet 166 of the U.S. Department of Agriculture, entitled 'Soybeans for the Table.' Moreover people learn to like soybeans as a fresh vegetable.

"Some varieties come to bearing in mid-August, and other later, so that by a selection of proper varieties, we can have them in bearing here until November. Especially valuable they are in areas where the gardens so often dry out in summer, for soybeans stand dry soil pretty well and yield something green when some of the garden is on strike. Therefore, soybeans deserve every consideration, for one of the problems of the Victory gardener is to plan and cultivate the garden so that it produces to the fullest in late summer.

"Mr. Werner Meyer on the Federal staff of the Extension Service had a fine Victory garden in Bethesda, Maryland this year, and said his garden was the finer and more enjoyable because of the excellent yield he obtained from green soya. His family enjoyed them fresh from the garden, and through the winter they will enjoy the canned soybeans put up during the summer.

"The Extension Service of the University of Tennessee found that three kinds of soybeans averaged 1 1/3 cups of shelled beans to three feet of row. The yield, however, has been exceeded by some gardeners who have good soil and favorable growing conditions. In fact, Mr. William J. Morse (who spoke to us earlier and whose name will be linked permanently with soybeans not only in the Department of Agriculture but throughout the United States) has told me that some of the vegetable varieties of soybeans yield from two to two and one-half times as much as our common lima beans.

"Mr. Morse recommends the following varieties for the Eastern and Central States: Hokkaido, Jogun, Imperial, and Kanro. Giant Green and Tastee are two early varieties recommended to enable enthusiasts to lengthen the season

of production. For the Southern States, Seminole, Edsoy [Delsoy], Nanda and Rokusun are recommended. For those who have room and want to grow small dry beans for sprouts, the well known Bansai is suggested.

"Soybeans should be grown in rows 24-30 inches apart. Therefore, it may not be practical to grow them in the small Victory gardens, say gardens less than 30 x 50 feet. Too many Victory gardeners planted corn, potatoes, cucumbers, and other space-taking crops in 1943. Such crops do not yield enough in small gardens, and in planting them the Victory gardener sacrifices space that might be given to other vegetables that yield more commensurately.

"Soybeans should be planted at corn planting time when the ground is warm and all danger from late frost is past. The seeds should be planted about one inch deep and three inches apart in the row. At this rate, one pound of seed will plant about 400 feet of row. The seeds preferably should be inoculated with a soybean culture before planting.

"The crop is cultivated like corn or any other garden vegetables. The beans are ready for use when the pods turn yellow green. This is from 100 to 130 days after planting.

"So far as pests go, soybeans have one advantage and one disadvantage The Mexican bean beetle which is such a pest on our common snap beans does not bother soybeans if other beans are nearby. But oh! how the rabbits love them. Some Eastern Victory Gardeners plant soybeans to lure the rabbits away from the snap beans.

"Shall we plant soybeans in the Victory garden? Well, if we want a delightful fresh green vegetable in late summer and fall, one that is easily grown and yields well, we will by all means plant soybeans–that is, provided we have enough space and a fairly long growing season. And on farms and in the larger Victory gardens in town and suburbs, we should also increase our plantings to have soys to can, to dry, and for sprouts." Address: Extension Service, WFA (War Food Administration), and Chairman of Victory Garden Committee.

1013. Morse, W.J. 1943. Introducing the soybean. In: U.S. Food Distribution Administration, War Food Administration, ed. 1943. Soybeans and Soya Products. Program for Meeting of Interdepartmental Nutrition Coordinating Committee. 25 p. See p. 1-2. Dec. 7. [1 ref]

• ***Summary:*** "The people of oriental countries, especially China, have much to teach the rest of the world in the matter of economy in the use of food products. For thousands of years the protein part of the diet of hundreds of millions of Chinese has been supplied or supplemented largely from soybean products. Fermented, the soybean yields all of their different sauces, which furnish the basic flavoring of their foods; pressed, it gives oil for cooking; sprouted, it gives a fresh vegetable rich in vitamins; picked when green, it makes an excellent green vegetable; ground dry, it makes flour; soaked, ground, and with water added, it provides milk; and the curdled milk furnishes the famous bean curd–the boneless meat of the Orient–used in the form of various cheeses and as a meat substitute. It has meant bread, meat, milk, cheese, and vegetables to these people, and has furnished what appears to be a well balanced diet at a relatively low cost. It is rapidly becoming one of the most valuable, if not the most valuable, of China's gifts to the people of the Western World."

Note. This is the earliest English-language document seen (Dec. 2016) that uses the term "boneless meat of the Orient" refer to tofu.

"Although the many and peculiar uses of the soybean have long been appreciated by the Chinese, it is only within comparatively recent years that the soybean has received much attention as a human food in either Europe or America. Strange to say, the first published use of the soybean in the United States, other than for forage purposes, was as a coffee substitute by the Indiana Experiment Station in 1892 [sic, 1894]. It was revealed that an Indiana farmer and his neighbors had been using the roasted beans for coffee for about 8 years. During the past two years, as many of you know, the soybean has been sold as 'Coffee Berry", and 'Coffee Plant', and used extensively to blend with coffee."

"The soybean was first used for food in America, beginning about 1910, as a flour prepared chiefly for infant foods and for persons requiring a food of low starch content" [diabetics]. At various times the soybean has attracted attention as an article of food, but it was not until World War I, when a cheap, and easily obtainable source of protein being sought, that the soybean was really considered seriously as an American food and the name soybean became fairly familiar. At that time the dry beans were prepared in many ways but owing to the time required for cooking, the peculiar taste, and improper methods of processing, soybean products in general received a poor reception. In most of the oriental foods made from the soybeans, the disagreeable flavor is avoided by the use of special edible varieties and also because of the nature of the products, the preparation of which, for the most part, involves some sort of fermentation, thus changing the flavor entirely. During that period cooking tests were conducted with all the varieties and introductions then available, in an attempt to find varieties lacking the unpleasant beany taste and which would cook quickly. Only two edible types–the Hahto and Easycook–were found in our 500 varieties and these had rather limited soil and climatic adaptations. For a brief period these varieties became popular in the green and dry stages but food habits are difficult to change, as is revealed in the history of the introduction of the potato, tomato and other foods now generally used. Most people have thought of the soybean primarily as a stock feed, a crop, to turn under for enriching the soil, or processing for oil and oil meal. Prejudice, custom, and ignorance of foods and food values have much to do in the retarded progress in the utilization of the soybean as food. In 1925 the American

Soybean Association held its annual meeting in Washington [DC] and in the exhibit of products, the only articles of food shown were canned baked soybeans, diabetic and infant foods, soy sauce, and health soy flour. At the present time more than 50 different foods made wholly or in part from soybeans by about 200 manufacturers are on the market.

"The importance of the soybean as an economical and valuable source of food in the human diet is becoming more generally recognized by the average American citizen. The rapid increase in the production of soybeans in the United States during the past decade has caused an expanding interest in the nutritional value of the soybean and in its possibilities as a food. Extensive nutritional studies made during recent years by industry, State experiment stations, and the Department of Agriculture have revealed the unique dietary value of the soybean and its products, and have had much to do with the rapid and growing popularity of the soybean as a food.

"The introduction of vegetable varieties of soybeans, which are now available in all sections of the soybean growing region is doing much to overcome earlier prejudices against the use of dry soybeans. This type of soybean has also become quite popular as green shelled beans used in the same manner as green peas or lima beans. During the past season vegetable soybeans were grown extensively in victory gardens, and several commercial concerns canned large packs of the green shelled beans in a similar manner to green peas. Vegetable soybeans led the list of new vegetables planted in the rural gardens in 1942 in South Carolina. Approximately 2000 home demonstration club women in 44 of the 46 counties in South Carolina planted them in the vegetable garden for the first time. In the winter and spring of 1943, 10,000 one-pound packages of dry vegetable soybeans were sold throughout South Carolina.

"The soybean through the past few years' has risen from an emergency crop to one of major importance, having won its way to its present recognition as a valuable aid to food farming, a commercial worth while crop, a useful nutritious human food, a source of raw material for numerous vital industrial products, and as a highly essential factor in the present international emergency program. It has been stated that the real problem with respect to the post-war food of the world population lies in marshalling the agricultural resources of the world and the proper distribution of foods based on human needs. The comparatively low cost of soybean food products makes them an ideal source of high quality protein. An adequate supply of protein at reasonable cost will be an important point in the post-war feeding of low-income groups in our own country, It will be doubly important in the problems presented by the people to be fed abroad.

"The soybean is very much in our news these days and it is said, seemingly with truth, that the country growing soybeans provides food for its people, its cattle, and its guns." Address: Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA, Washington, DC.

1014. *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."

1015. Morse, W.J. 1943. Soybean experience in 1943: and how it may be used in making a bigger crop next year. *Successful Farming* 41(12):19, 48-49. Dec.
• ***Summary:*** W.J. Morse, foremost soybean authority in the USA, summarizes his observations in the form of recommendations for next year, when America's largest soybean acreage is expected to be planted.

A large photo on the 1st page shows a man in a tractor in a field of soybeans planted on the contour. The caption: "On this typically sloping land of Western Iowa, beans have been planted on the contour to avoid the erosion common to this crop." Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture.

1016. U.S. Food Distribution Administration, War Food Administration. 1943. Soybeans and soya products: Program for meeting of Interdepartmental Nutrition Coordinating Committee. Washington, DC. 25 p. Dec. 7. [10 ref]
• ***Summary:*** Contents: Purpose of the meeting, by M.L. Wilson. Introducing the soybean, by W.J. Morse. Soybeans and their products as human food, by H.C. Sherman. Availability of soybeans and soya products for civilians, by Norman L. Gold. Shall we plant soybeans in the victory garden?, by H.W. Hochbaum. The story of soya products, by Donald S. Payne. Information program on soybeans and soya products, by Keith Himebaugh. Preparation of soybeans and soya products in the home, by Mary E. Kirkpatrick. Discussion.

The meeting ended with a "luncheon featuring soya products, served by the cafeteria of the Department of Agriculture in Room 6962, 12:00 to 1:00 for members of the group holding reservations." Address: Washington, DC.

1017. Walls, E.P. 1943. Edible soy beans. *Maryland Agricultural Experiment Station* (*Department of Horticulture*), *Miscellaneous Publication* No. 28. Contribution No. 1934. 7 p. Summarized in Soybean Digest, April 1945. p. 16, 18. [9 ref]

• ***Summary:*** "Since all soybeans are 'edible,' probably a better name for those types and varieties which have been developed for table use and for canning would be 'vegetable type' soybeans, to distinguish them from the better known agronomical types used for hay crops and soil improvement purposes."

"Probably no crop grown today has a more interesting history than the soybean." In the USA "Illinois was the pioneer state. Here the Experiment Station workers, cooperating with Mr. W.J. Morse of the Bureau of Plant Industry, U.S. Department of Agriculture, conducted extensive county tests."

Discusses "vegetable soybeans" and work at the Maryland Experiment Station. In 1939 canners and growers in Maryland began making inquiries about the possibility of growing edible soybeans as a canning crop. The author describes how the soybeans are prepared for canning. There is a marked tendency for the liquor to jell after the cans have stood for a time. This makes a very unattractive product. "Observation has led to the belief that jelling is closely associated with maturity and this can largely be avoided by harvesting the beans at the stage just before any white or yellow beans have made their appearance."

"Varieties grown in the four years have included Sousei, Giant Green, Bansei, Toku, Jogun, Higan, Hokkaido, Emperor, Willomi, Imperial, Aoda, and Mendota, making twelve in all." Varieties with the top 4 quality ratings in 1940 were Emperor, Bansei, Higan, and Giant Green. In 1941 they were Emperor, Willomi, Jogun, and Toku. "It has been found that soybeans may be hulled satisfactorily with a pea viner by using Pea screens."

"Sprouting soybeans: Either field or vegetable varieties may be used. Usually the varieties having the smaller seeds are preferred, because in the final product there is relatively more sprout in relation to the attached bean, and both sprout and bean are used. The light colored varieties make a more attractive product than those with darker seed coats."

"Miss Christine A. Heller, of the School of Nutrition, Cornell University [New York], is quoted as saying: 'These beans (that is the remainder of the bean to which the sprout is attached) have a very chewy texture, crisp and waxy like the peanut. They will not get mushy like dried beans do, even after long cooking. They need to be cooked only long enough to remove the raw bean flavor.'"

Note: This is the earliest document seen (June 2013) that mentions the soybean variety Mendota. Address: Canning Crop Technologist, Univ. of Maryland.

1018. William Morse smiling (Photograph). 1943.

• ***Summary:*** This digital photo, with date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1019. U.S. Regional Soybean Laboratory. 1944. Southern States Soybean Conference, U.S. Regional Soybean Laboratory, Stoneville, Mississippi. February 29 to March 1944. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 108. Jan. 17. 3 p.

• ***Summary:*** This is the typewritten agenda for the conference.

"First Session, February 29
"Tuesday Afternoon, 2:30 p.m.
"Dr. J.E. Adams
"Inspection of Delta Experiment Station
"Second Session, March 1
"Wednesday Morning, 8:30 a.m.
"Greenville, Mississippi
"Dr. J.E. Adams, Presiding
"General Organization
"The Delta Experiment Station
"Dr. C. Dorman, Mississippi Experiment Station
"2. The Bankhead-Jones Laboratories
"H.W. Marston, Agricultural Research Administration,

U.S.D.A.

"3. Cooperative relations–State Experiment Stations and. the U.S. Regional Soybean Laboratory

"Dr. O.S. Aamodt, Division of Forage Crops and Diseases, U.S.D.A.

"4. Coordinating activities of the Division of Forage Crops and Diseases and the U. S. Regional Soybean Laboratory

"W.J. Morse, Division of Forage Crops and Diseases, U.S.D.A.

"5. Activities of the U.S. Regional Soybean Laboratory

"J.L. Cartter, U.S. Regional Soybean Laboratory

"6. Cooperation with the Southern States

"P.R. Henson, U.S. Regional Soybean Laboratory

"7. Southern Experiment Stations

"Representative

"Third Session March 1

"Wednesday Afternoon, 1:30 p.m.

"Stoneville, Mississippi

"W.J. Morse, Presiding

"Reports from Cooperating States

"(10 minutes each)

"1. Alabama Experiment Station, Auburn. H.R. Albrecht

"2. Arkansas Experiment Station, Fayetteville. R.P. Bartholomew, Stuttgart, C.R. Adair

"3. Florida Experiment Station, Gainesville. G.E. Ritchey

"4. Georgia Experiment Station, Experiment. U.R. Gore, Tifton. T.L. Stephens

"5. Louisiana Experiment Station, Baton Rouge. T.P. Gray

"6. Mississippi Experiment Station, State College. T.F. O'Kelly

"7. North Carolina Experiment Station, Raleigh. T.A. Rigney, Raleigh. E.E. Hartwig

"8. Oklahoma Experiment Station, Stillwater. H.W. Staten

"9. South Carolina Experiment Station, Clemson. W.R. Paden

"10. Tennessee Experiment Station, Knoxville. T.B. Washko

"11. Texas Experiment Station, College Station. K.F. Menke

"12. Virginia Experiment Station, Blacksburg. T.B. Hutcheson

"Wednesday Evening, 8 p.m.

"Interesting War-Time Developments at the Northern Regional Research Laboratory

"Dr. R.T. Milner, Northern Regional Research Laboratory

"Fourth Session, March 2

"Thursday Morning, 8:30 a.m.

"J.L. Cartter, Presiding

"1. Discussion of soybean diseases.

"W.B. Allington, U.S. Regional Soybean Laboratory

"2. Discussion of soybean insect pests.

"E.W. Dunnam, Bureau of Entomology and Plant Quarantine, U.S.D.A.

"3. Summary of 1943 southern agronomic data.

"P.R. Henson, U.S. Regional Soybean Laboratory

"4. Summary of 1943 southern chemical data.

"J.L. Cartter, U.S. Regional Soybean Laboratory

"5. Arranging uniform nursery tests for 1944.

"L.F. Williams, U.S. Regional Soybean Laboratory

"Fifth Session, March 2

"Thursday Afternoon, 1:30 p.m.

"P.R. Henson, Presiding

"Discussion of Plans for 1944

"1. Discussion of date-of-planting tests and selections for 1944.

"H.R. Albrecht, Alabama Experiment Station

"T.P. Gray, Louisiana Experiment Station

"T.A. Rigney, North Carolina Experiment Station

"2. Discussion of breeding methods and maintaining pure seed stocks.

"L.F. Williams, U.S. Regional Soybean Laboratory

"3. Discussion of chemical methods of the Laboratory and recommendations for improvement in agronomic end chemical sampling.

"J.L. Cartter, U.S. Regional Soybean Laboratory

"Thursday Evening, 8 p.m.

"Illustrated Talk on Soybeans in the Orient

"W.J. Morse

"Division of Forage Crops and Diseases

"Sixth Session, March 3

"Friday, 6:30 a.m.

"1. General agronomic problems with soybeans in the Southern States,

"J.F. O'Kelly, Mississippi Experiment Station

"2. Administrative problems.

"J.L. Cartter, U.S. Regional Soybean Laboratory

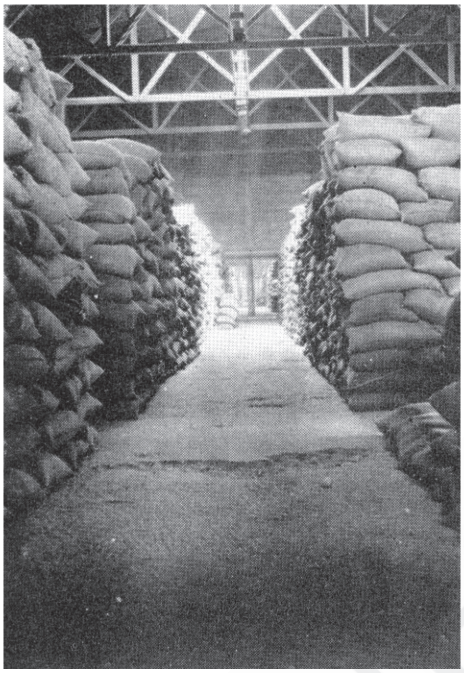
"3. New cooperative projects

"J.L. Cartter, U.S. Regional Soybean Laboratory

"4. Individual conferences

"RSLM 108 1-17-44."

1020. Johnson, Crockett. 1944. Barnaby (Cartoon).
• ***Summary:*** In this 4-part cartoon, a short man, wearing a hat and earmuffs, looks up at black pot on the stove and asks a boy: "What's this on the stove?" He then stands up on a chair by the stove, lifts the lid off the pot, and says to the boy: "Hmm... Soy beans. Too bad she [your mom] didn't consult me about this dish, m'boy." Getting down off the chair, he continues: "She'd have been surprised and delighted to learn of a much more easily prepared substitute, containing most of the nutritional values of soy beans, too. A two-inch cut of T-bone sirloin steak." Address: USA.



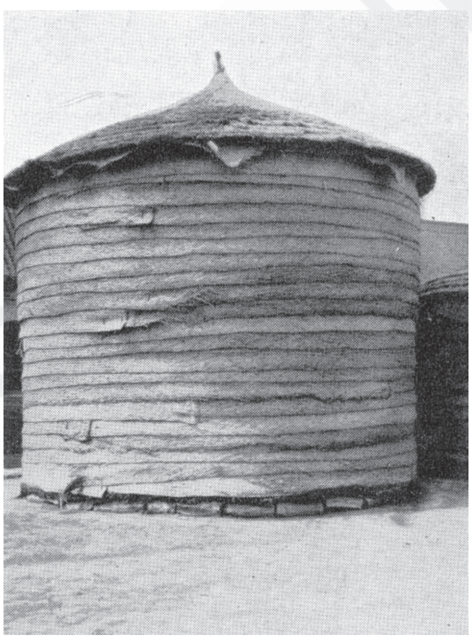
1021. Morse, W.J. 1944. Marketing and storage of soybeans in Manchuria. *Soybean Digest.* Jan. p. 6-7.

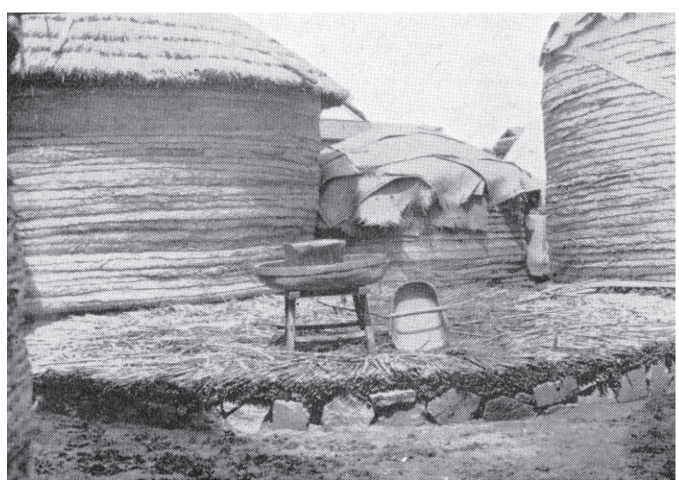
• ***Summary:*** "The soybean is the most important agricultural crop in Manchuria." Soybeans make up more than 25% of Manchuria's staple crop acreage; annual production is about 150 million bushels. About two-thirds to three-fourths of Manchuria's soybeans and soybean products (the oil and cake) are exported, and account for more than 60% of the value of Manchuria's exports.

The great movement of soybeans from the farmer to market begins in November or December, after the ground and rivers freeze, since the trails across the country are otherwise unfit for heavy hauling in the cumbersome two-wheel carts.

The farmer threshes his beans using a primitive flail, or by having a donkey or horse pull a stone roller over them on the dirt threshing ground. The seeds are then stored in small bind made of hand-woven grass matting along the side of the threshing ground. When travel conditions permit, the farmers sacks his beans, loads from 8 to 12 sacks upon the cart, and starts overland to the nearest rail or river point, where the beans are sold to Chinese grain merchants.

In North Manchuria, where the fall and winter months are comparatively dry, open storage with little covering on the beans prevails. The beans are placed in bags, each holding 213 pounds, and piled in large ricks. In some cases,





matting or canvas is used to cover the top and part way down the sides of the ricks. In South Manchuria, where there is more or less rain or snow during the winter months, the beans are placed in covered storage. Osier bins are widely used by the Chinese grain merchants in this region to store beans, millet, or kaoliang. “In the construction of these bins, logs or heavy pieces of timber are placed close together in a circle with a diameter of about 18 feet. A matting of closely-woven kaoliang stalks is then placed over the logs or timber forming the floor of the bin. The wall of the bin is made of strips of rice straw matting about 15 inches wide. As the bin is being filled the strips are gradually wound around until about 20 feet high. The roof of the bin consists of bundles of rice or millet straw overlapping each other like shingles. The average osier bin is said to hold about three carloads of beans, each carload containing 150 sacks.”

Photos show: (1) Many large, cylindrical osier bins, about 20 feet high, in the storage yard of a Chinese merchant, Kaiyuan, Manchuria. Some 6-8 two-wheel carts, piled high with bags, are arriving and unloading their cargo. In this storage yard, more than 80 osier bins are filled with new-crop soybeans and many others are being filled. The yard is said to receive about 1,000 carts of beans a day during the height of the bean season. (2) Soybeans, piled high in large sacks, stored in a modern metal warehouse of the South Manchurian Railway, Dairen, Manchuria. (3) Transporting soybeans in bags on a junk with one rectangular sail. (4) Two men standing by a soybean storage bin (about 4 feet high) made of woven grass matting at the side of the threshing ground. (5) An osier bin for storing soybean seed commonly used in South Manchuria. (6) The foundation of an osier bin, showing the logs over which a matting of kaoliang stalks is laid. (7) Inspecting soybean seed in a railway yard. Address: Senior Agronomist, USDA Bureau of Plant Industry, Washington, DC.

1022. Morse, William J.; Cartter, Jackson L.; Weber, Charles R.; Williams, Leonard F.; Probst, Albert H.; Arneson, Morris A.; Heusinkveld, David. comps. 1944. Results of the Cooperative Uniform Soybean Nurseries. Part I. North Central States–1943. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 109. Feb. 86 p. https://www.ars.usda.gov/arsuserfiles/50200500/nust/1944%20nust.PDF

• ***Summary:*** The title page states, from top to bottom: “United States Department of Agriculture. Agricultural Research Administration. Bureau of Plant Industry, Soils, and Agricultural Engineering, cooperating with State Agricultural Experiment Stations of the North Central Region.”

Contents: Introduction. Cooperation. Location of uniform tests. Map of north central region. Methods. Uniform Test, Group I. Uniform Test, Group II. Uniform Test, Group III. Uniform Test, Group IV. Precision of experimental designs. Effect of location on composition. Address: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

1023. Roach, Howard L. 1944. The Iowa farmer and his soybean baby. *Soybean Digest.* March. p. 11-12.

• ***Summary:*** From a speech before the Iowa Processors’ Conference. “Twenty five years ago a new crop was introduced to the farmers of the Corn Belt. This, shall we say new baby, had been conceived years before when the United States Department of Agriculture sent Dr. W.J. Morse to China to investigate and send to the United States the results of his discoveries, together with identified samples of soybeans.

“For a number of years farmers paid little attention to this new arrival. Some farmers planted soybeans for hay when they were short of roughage, but, for the most part, soybeans were a special crop and new skills had to be acquired to grow them. Long debates were held in the country elevators, and on cracker boxes in the village stores, as to whether it was better to broadcast, or drill, or plant in rows so the crop could be intertilled. Other debates were held regarding the rate of seeding, how hard soybeans were on the ground, the best way to inoculate, how to harvest and all the other details that are necessary for the farmer to know in order to successfully grow and harvest a crop. Agricultural colleges, through their experiment stations, started to find the answers to these questions, yet some of them are still unanswered.

“All this took place during the time we now look back to as the ‘Roaring Twenties.’ Most farmers were making fair money and interest was not as great as the advocates of the ‘wonder’ crop wished. During this time the agricultural press described soybeans under such captions as ‘What’s New in Agriculture.’

“The baby became an adolescent during the drouth years and depression of the thirties [1930s]. Twelve cent corn and $2.50 hogs made 65 cent beans look like a gold mine. Lack of sufficient forage, due to the drouth and the killing of

legume seedings, forced farmers to plant soybeans for hay. The Triple A programs encouraged this youth and industry started to afford a market for the grain. A few feeders became acquainted with the meal as a source of protein for their animals, and the National Farm Chemurgic Council, with Henry Ford as the spokesman, told the American public about this youth that was becoming a man and prophesied great things for the future.

"Pearl Harbor: Then came Pearl Harbor and the loss of our source of vegetable oils from the Orient. This soybean youth, over night, became a man and the nation looked to it to do a man's job, even as your lad and mine were expected to do their duty. The growers responded and in 1943 we produced the largest acreage of soybeans in our history. We are being asked to do even more in 1944.

"The American Soybean Association, with a directorate composed of soybean growers, met in December 1943 at Chicago [Illinois] and passed a resolution recommending that the support price of soybeans be fixed at approximately two and one-half times the price of corn, if the goals of the War Food Administration were to be reached. This action was taken after conference with the American Society of Farm Managers, an organization having membership in the United States, Canada and Mexico.

"It is hard to convince the farmer that he is doing more for the war effort by producing 1500 pounds of beans per acre than by producing 3920 pounds of corn or 1600 pounds of oats both of which are used on the farm for feed. This is particularly true when corn will be far more profitable, and oats acreage has been cut to the minimum, from the standpoint of labor utilization and feed requirements. Within the past few days the addition of 10 cents to the announced support price making it now $2.04 per bushel, comes nearer this goal.

"At a meeting of the Iowa Association of Farm Managers held here on the campus at Ames two weeks ago, the unanimous opinion was expressed that Iowa probably would not have a greater acreage of soybeans planted this year than in 1943. The reasons given were the low support price, the lack of harvesting facilities in those areas that had not previously grown many beans, and the need for corn to be used as feed to support our livestock population." Address: Vice President, American Soybean Assoc., and President, J. Roach's Sons, Inc., Plainfield, Iowa.

1024. U.S. Regional Soybean Laboratory. 1944. Southern States Soybean Planning Conference, U.S. Regional Soybean Laboratory, Stoneville, Mississippi, February 29 to March 3, 1944 (Continued–Document part III). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 112. [March.] 14 p.

• ***Summary:*** (Continued): "Dr. J.L. Weimer, Georgia Experiment Station

"Most of the soybean diseases found in the South now were noted in southeastern and Gulf Coast states in 1925. The increased production of soybeans in recent years are causing these diseases to become more of a factor in soybean production.

"Discussion of soybean insect pests

"Dr. Clay Lyle, Mississippi Agricultural Experiment Station:

"Soybean insects in order of their importance:

"a. Velvet bean caterpillar (*Anticarsia gernmatilis*)

"This insect over-winters in the southern tip of Florida. It is of the greatest importance in the southeastern states. It reaches Stoneville in late August or early September. It can be controlled with cryolite or barium or sodium fluorosilicate.

"b. Bean leaf beetle (*Cerotoma trifurcata*)

This insect is variable in color and markings. They feed on young plants and are easily disturbed making them difficult to find. They over-winter as the adult. Control is by dusting with cryolite or derris.

"c. Mexican bean beetle (*Epilachna corrupta*)

Found east and south of Mississippi. Not found at Stoneville but usually are in the eastern part of the state.

"d. Southern striped blister beetle (*Epicauta lemniscata*)

"Sometimes very serious in limited area. They can be controlled with cryolite or by driving off and burning.

"e. Grasshopper (*Melanoplus* sp.?)

"Control by use of poison bait. Usually of minor importance.

"f. Green stink bug (*Aprosternum hilaris*)

"Usually of minor importance. No control measure known. Summary of 1943 southern agronomic data Paul R. Henson, U. S. Regional Soybean Laboratory Because of limited time, it was decided to take this phase of the work up at the same time the plans for 1944 were being formulated.

"Summary of 1943 southern chemical data

"J.L. Cartter, U.S. Regional Soybean Laboratory

"The effect of environment on chemical composition was discussed

"a. At Hartsville, South Carolina, Groups V and VI were planted at two dates. For the most part, varieties in the later planting had the highest oil content.

"b. Any condition that increases the vigor of the plant tends to increase the oil content.

"c. Iodine number of the oil is governed by the temperature during the time from fertilization to maturity of the seed. The higher the temperature during that period, the lower the iodine number.

"d. The variety x location interaction for chemical composition seems to be higher in the southern region than it is in the Cornbelt states in the north central region. An effort will be made to define areas in the South wherein the chemical samples can be composited for analysis.

"e. The oil content is more stable between locations than protein.

"Fifth Session: 1:30 p.m., March 2, Stoneville, Mississippi

"P.R. Henson, chairman

"Arranging uniform nursery tests or 1944

"L.F. Williams, U.S. Regional Soybean Laboratory

"The question of excluding all colored-seeded varieties was raised. Dr. Milner pointed out that there is not much discrimination against the oil from colored varieties and that it should be possible to overcome the slight prejudice against meal from those varieties. It was decided that since some colored-seeded varieties were being used in the breeding program that they should be included in the uniform tests.

"Groups V and VI were reorganized into three groups in order to have a narrower spread in maturity among the varieties within a group.

"The varieties in Uniform Groups V, VI, and VII were decided upon by studying their performance in the uniform tests in 1943 and in tests at the southern stations in former years. The varieties and the source of seed for 1944 and 1945 for Groups V, VI, and VII are given below. The varieties in Group IV are also given although there, was no discussion on the varieties to be included in that test.

"Uniform Group IV

"1. Boone

"2. Chief

"3. Gibson

"4. Macoupin

"5. Patoka

"6. S32-11

"7. S55-10

"8. S55-35

"9. S100

"Uniform Group V

"Source of Seed

"Variety, 1944, 1945

"1. Arksoy 2913, Arkansas, Arkansas

"2. Magnolia, Tifton, Stoneville

"3. Mamredo, Stoneville, Stoneville

"4. N. 41-39, North Carolina, North Carolina

"5. Ogden, North Carolina, Tennessee

"6. P.I. 97066, Stoneville, North Carolina

"7. Ralsoy, Stoneville, Stoneville

"8. 2-40-A, General American Life Insurance Co., Arkansas

"9. 26-39M, Gen. Amer. Life Ins. Co. Arkansas

"1. Au #1, Alabama, Alabama

"2. Clemson, Clemson, Clemson

"3. Clemson Non-Shattering, Henson (N.C. Seed Co.), North Carolina

"4. Mamloxi, Stoneville, Stoneville

"5. Missoy, Tifton and West Point, West Point

"6. Monetta, Monetta and Tifton, Tifton

"7. N 41-90, North Carolina, North Carolina

"8. Ogden, North Carolina, North Carolina

"9. Palmetto, Tifton, Tifton

"10. P.I. 85335, Stoneville, Stoneville

"11. P.I. 89775A, All 1943 tests, All 1943 tests

""12. Rose Non-Pop, North Carolina, North Carolina

"13. Tennessee Non-Pop, Tennessee, Tennessee

"14. Tokyo, North Carolina, North Carolina

"15. Volstate, North Carolina, Tennessee

"16. Wood's Yellow Henson (N.C. Seed Co.), North Carolina

"Extra variety at some locations.

"P.I. 84922, 1943 tests.

"Source of seed

"Variety, 1944, 1945

"1. Acadian, Louisiana, Louisiana

"2. Avoyelles, Louisiana, Louisiana

"3. Cherokee, Alabama and Arkansas, Arkansas

"4. Delsta, Stoneville, Stoneville

"5. Getan, Experiment, Georgia, Experiment, Georgia

"6. L Z, Louisiana, Louisiana

"7. Mamotan 6640, Stoneville, Stoneville

"8. Nanda, Arkansas, Stoneville

"9. Pelican #1, Louisiana, Louisiana

"10. Seminole, Experiment, Georgia, Experiment, Georgia

"11. Wood's Yellow, Henson (N.C. Seed Co.), North Carolina

"Plan for Uniform Tests in 1944

"1. Number of replications–4

"2. Length of row–plant 20 feet, harvest 16 feet

"3. Rate of planting–200 viable seeds per 20-foot row

"4. Design–it was the opinion of most everybody at the Conference that since the number of varieties was small, complete randomized blocks could be used.

"5. The station that was to grow seed of each variety in the uniform tests for planting in 1945 was agreed upon. These stations ere given above in the variety lists.

"6. A. scale for recording shattering notes was worked out which is to be included in the instructions for recording notes in 1944 as follows: 'Shattering shall be recorded on a scale of 1 to 5 according to the following: (1) no shattering; (2) 1 to 5 percent shattered; (3) 6 to 10 percent shattered; (4) 11 to 24 percent shattered; (5) 25 percent and over shattered.'"

"Mr. Henson suggested that a uniform numbering system to be used by the southern states in designating new selections be set up. The following system was agreed upon:

"1. Alabama–Au

"2. Arkansas R

"3. Florida–F

"4. Georgia–Ga

"5. Louisiana–La

"6. Mississippi–D

"7. North Carolina–N

"8. Oklahoma–Ok

"9. South Carolina–SC
"10. Tennessee–UT
"11. Texas–TS
"12. Virginia–V

"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.

"It was suggested that Mr. Morse be notified so that the name could be checked to make sure that it did not conflict with the name of any manufactured food product or with the name of any other variety of soybeans. Mr. McClelland suggested that the A.E. Staley Company be notified of the change" (Continued). Address: U.S. Regional Soybean Industrial Products Lab., Urbana, Illinois.

1025. Garden Gate, Columbia Broadcasting System. 1944. Interview with W.J. Morse. Radio broadcast. CBS. 9:15 to 9:45 AM. April 22. 3 p. transcript.

• ***Summary:*** "Worcester: I've a guest with me today to tell about a relatively new crop in the Victory Garden. He's W.J. Morse–well known authority on soybeans. And after you hear him tell of the uses and values of the soybeans that can be grown easily in the average Victory Garden–I'm sure you'll agree that most any garden plot of reasonable size ought to include a row or two of vegetable soybeans this year.

"Mr. Morse–I'd like to know first off, what's the difference between these so-called vegetable soybeans and the kind farmers in the middlewest have been raising by the millions of acres for these past few years–for oil and for livestock feed?

Morse: There really isn't a great deal of difference. They're all soybeans. They look alike and grow alike. But the vegetable varieties have certain qualities that make them better eating. For instance, most of the regular soybeans are more difficult to prepare and are tougher and harder. Many of the beans used for livestock feed have a less desirable flavor. So the vegetable soybeans are really just a selected group of varieties better suited for table use."

"Tell me Mr. Morse–have we paid much attention to soybeans in this country until recent years?

"Morse: A little over 50 years ago the Indiana Experiment Station mentioned the use of soybeans as a coffee substitute [Plumb 1894]. That's the first published use in this country other than for forage purposes. It seems that some Indiana farmer and his neighbors had been roasting the beans to make a coffee substitute. Only in recent years however has there been widespread interest in soybeans as human food in this country.

"Worcester: Well let's get down to the facts of raising these vegetable soybeans in the home victory garden. What kind of crop are they? Anything like other beans?

"Morse: They grow much the same as the regular green bush beans. You plant them about the same time of year as corn or beans. They grow best in rows, 2½ to 3 feet apart and about 3 inches apart in the row. Seed ought to be inoculated before planting, and seeds can best be planted by hand in a small garden, putting them in about 1 inch deep.

"Worcester: How long before they'll be ready for the table?

"Morse: That depends on the variety you plant and the way you use them. Some kinds like the Giant Green and the Sioux will mature in about 100 days. Others like the Hahto and Rokusun will take half again that long or about 5 months.

"Worchester: That's a little too long for some gardens in the northern states.

"Morse: Yes, I'm afraid so. In fact, unless the season is unusually favorable, many parts of the northern states are too cold for soybeans–the growing season just isn't long enough. Of course, if you use the beans as a green vegetable, shelled from the pod like peas or lima beans, then you can harvest a little earlier than if you are trying to get mature dry beans."

Also discusses how to harvest, shell, cook vegetable soybeans. The biggest pest is rabbits, which can be stopped by dusting with hydrated lime. The key point is to be sure you have the right variety "and a long enough growing season so that the soybeans will mature before frost. They take quite a bit more time than the usual green beans."

1026. Morse, W.J. 1944. Registration of varieties of soybeans, II [Patoka, Gibson, and Earlyana]. *J. of the American Society of Agronomy* 36(5):458-60. May. [7 ref]

• ***Summary:*** Gives details on the following soybean varieties: Patoka (Reg. No. 2, from Patoka, Indiana), Gibson (No. 3), and Earlyana (No. 4). All were developed at the Purdue University Agric. Exp. Station in Indiana. Address: Senior Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural

Engineering, Agricultural Research Administration, USDA.

1027. *Soybean Digest.* 1944. American Soybean Association will hold its silver jubilee at Urbana, Illinois, September 12-13, 1944. May. p. 11.
• ***Summary:*** A large table lists the ASA's annual meetings and officers, 1920-1944 inclusive. 1st annual meeting. Sept. 1, 1920, Camden, Indiana. President: Taylor Fouts, Camden, Indiana. Secretary: W.A. Ostrander, Lafayette, Indiana. 2nd. Sept. 1, 1921, Urbana & Tolono, Illinois. President: W.E. Riegel, Tolono, Illinois. Secretary: W.A. Ostrander. 3rd. Sept. 1, 1922, Columbia, Missouri. President: C.E. Carter, Columbia, Missouri. Secretary: W.A. Ostrander. 4th. Sept. 11, 1923, Madison, Wisconsin. President: G.M. Briggs, Madison, Wisconsin. Secretary: W.A. Ostrander. 5th. Aug. 29-30, 1924, Ames, Iowa. President: W.J. Morse, Washington, D.C. Secretary: C.L. Meharry, Attica, Indiana.

6th annual meeting. Sept. 1-3, 1925, Washington, DC. President: W.J. Morse. Secretary: C.L. Meharry. 7th. Aug. 10-12, 1925, Stoneville, Clarksdale, and Greenville, Mississippi. President: W.E. Ayres, Stoneville, Mississippi. Secretary: C.L. Meharry. 8th. Aug. 9-11, 1927, Belhaven, Washington, and Elizabeth City, North Carolina. President: F.P. Latham, Belhaven, North Carolina. Secretary: W.E. Ayres. 9th. Aug. 15-17, 1928, Camden and Lafayette, Indiana. President: Taylor Fouts. Secretary: W.E. Ayres. 10th. Aug. 22-24, 1929, Guelph, Ontario, Canada. President: G.I. Christie, Guelph, Canada. Secretary: J.B. Edmondson.

11th annual meeting. Sept. 10-12, 1930. Urbana, Illinois. President: W.L. Burlison, Urbana, Illinois. Secretary: J.B. Edmondson. 12th. Aug. 17-18, 1931, Columbia, Missouri. President: W.C. Etheridge, Columbia, Missouri. Secretary: W.L. Burlison. 13th. Sept. 2-3, 1932, Washington D.C. President: W.J. Morse. Secretary: J.B. Park. 14th. Aug. 3-5, 1933, Baton Rouge and Houma, Louisiana. President: John Gray, Baton Rouge, Louisiana. Secretary: W.E. Ayres. 15th. Aug. 22-24, 1934, Little Rock and Stuttgart and Marianna, Arkansas [Jacob Hartz of Stuttgart spoke]. President: C.K. McClelland, Fayetteville, Arkansas. Secretary: P.A. Webber.

16th annual meeting. Aug. 22-24, 1935, Evansville and Lafayette, Indiana. President: K.E. Beeson, Lafayette, Indiana. Secretary: P.A. Webber. 17th. Sept. 14-16, 1936, Ames and Cedar Rapids and Hudson, Iowa. President: E.C. Dyas, Ames, Iowa. Secretary: K.E. Beeson. 18th. Sept. 14-16, 1937, Urbana, Illinois. President: J.C. Hackleman, Urbana, Illinois. Secretary: K.E. Beeson. 19th. Sept. 12-14, 1938, Columbus and Wooster, Ohio. President: J.B. Park, Columbus, Ohio. Secretary: K.E. Beeson. 20th. Sept. 11-12, 1939, Madison, Wisconsin. President: G.G. McIlroy, Irwin, Ohio. Secretary: J.B. Edmondson.

21st annual meeting. Aug. 18-20, 1940, Dearborn, Michigan [Hosted by Henry Ford]. President: G.G. McIlroy. Secretary: J.B. Edmondson. 22nd. Sept. 12-13, 1941, Ames and Des Moines, Iowa. President: G.G. McIlroy. Secretary: J.B. Edmondson. 23rd. Sept. 15-17, 1942, Lafayette, Indiana. President: D.G. Wing, Mechanicsburg, Ohio. Secretary: G.M. Strayer. 24th. Sept. 5-7, 1943, Cedar Rapids, Iowa. President: D.G. Wing. Secretary: G.M. Strayer. 25th. Sept. 12-13, 1944, Urbana, Illinois. President: J.E. Johnson, Champaign, Illinois. Secretary: G.M. Strayer.

1028. *Unknown newspaper.* 1944. W.J. Morse's work with soy beans told: Lewis County native called father of soy bean industry in America. Aug. 25.

1029. *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.

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.

1030. Morse, William J.; Cartter, Jackson L.; Henson, Paul R.; Carr, Robert B. comps. 1944. Results of the Cooperative Uniform Soybean Tests: Part II. Southern States–1943. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 122. Aug. 120 p. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/43soybook.pdf
• ***Summary:*** This entire document, including the cover, is typewritten.

At the top of the title page is written:

"U.S. Regional Soybean Laboratory

U. S. REGIONAL SOYBEAN LABORATORY
Urbana, Illinois

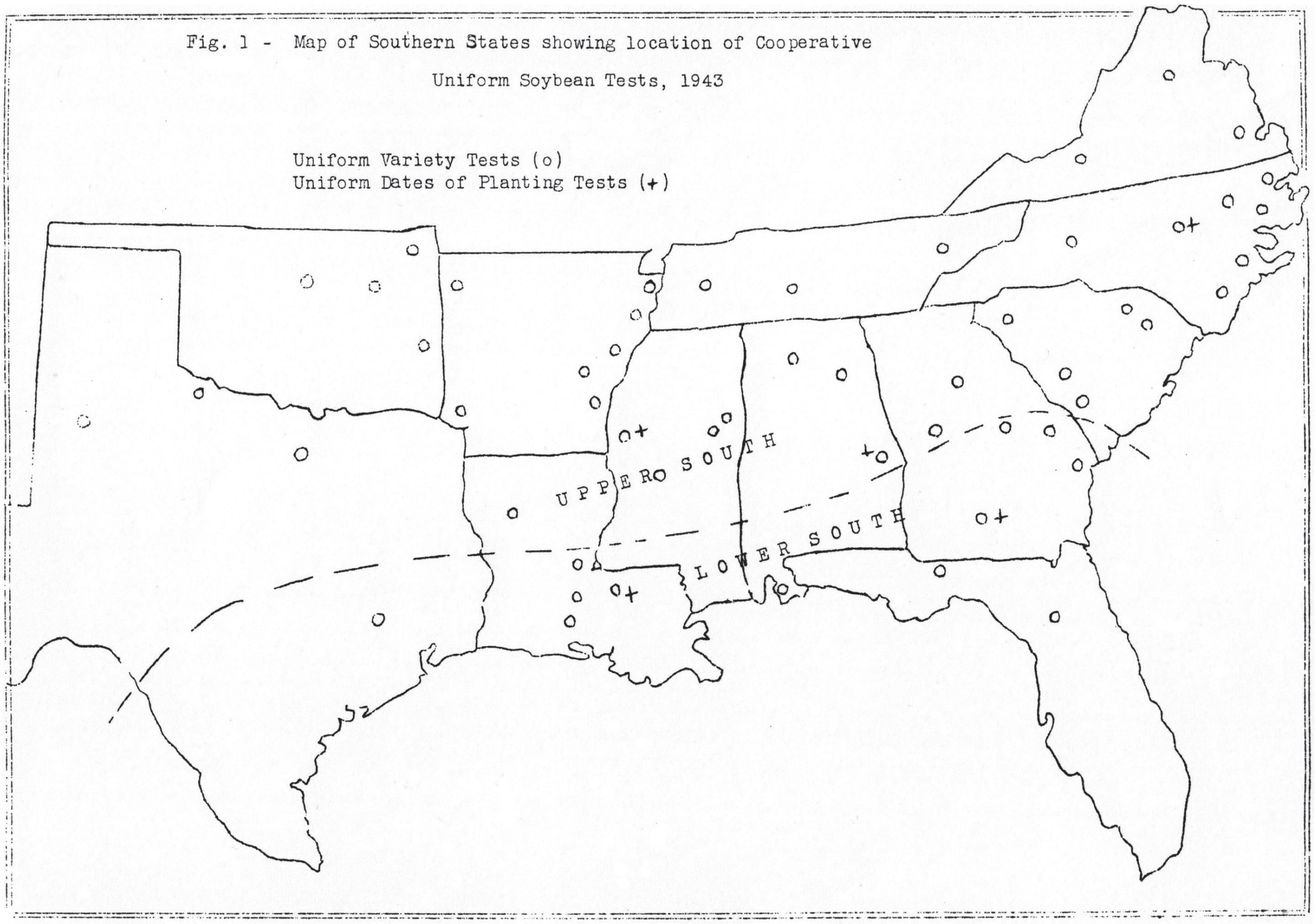
RESULTS OF THE COOPERATIVE UNIFORM SOYBEAN TESTS, 1943

PART II. SOUTHERN STATES
Hdqrs: Stoneville, Mississippi

* * *

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF PLANT INDUSTRY,
SOILS, AND AGRICULTURAL ENGINEERING,
DIVISION OF FORAGE CROPS AND DISEASES
cooperating with
STATE AGRICULTURAL EXPERIMENT STATIONS

August, 1944.
RSLM 122



"Urbana, Illinois."

Below the title is written:

"United States Department of Agriculture

"Agricultural Research Administration

"Bureau of Plant Industry, Soils, and Agricultural Engineering

"Division of Forage Crops and Diseases

"cooperating with

"State Agricultural Experiment Stations.

"August, 1944

RSLM 122.

Contents: Introduction. Cooperation. Location of uniform tests. Map of southern region. Methods. Uniform Test, Group IV. Uniform Test, Group V, Upper South. Uniform Test, Group V. Lower South. Uniform Test, Group VI, Upper South. Uniform Test, Group VI. Lower South. Uniform dates of planting tests.

"Introduction: The increased demand for vegetable oils because of wartime needs resulted in the expansion of the program of the U.S. Regional Soybean Laboratory at Urbana, Illinois, to include 12 Southern States. The states comprising the southern section are Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. Headquarters for the southern section are located at the Delta Experiment Station, Stoneville, Mississippi.

"The most important objective of the Regional program is the development of superior varieties of soybeans for industrial purposes for the South. An essential part of this objective is the evaluation of existing southern strains and varieties of soybeans in Uniform Variety Tests. Since 1936, the Regional Soybean Laboratory has been conducting tests composed of groups of varieties and strains of soybeans classified according to maturity in the North Central States. At the time of the inauguration of the southern program, four such uniform variety groups were being tested. The Uniform Variety Test, Group I, contains the short season varieties adapted to the northern tier of states in the North Central Region. The seasonal requirements of Group II, III, and IV, are progressively longer. In keeping with this classification, the southern soybean varieties were tentatively divided into two Uniform Variety Tests, Groups V and VI.

The Uniform Variety Test, Group V, includes varieties which normally mature in late September and early October over much of the South. Group VI contains the later maturing strains. The varieties, Arksoy, Ralsoy, Ogden, and others are typical of the maturity of Group V, while Mammoth Yellow, Mamloxi, and Biloxi are typical strains

of Group VI. In addition to these two Uniform Variety Tests, Group IV composed of varieties of the approximate maturity of Macoupin, were grown at a number of locations in the northern and northwestern part of this region.

"In addition to the Uniform Variety Tests, five Dates of Planting Tests were conducted at various points over the South. It is important to know the effect of date of planting not only on yield of soybeans, but also on the chemical composition of the seed. Relatively wide differences in the chemical composition and yield due to variations in rainfall, temperature, and time of planting, have been reported in the North Central States. The long growing season in the South coupled with the wide variations in rainfall and temperature in different sections of the 12 Southern States are factors which must be fully evaluated in order to successfully expand the production of soybeans in the South.

"Average results, both agronomic and chemical, of the Uniform Variety Tests, Groups IV, V, and VI, and the Dates of Planting Tests for the 1943 season are herein reported. The location of the Uniform Variety and Dates of Planting Tests are shown in Figure 1."

Page 3: Cooperating agencies and personnel for the Southern States, begins:

"Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Forage Crops and Diseases: William J. Morse, Jackson L. Cartter, Paul R. Henson, Robert B. Carr, C. Roy Adair, Edgar E. Hartwig, George E. Ritchey, S.L. Stephens, T.F. Akers, T.L. Moore, and E. E. McGee.

"Alabama Agricultural Experiment Station Agronomy Department: H.R. Albrecht

"Arkansas Agricultural Experiment Station Agronomy Department: C.K. McClelland

"Florida Agricultural Experiment Station Agronomy Department: George E. Ritchey

"Georgia Agricultural Experiment Station Agronomy Department: U.R. Gore Louisiana Agricultural Experiment Station Agronomy Department: J.P. Gray

Pages 4-5: Location of cooperative nurseries and cooperators.

Page 6: Map of southern states (divided by a curving line into Upper South and Lower South) showing location of cooperative uniform tests, 1943, A small circle indicates Uniform variety tests. A + indicates Uniform dates of planting tests.

Page 7: Methods: Tells how the following are measured: Yields. Chemical composition. Lodging. Shattering. Height (of plants). Maturity. Seed quality (rated from 1 to 5). Statistical analysis (by analysis of variance).

Note: This is the earliest report seen (Jan. 2017) concerning the Results of the Cooperative Uniform Soybean Tests: Part II. Southern States. Address: 1. Principal Agronomist; 2. Senior Agronomist; 3. Agronomist; 4. Asst. Agronomist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S.D.A.

1031. American Soybean Association, Silver Jubilee Meeting, Urbana, Illinois (Photograph). 1944. Sept. 12-13.
• ***Summary:*** Back row–left to right: C.K. McClelland (Arkansas). Jacob Hartz (Arkansas). R.G. Wiggans (Cornell Univ., New York). K.E. Beeson (Indiana). David Wing (Ohio). W.E. Riegel (Illinois).

Front row–left to right: S.B. Edmondston, Indiana. John T. Smith (Illinois). Taylor Fouts (Indiana). W.J. Morse (USDA, Washington, D.C.). George Briggs (Wisconsin). J.C. Hackleman (Illinois).

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1032. Borman, Ed. 1944. ASA speaker asks elimination of... ["mature economy theorists"?]: Sees no reason for lengthy depression. *News-Gazette* (*Urbana, Illinois*). Sept. 13.
• ***Summary:*** Photos show: (1) "Soybean pioneers honored: Three Champaign county farmers were among the pioneers honored Tuesday night at the American Soybean Association's "Silver Jubilee" for their part in developing soybeans into a major farm crop. Left to right are: A.E. Burwash, Champaign; W.E. Riegel, Tolono; W.J. Morse, USDA scientist who introduced one of the first successful soybean varieties from Asia; and John T. Smith, Tolono. (2) "'First' grower still active: On most farms cultivation of soybeans was started not more than 25 years ago [i.e. in about 1919], but Frank Hurrelbrink, Taylorville, second from right, first grew the then strange crop in 1904. Today he is still an active producer. Left to right are Farm Adviser C.S. Love, Taylorville; Frank Garwood, Stonington, who operated the first combine; Hurrelbrink; and Professor J.C. Hackleman of the University of Illinois agronomy department, one of the leaders who helped plan the conference on the campus. Address: Staff writer.

1033. *News-Gazette* (*Urbana, Illinois*). 1944. Iowan named successor to J.E. Johnson. Sept. 13.
• ***Summary:*** Howard Roach (of Plainfield, Iowa), will succeed J.E. Johnson (Champaign, Illinois) as president of the American Soybean Association, after being unanimously elected at the annual business meeting of the ASA held late Wednesday morning in the University of Illinois Auditorium.

1034. *Unknown newspaper.* 1944. Bean pioneers are cited in meeting here. Sept. 13.
• ***Summary:*** Contents: Introduction. Veterans honored. 'Enemies of freedom.' Assails crop controls.

1035. *Lowville Leader.* 1944. How the Corn Belt struck oil and created a new industry. Sept. 21.
• ***Summary:*** This article is an exact reprint of an article with a similar title published in the Aug. 1944 issue of *Country Gentleman* (p. 20).

1036. Ostrander, W.A. 1944. It's fun to remember [the birth of the American Soybean Assoc.]. *Soybean Digest.* Sept. p. 16-17.
• ***Summary:*** One of the best early histories of the A.S.A. It all began on the Fouts Bros. farms near Camden, Indiana. The author, now a farm manager, was formerly a member of the Purdue University faculty. He was one of the founding spirits of ASA and served as its secretary for the first four years. "The American Soybean Association grew out of the soybean campaign that was started in 1920 in Indiana because we needed a larger acreage of legumes in the cornbelt rotation. Clover was failing us possibly because of soil acidity, its biennial growth, or things we didn't know anything about. Soybeans looked like an answer."

"It was in the fall of 1920 that we in Indiana decided to have a sort of statewide get-together to see where we stood on the soybean situation, appraise what we had, and outline where we were going. We had had county soybean field meetings over the entire state and it seemed right that we hold a big get-together to finish it up. As we worked out the plan for this meeting it occurred to us that a good neighbor policy would be to invite the growers and experiment station men from our surrounding states to join us. Start it off with a bang. So out of that which started to be a state meeting was a Cornbelt meeting and out of it the American Soybean Association. All this on the Fouts Bros. farms near Camden, Indiana. Our idea was to take the soybeans to the farmer and the farmer to the fields of soybeans in his country. Conversion on the ground.

"The response to this meeting was away above what A.L. Hodgson, County Agricultural Agent of Carroll County, and I had any reason to expect. Illinois, Ohio, Michigan, Wisconsin, and Kentucky sent growers, county agents and men from the experiment stations. Over a thousand came. We fed them well. The start was made.

"All speeches were limited to three minutes; it shut off some of the long-winded folks but it gave all a chance.

"G.I. Christie reported for Indiana. He said we had 200,000 acres and thought he had the record stopped and I guess it was for the day. No one dared to go higher, but this year it is just 10 times that amount, 2 million acres. In those days we counted every acre that had a bean on it, in the corn, for hay and for seed.

"W.L. Burlison of Illinois said there were 25,000 acres in his state and more in sight. He was right. Last year they had 4 million acres.

"George Briggs was modest in reporting 4,000 acres for Wisconsin and he still is modest for they had 115,000 acres there last year.

"Wallace Hanger of Ohio surmised that Ohio had 15,000 acres and there the acreage is now 1,500,000.

"Iowa reported 50,000 acres and now has 2,200,000 acres and still going strong.

C.R. McGee [Megee] of Michigan said they were just getting going with 5,000 acres but they now have 150,000 acres."

"After visiting the soybean fields on the three Fouts Bros. farms, eating soybeans and talking our heads off and making many new friends, it was decided to hold a winter

meeting at the time of the International Hay & Grain Show at Chicago, to keep the iron hot and to carry on. The first meeting was held on the bridge connecting the two exhibit rooms as we were not considered important or big enough to rate a room. Each year our numbers grew until we had to have the largest room they had. At these winter meetings we hashed over the latest soybean findings, worked on standards for the grading of the crop, talked over certification rules and always as a final job selected the state in which was to be held the summer meeting. Each year it was to be a different state.

"Our first big problems were better varieties, methods or harvesting, and the utilization of the crop.

"Just by a lucky break we brought the Manchu down from Michigan and this was our first unintentional success, a bean that was a 'natural' for the Cornbelt at that time. It did well most anywhere for hay or grain and did not shatter as did those we had. We were growing largely the old so-called Hollybrook (the Association changed its name to the Midwest) and the Ito San was our early variety. Our big headache was the harvesting of the crop... A combine seemed to be the answer.

"Then came the utilization of the crop. Up to 1920 we had been using all soybeans produced in the Cornbelt for seed, for hay, hogging off and seed again. It was not a grain crop yet. We went to the oil extraction companies and they said sure we will put in additional machinery to take care of them as soon as you have the quantity to make it worth while. Back to the farmers we went but they came right back and said sure we will put in more acreage and glad to as soon as we are certain we can get rid of the crop at a fair price. So–there we were. It is too long a tale to tell all that came and went until the oil plant at Chicago Heights was taking all beans offered. It was the old hydraulic system and it worked fairly well. The late Russel East and I got the corn starch plant at Edinboro, Indiana, to try some beans through their Anderson Expellers. It worked. It wasn't long then before Bloomington, Monticello, and Taylorville, Illinois, had plants and that chapter was ended.

"It had not been hard to sell the idea to our farmers that they were wise to grow their own protein feed. That was a natural. When we fed the soybeans alone as a supplement the oil in the beans gave us soft pork and that was a black eye for a few years but now that, too, has been eliminated.

"Where we fell down the worst, as I see it now, was that we did not stress the human food side stronger. We talked about it enough but got nowhere. The principal reason, I believe, was in our shortsightedness in not dropping the word 'bean' and just using the word 'soy.' Let's give away half of the name after we work on the grain and open up the road to unlimited food uses of this best of all protein grains raised on our farms.

"Many still with us: One of the fine things as we look back over the past 25 years is that so many of the boys that were with us at that first meeting are still going strong for soys. I don't believe the old mainspring, W.J. Morse of the U.S. Department of Agriculture, has missed a single meeting, at least not of his own volition. Probably the ones we miss most are the two Fouts Bros., Noah and Finis, Charles Meharry and Dean J.H. Skinner. They were always on hand. You can not meet Burlison, Hackleman or Bill Riegel of Illinois without talking soybeans. George Briggs of Wisconsin is still his old soybean story self.

"Helms of Missouri, McGee [Megee] of Michigan, and Hanger of Ohio still talk of that first meeting under the trees on the Fouts farm. Hughes of Iowa is as strong as ever for the beans and Christie, while he has been gone to Canada, this some time, can still tell a tall soybean story. Our own A.T. Wiancko here in Indiana, who guided us so well from behind the scenes, is still the active pusher for soys that he always was.

"We have been making soybean history in the Association for the past 25 years. If we can go on as much farther in the next 25 years–soybean history will have been made."

Photos show: (1) "The birthplace of the A.S.A." The three Fouts brothers, Taylor, Finis, and Noah (from left to right, each wearing a hat, coat, and tie) standing in front of a barn on which is written "Soyland–Taylor Fouts," at the first meeting of the ASA, September 1920. (2) "1,000 at first meeting." The top half of this photo shows hundreds of attendees seated on the grass under trees in the yard at Soyland listening to a speech. "Attendance was far beyond that expected, with representatives from many states." The bottom half shows 25-30 mean and women standing in a soybean field at Soyland. Address: Lafayette, Indiana.

1037. Pieters, Mary Burr. 1944. Bill Morse–Soybean daddy. *Soybean Digest.* Sept. p. 14.

• ***Summary:*** The editor's introduction begins: "Dr. W.J. Morse has been called the daddy of soybean growing in the United States. And rightly, for he more than any other man living is responsible for the tremendous soybean industry."

"Grasses and legumes, their improvement, development, and utilization are the primary interests of the Division of Forage Crops and Diseases. Any grass or any legume that offers promise anywhere in this country is studied and considered and out of this study and consideration has come some most extraordinary results; results that have enriched a nation and agriculture. We have some favorite stories of our accomplishments that we like to tell. For example we like to tell our story of soybeans and of the man who did the job–a job that enriched the nation by well over half a billion dollars in 1942.

"Soybeans were first mentioned in American literature by Mease in 1804 who writes, 'The soybean bears the climate of Pennsylvania very well. The bean ought to be cultivated.' But the first real impetus that the crop got in the

United States was not until over a hundred years later when a man of great vision and drive–the late Charles V. Piper, then in charge of the division, saw the possibilities and needs for the soybean in this country. He went further–he knew the man to promote the crop, picked him and put him to work. That was in 1907. The man was and is William J. Morse. Morse, just out of Cornell [Univ., Ithaca, New York], had the enthusiasm and adaptability of youth, and Piper spurred him on. Dr. Piper died in 1926 and then Morse was on his own. Being 'on one's own' in the Division of Forage Crops and Diseases has special meaning. The men who have directed the affairs of this division have happily been endowed with a fine sense of understanding and a gift for cooperation and have extended to each man under their supervision an opportunity to go the limit on any piece of work he had undertaken. Morse took full advantage of this opportunity and what he has done with soybeans between 1926 and 1943 sounds much more like fiction than hard facts, facts that are being translated with telling effects toward feeding a nation and winning a war.

"Morse put every other scientific consideration and ambition and every other hobby out of his mind and fixed his gaze on soybeans. He studied, he traveled, he toiled, he experimented–he exhorted–and the result of all this single-mindedness of purpose and devotion surely borders on the fantastic. A crop that had been the mainstay of Oriental peoples for centuries got its roots deep into the good soil of the Cornbelt and the not-so-good soil of the Cottonbelt states and liked it.

Not all varieties liked all locations nor suited all needs. Morse went back to Manchuria, China, to Japan, or wherever he thought what he wanted was to be found, brought it back, set to work studying and developing and pretty soon, just what was needed for a given location or need was available. The conditions under which this crop will grow and the uses to which it may be put have reached astronomical figures and its potentialities have not yet been exhausted, not by a long way. It supplies good and abundant food for all sorts of livestock, and being a legume it adds nitrogen to the soil; its seed is abundantly and inexpensively produced and yields high quality oil; it is a component of almost all of the new industrial plastic products; it is an admixture of many foods and an ally to the nation's health. At Urbana, Illinois, a Regional Soybean Laboratory has been established as a center for soybean improvement and production in this country with Mr. Morse as project leader.

"Modest and retiring, but sure and right as rain Morse goes right on digging deep into his experience and resources, pulling new rabbits out of his hat with each new product placed on the market, with each new record rolled up. He is the author with Dr. Piper of *The Soybean,* published by. McGraw-Hill in 1923, and of many Department of Agriculture bulletins and scientific papers. He was the president of the American Soybean Association in 1924.

"Editor's note: Dr. Morse might be called daddy of the American Soybean Association as well as of the soybean in America, since our organization has probably leaned on him more than any other man through the years. He has always been a guiding light and has missed few, if any meetings [Note: He missed two, in 1929 and 1930, while in East Asia studying soybeans]. It is doubtful if anyone else can equal this record."

Photos show: (1) William Morse standing in front of a many floor-to-ceiling shelves filled with soy products (for details see 1936 photo). (2) Dr. Charles V. Piper (small portrait), with the caption: "He pushed Morse into soybeans." Address: Div. of Forage Crops and Diseases, Beltsville, Maryland.

1038. *Soybean Digest.* 1944. Pioneers recognized: Fouts, Ostrander, Meharry, Hurrelbrink, Burlison, Morse, Christie, Wilkins. Sept. p. 19.

• ***Summary:*** "Some pioneers whose work contributed materially to the rise of the soybean in America were given recognition on behalf of the Association by J.C. Hackleman, University of Illinois extension agronomist, at the Tuesday evening meeting of the Silver Jubilee. They included:"

Taylor Fouts, W.A. Ostrander, Chas. Meharry, Frank Hurrelbrink, Dr. W.L. Burlison, W.J. Morse, G.I. Christie, and F.S. Wilkins.

Taylor Fouts (Camden, Indiana) was the first president of the American Soybean Association. He was one of the most enthusiastic soybean producers and a farmer with vision.

W.A. Ostrander (Lafayette, Indiana) was the first secretary of the American Soybean Association. "Then the extension agronomist at Purdue University, he worked very closely with Fouts in preparing the first meeting [in Sept. 1920 at the Fouts farm, Soyland, in Indiana].

"The late Chas. L. Meharry (Tolono, Illinois), truly one of the pioneers of both Indiana and Illinois. He grew soybeans as early as 1908, and when he announced his intention of growing 19 acres in 1909, his farm manager, C.H. Oathout, asked, 'What in the world are you going to do with that many acres of soybeans?' Mr. Meharry helped

pioneer the combine for harvesting soybeans. He assisted with the work of the Association for years, acting as secretary and as a member of the board of directors. He was largely responsible for the design of the Association emblem."

Frank Hurrelbrink, a farmer from Taylorville, Illinois, "began growing soybeans in 1904 and has grown them ever since. Obtaining seed from the University of Illinois, he set out to develop his own variety, seeking a bean that would stand well, resist shattering and could be left in the corn field until the livestock could harvest the seed from the standing plants. This he did. The Hurrelbrink soybean is still grown and in demand.

"Dr. W.L. Burlison, chief of the Agronomy Department of the University of Illinois, unable to attend the Jubilee because of illness although the program was largely of his planning. He has been actively interested in the crop since his association with the department. He led a coordinated study at Illinois is search of commercial outlets for soy products and had influence in obtaining a special federal laboratory for the study of the commercial uses of soybeans.

"W.J. Morse, U.S.D.A. Bureau of Plant Industry agronomist, dean of all soybean enthusiasts. The regional laboratories are in no small part the result of his unceasing efforts."

G.I. Christie of Guelph, Canada, a former Purdue University agronomist, was president of the American Soybean Association in 1929. Now president of the Ontario Agricultural College, he was formerly director of the Indiana Experiment Station and a booster for soybeans.

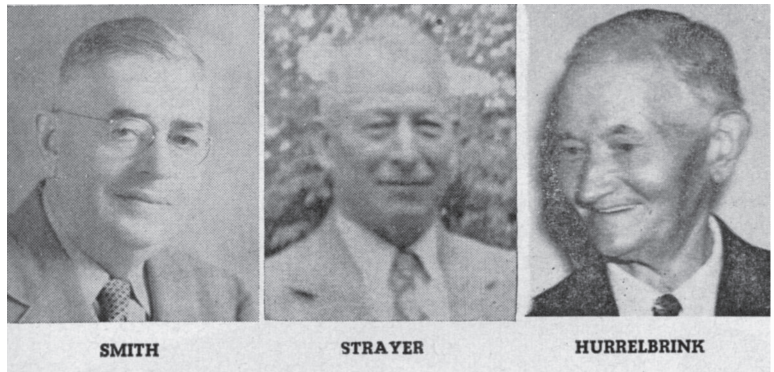
The late F.S. Wilkins of Ames, Iowa, was leader of the soybean project at Iowa State College until his death in 1936. He picked the Mukden soybean variety, the most widely grown of Iowa's varieties, from the thousands of selections under his supervision. "A most enthusiastic scientist."

Photos show: (1) A.E. Burwash (Champaign, Illinois), W.E. Riegel and J.T. Smith (Tolono, Illinois), and W.J. Morse (USDA). (2) Chas. Meharry (Tolono, Illinois).

Note: This is one of two articles published in 1944 which appear to be the forerunners of the concept of "honorary life members" in the American Soybean Association.–which began in Sept. 1946.

1039. *Soybean Digest.* 1944. Pioneers: [John T.] Smith, [Bert S.] Strayer, [Frank] Hurrelbrink. Nov. p. 9.

• ***Summary:*** These "three pioneers, two of them [Smith and Hurrelbrink] still living, blazed early trails for soybeans in Illinois and Iowa.



"Frank Hurrelbrink of Taylorville, Christian County, Illinois, saw a few varieties of soybeans growing on the Illinois University farm in the fall of 1903, and asked for a small amount of seed of each of several varieties. He grew these the following year and has been producing soybeans annually since that date. Mr. Hurrelbrink soon had a definite idea as to what he wanted in a good variety–one that would stand well, resist shattering and one that could be left in the cornfield until the livestock could harvest the seed from the standing plants. So he developed the Hurrelbrink soybean which is still being grown and is still in demand."

John T. Smith, who lives in Champaign County, Illinois, grew his first soybeans in 1908, when he procured a bushel of seed each of two varieties from Dr. [sic, Mr.] W.J. Morse of the USDA. The following year he obtained seed from Charles Meharry.

"In 1921, John T., with Frank Barton and J.E. Johnson, past president of the American Soybean Association, took the lead in inducing farmers in that part of Illinois to standardize on a new strain of so-called black hilum Manchu. He took 59 of the original 80 bushels of this seed and increased it on his farm.

"In 1924, he held a soybean harvesting demonstration on his farm, with everything from the old reap hook, through the cradle, flail, mower, self rake, binder and finally the modern combine being shown. Since that day John T. has harvested his soybeans with a combine, and his farm served as a laboratory for at least one farm machinery manufacturer for several years.

"Mr. Smith and Mr. Hurrelbrink are still active members of the American Soybean Association."

"B.S. Strayer grew his first soybeans on his farm at Hudson, Iowa, in 1912, and probably was the first to grow them in the Midwest west of the Mississippi. He obtained seed of the Columbia variety, a large yellow bean from South Carolina. This he planted for three years and secured not a single mature soybean during that time. He was about to give it up as a bad job when he secured some seed of the Blackeye [sic, Black Eyebrow] soybeans. These, as a final trial, he planted with popcorn–and got a bumper crop of corn and beans [in 1915]. Soybeans have been grown every year since at the Strayer Seed Farms for the past 20 years commercially. Bert took his son, George, now editor of *The Soybean Digest,* into partnership with him, and later his other son, Gordon. So the Strayers have been Iowa pioneers and leaders in growing this crop from the beginning. Since 1935 U.S. Department of Agriculture soybean test plots have been

located on the Strayer farm. Mr. Strayer died in 1941."

Note from Dennis Strayer (June 1999): Bert S. Strayer was born in 1880 on a farm in Black Hawk County, Iowa. He married Velma Martin, who was born in 1888 in Webster City, Iowa. They had three children, all born on their farm in Black Hawk County, Iowa: George M. Strayer (1910-1981), R. Gordon Strayer (1912-1998), and Virginia Strayer (1919-). "Bert (legally shortened from Robert) was an innovative farmer in Black Hawk county, Iowa. He started a seed business at the urging of neighbors in 1904. He was an early soybean grower in 1912 and had one of the first combines in Iowa. The business began production of specialty soybeans, sometimes referred to as 'edible' or 'vegetable' soybeans, in 1936. Some of the specialty production was contracted to the government during World War II. Velma, Bert's wife, was active in the business of Strayer Seed Farms and Strayer Farms. Early business records indicate that she was keeping the books during the 1940s, following Bert's death. Velma Martin Strayer died in 1982.

Small portrait photos show Smith, Strayer, and Hurrelbrink.

Note 1. This is one of two articles published in 1944 which appear to be the forerunners of the concept of "honorary life members" in the American Soybean Association–which began in Sept. 1946.

Note 2. Concerning Bert Strayer: The Columbia soybean variety was first available in the USA by Dec. 1910, and the Black Eyebrow variety by May 1915. Strayer was definitely not the first person to grow soybeans in the Midwest west of the Mississippi River; soybeans were first cultivated in Iowa in 1852, in Missouri and in Arkansas in 1855, in Kansas in 1889, in Nebraska in 1898, and in Minnesota in 1900.

1040. Morse, W.J. 1944. Versatile soybean. *Nature Magazine* 37:551. Dec. *
Address: USDA, Washington, DC.

1041. Cattell, Jaques. ed. 1944. American men of science: A biographical dictionary. 7th ed. Lancaster, Pennsylvania: The Science Press. vi + 2033 p.
• ***Summary:*** Among the 34,000 names, contains entries (each 1-2 column inches) for the following scientists working with soybeans: Jackson Leaphart Cartter (p. 288). Prof. William Leonidas Burlison (p. 250). William Joseph Morse (p. 1261; He resides at 6809 Fifth St., N.W., Washington, DC). Prof. Clyde Melvin Woodworth (p. 1979).

Jaques Cattell lived 1904-1960.

1042. 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 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.

1043. Miller, Harry W. 1944. The story of milk from the soya bean (Continued–Document part V). Mount Vernon, Ohio: International Nutrition Laboratory. 37 p. See p. 23-30.

• ***Summary:*** (Continued): "Unfortunately, the war that broke out in Shanghai on August 13, 1937, put an end to this illustrious beginning of making a soya milk with the vegetable cow. The sales returns were just beginning to equal the cost of operation. As a consequence of the war, the fire and bombing destroyed more than a hundred thousand dollars, national currency, worth of property and equipment. However much valuable experience had been gained during this time through the feeding of infants and children and the dieting of special disease conditions. The results of this experience were published in the *China Medical Journal,* 1937. These results showed that soy bean milk was second only to mothers milk in the feeding of infants and children and has no equal in dieting cases of stomach acidity and other intestinal complaints. The high biologic value of its protein, the ease of its digestion and ready absorption, when combined with dextrose and maltose, yielded a food of tremendous value to the people of the Orient where the soy bean is indigenous. This brief experiment in conducting a soy bean dairy left a contribution far exceeding the losses sustained by fire and the bombs. For two years we had to turn largely aside from food manufacture. We were busy establishing and organizing a sanitarium at Hankow, China, known as the Wuhan Sanitarium and Hospital. This large institution was extensively used for the care of sick refugees and disabled and wounded soldiers up till October 25, 1938, when the Japanese army forces entered the Wuhan area. Three months later I, with a group of four other Americans, being among the first to evacuate from Central China, were granted transportation on a Japanese transport to Shanghai.

"The Role of the International Nutrition Laboratory in America: Back in America, my first thoughts were how most advantageously to follow up our food research work and lay hold upon the wealth of nutritional advance and the knowledge of food processing in the U.S.A. in perfecting processes developed in China. The need of the peoples of the Orient was uppermost in our mind and protein direct from vegetation seemed their only way out for adequate nutrition, the soy bean naturally being that source. We, therefore, secured land and erected a suitable building on a farm at the suburbs of Mt. Vernon, Ohio, as this was in the soy bean growing belt.

"No sooner did we start the foundation of the building than we began also to fabricate the equipment for carrying forward the processes already worked out for the manufacture of soya milk and subsidiary food products from the soy bean according to our more recent research. The farm gave me opportunity to grow several types of the edible soy beans. The edible soy beans differ widely from the field type beans grown so extensively in the United States. The field varieties are raised for hay or for ripened beans to be used by the oil refiners, the residual bean cake is sold for stock feed. A small part of the bean crop is used for flour. The edible beans are those varieties that are better flavored, easier to cook, make better flour and are such as can be shelled in the immature state for green pack tinned beans. There is as much difference in foods made from the edible beans and those made from the field soy beans as in the taste and quality of sweet corn and that of field corn. There are two belts in America for producing soy beans. Some varieties of soy beans mature in from 90 to 120 days and are suitable for planting in the northern belt which includes the states of Ohio, Indiana, Illinois, Michigan, Wisconsin and Iowa, and the beans requiring over 120 days to mature are grown in the southern belt including the states of North and South Carolina, Georgia, Arkansas, Texas and Missouri.

"Out of fourteen varieties of the edible beans planted on our farm, four outstanding varieties were selected, namely, Bansei, Aoda, Funk's Delicious and Hokkaido. These four mentioned in the order of their value were found best for green pack canning, also made the best quality flour and milk, and were found best for processing for other foods. From our southern soy bean station located in North Carolina, there were three varieties, namely, Rokusun, Tokyo and Woods Yellow, named in the order of their value for food processing, A very unique feature of our farm experiment work was the shelling of green soy beans, with the use of a Viner obtained from the Scott Viner Company of Columbus [Ohio]. Some 40,000 cases of these delicious beans were put up this season (1943). A single unit of these Viners is capable of shelling five tons of green beans in one day.

"Because of the limited production in America of these fine vegetable types of soy beans, we readily saw that we would have to run, as an important adjunct of the laboratory, a seed department, and an extensive agricultural program in raising this type of beans, and our methods in these lines have been perfected to overcome shattering, uneven ripening and other heretofore drawbacks to the raising of these splendid beans. We now have under cultivation annually several hundred acres of these large delicious edible soyas for green bean canning and for milk processing.

"Our factory, a newly built brick structure, lined with enameled tile, was completed in the autumn of 1939 and contains laboratory space, test kitchen space where soy milk and soy products are under continual tests for their combining properties in tasty recipes. This modern food factory has three large boilers for supplying steam pressure for processing, and contains specially constructed stainless steel cookers, vacuum pans, spray dryer, iron cow (homogenizer), grinder, centrifuges, sterilizers and other processing machinery. This is our first model plant where we have arranged the machinery in series so that the hydrated beans start at one end of the factory and come out a dehydrated complete milk powder at the other end, all ready for tinning in sanitary cans, and shipping.

"Nothing is perhaps more spectacular than to watch this milky bean juice being converted into a palatable, readily digestible milk, containing all the food essentials, with

minerals and vitamins added and flowing from the iron cow in quantities as much as is often secured from the aggregate milkings of several hundreds of cows. It is truly a wonder, a colloid milk, bacteria free, being made in a sanitary laboratory.

"The splendid tasting and readily soluble powdered milk as it is now produced at the International Nutrition Laboratory came about only as a result of much effort and time in making many improvements and alterations of equipment from week to week. Dr. Weisner, of Ohio State University, did much valuable research work on the bacteriology of soy milk, and we are indebted to Dr. W.J. Morse for supplying seeds and much valuable information, and to Dr. LeClerc, senior chemist of the Government Department of Agriculture, for check-ups that assisted us in the standardization of our products.

"We were fortunate in being able to develop this milk in the Orient with a background of the Chinese experience with soy bean foods for ages and also have the benefit of scientific and technical expert help in the United States through the frequent visits I made to this country, and I feel profoundly grateful for the services of many of the leading nutrition experts as also the laboratory and engineer help to be found in Government Bureaus at Washington [DC] and at the Ohio State University. For vitamin assays, I am indebted to Dr. Howard J. Cannon, Director of the Laboratory of Vitamin Technology at Chicago. In the Orient we also had able laboratory help, and the feeding work was under our own supervision in Shanghai Sanitarium Clinic, a 200-bed hospital conducting a very large maternity and children's department.

"Soy beans can be grown in almost any country of the world and are capable of many methods of preparation. In Oriental countries we need to improve the preparation of soy bean foods to make them more digestible. In the Occident we have readily at hand the processing vats to thoroughly cook the beans, but to go over big, they must be made readily available and also palatable. The International Nutrition Laboratory, as its name indicates has been established to thoroughly process the bean and at the same time make it palatable so that its use can be universal. In warm climates or frigid areas nothing is more easy of digestion than the colloid liquid, soya milk.

"On several occasions we have gone out to lecture and give demonstration to clubs and to the annual meetings of the American Soy Bean Association. We have observed the textiles, fabrics and plastics made from soy bean protein with great admiration. At one meeting, wool was shown made from the soy bean and at another a cap, necktie, and many other articles we use" (Continued). Address: Mt. Vernon, Ohio.

1044. W.J. Morse and USDA co-workers in the 1944 (or 1948) (Photographs). 1944.
• ***Summary:*** (1) 1944–Division of Forage Crops and Diseases, including Dr. O.S. [Olaf Sverre] Aamodt, Chief, seated on a set of front porch stairs in Beltsville, Maryland.

(2) 1944–Divisions of Cereal Crops and Forage Crops and Diseases, including Dr. O.S. Aamodt, Chief of Forage Crops, and Dr. M.A. McCall, Chief of Cereal Crops, standing on front porch stairs in Beltsville, Maryland.

(3) 1944 (or 1948)–Dr. Lew Allison (left), William Stuart (center) and W.J. Morse (right) on the site of soybean breeding experiments in Beltsville, Maryland.

(4) 1944 (or 1948)–Dr. Lew Allison and W.J. Morse in Beltsville, Maryland.

(5) 1944 (or 1948)–W.J. Morse in a hat, coat and tie in Beltsville.

(6) 1944 (or 1948)–W.J. Morse touching soybean plants in Beltsville.

(7) 1944 (or 1948)–W.J. Morse in soybean rows in Beltsville.

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).

1045. Brown, Bo. 1944? Do you realize we're the only things in this room not made from soy beans? (Cartoon). *Redbook.* Aug.

1046. 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.

1047. Hemphill, Josephine. 1945. Science and the soybean. Radio broadcast. Farm Science Serves the Nation No. 10. Timely Farm Topics 23a. USDA. Feb. 27. 4 p. transcript.
• ***Summary:*** Recorded 27 Feb. 1945 (Tuesday) by Ernest Moore and M.L. DuMars, Office of Information, USDA, Script by Josephine Hemphill. Time, without announcer's parts, 7 minutes and 35 seconds. Address: USA.

1048. Dorsett, P.H.; Morse, W.J. 1945. Soys in the Orient. *Soybean Digest.* April. p. 10-12. Text of a letter written July 1930.
• ***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.

1049. Morse, William J.; Cartter, J.L.; Probst, A.H.; Williams, L.F.; Saboe, L.C.; Heuskinveld, D.; Collins, F.I.; Kroeber, O.A.; Kalton, R.R.; Feaster, C.V.; Geeseman, G.E.; Lawrence, R.E. comps. 1945. Results of the Cooperative Uniform Soybean Tests, 1944: Part I. North Central States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 125. April. 95 p. Not for publication. https://www.ars.usda.gov/arsuserfiles/50200500/nust/1944%20nust.PDF
• ***Summary:*** Near bottom of title page: "United States Department of Agriculture. Agricultural Research Administration. Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Forage Crops and Diseases, cooperating with State Agricultural Experiment Stations."

Contents: Introduction. Cooperation. Location of Uniform Tests. Map of North Central region. Methods. Uniform Test, Group 0. Uniform Test, Group I. Uniform Test, Group II. Uniform Test, Group III. Uniform Test, Group IV. Preliminary Uniform Test, Group IV. Effect of location on composition.

The section titled "Cooperating agencies and personnel for the North Central Region" (p. 2-3) includes: Bureau of Plant Industry and Soils, and Agricultural Engineering (their Cooperators are the authors of this report). Illinois Agric. Exp. Station, Agronomy Dep.: W.L. Burlison and C.M. Woodworth. Iowa Agric. Exp. Station, Farm Crops Dep.: I.J. Johnson. Kansas Agric. Exp. Station, Agronomy Dep.: J.W. Zahnley. Michigan Agric. Exp. Station, Agronomy Dep.: Leyton V. Nelson. Minnesota Agric. Exp. Station, Agronomy Dep.: A.C. Arney, [Jean Lambert]. Missouri Agric. Exp. Station, Farm Crops Dep.: W.C. Etheridge, B.M. King. Nebraska Agric. Exp. Station, Agronomy Dep.: T.A. Kiesselbach. North Dakota Agric. Exp. Station, Agronomy Dep.: T.E. Stoa. Ohio Agric. Exp. Station, Agronomy Dep.: R.D. Lewis. Purdue Agric. Exp. Station [Indiana], Agronomy Dep.: G.H. Cutler. South Dakota Agric. Exp. Station, Agronomy Dep.: E.L. Erickson. Wisconsin Agric. Exp. Station, Agronomy Dep.: J.H. Torrie.

The map shows that the test sites range from Park River, North Dakota on the far northwest, to Thayer, Kansas on the far southwest, to Sikeston, Missouri on the far south, to Blacksburg, Virginia on the far southeast, to Strongsville, Ohio on the far northeast.

"The Group 0 Test (p. 7) consisted of twelve named varieties: Early White Eyebrow, Goldsoy, Kabott, Kagon, Mandarin (Ottawa), Minsoy, Montreal Manchu, Norsoy, Flambeau, Ontario (from New York), Pagoda, Wisconsin Mandarin. A table gives the source or originating agency, and origin of each.

"The Group I Test (p. 22) consisted of seven named varieties, two U.S.D.A. plant introductions, and seven selections from hybrids." A table shows the names and origins of these varieties. The named varieties are: Earlyana, Habaro, Manchukota, Mandarin (Ottawa), Ontario, Wis. Manchu 3, Wis. Manchu 606, F.C.31596 [F.C. = Forage Crops and Diseases, Bureau of Plant Industry].

Group II named varieties (p. 37) are: Dunfield, Earlyana, Harman, Illini, Lincoln, Mingo, Mukden, Richland, Wis. Manchu 3. Group III named varieties (p. 59) are: Chief, Dunfield, Illini, Lincoln, Patoka, Viking.

Group IV named varieties (p. 78) are: Boone, Chief, Gibson, Macoupin, Patoka.

Note: This is the earliest document seen (Sept. 2004) that mentions the soybean variety Harman. Address: 1. Principal Agronomist; 2. Senior Agronomist; 3. Associate Agronomist. All: Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA.

1050. June 30–Clinton P. Anderson (D), New Mexico, becomes U.S. Secretary of Agriculture under President Harry S. Truman (1945-1953) (Important event). 1945.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

1051. Morse, William J.; Cartter, Jackson L.; Henson, Paul R.; Carr, Robert B.; Bounds, Frances E. comps. 1945 Results of the Cooperative Uniform Soybean Tests: Part II. Southern States–1944. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 124? Aug. 135 p. https://www.ars.usda.gov/ARSUserFiles/60661000/UniformSoybeanTests/44soybook.pdf
• ***Summary:*** This document is typewritten. The title page is missing on the copy archived by USDA-ARS, so we are unable to give the valuable information it contains, especially the RSLM number and date the report was released. However we can infer the following from the reports before and after it.

At the top of the title page is written:

"U.S. Regional Soybean Laboratory

"Urbana, Illinois."

Below the title is written:

"United States Department of Agriculture

"Agricultural Research Administration

"Bureau of Plant Industry, Soils, and Agricultural Engineering

"Division of Forage Crops and Diseases

"cooperating with

"State Agricultural Experiment Stations.

Contents: Introduction. Cooperation. Location of uniform tests. Map of southern region. Methods. Uniform Test, Group IV. Uniform Test, Group V, Upper South. Uniform Test, Group V. Lower South. Uniform Test, Group VI, Upper South. Uniform Test, Group VI. Lower South.

Uniform dates of planting tests.

"Introduction: The increased demand for vegetable oils because of wartime needs resulted in the expansion of the program of the U.S. Regional Soybean Laboratory at Urbana, Illinois, to include 12 Southern States. The states comprising the southern section are Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. Headquarters for the southern section are located at the Delta Experiment Station, Stoneville, Mississippi.

"The most important objective of the Regional program is the development of superior varieties of soybeans for industrial purposes for the South. An essential part of this objective is the evaluation of existing southern strains and varieties of soybeans in Uniform Variety Tests. Since 1936, the Regional Soybean Laboratory has been conducting tests composed of groups of varieties and strains of soybeans classified according to maturity in the North Central States. At the time of the inauguration of the southern program, four such uniform variety groups were being tested. The Uniform Variety Test, Group I, contains the short season varieties adapted to the northern tier of states in the North Central Region. The seasonal requirements of Group II, III, and IV, are progressively longer. In keeping with this classification, the southern soybean varieties were tentatively divided into two Uniform Variety Tests, Groups V and VI.

The Uniform Variety Test, Group V, includes varieties which normally mature in late September and early October over much of the South. Group VI contains the later maturing strains. The varieties, Arksoy, Ralsoy, Ogden, and others are typical of the maturity of Group V, while Mammoth Yellow, Mamloxi, and Biloxi are typical strains of Group VI. In addition to these two Uniform Variety Tests, Group IV composed of varieties of the approximate maturity of Macoupin, were grown at a number of locations in the northern and northwestern part of this region.

"In addition to the Uniform Variety Tests, five Dates of Planting Tests were conducted at various points over the South. It is important to know the effect of date of planting not only on yield of soybeans, but also on the chemical composition of the seed. Relatively wide differences in the chemical composition and yield due to variations in rainfall, temperature, and time of planting, have been reported in the North Central States. The long growing season in the South coupled with the wide variations in rainfall and temperature in different sections of the 12 Southern States are factors which must be fully evaluated in order to successfully expand the production of soybeans in the South.

"Average results, both agronomic and chemical, of the Uniform Variety Tests, Groups IV, V, and VI, and the Dates of Planting Tests for the 1943 season are herein reported. The location of the Uniform Variety and Dates of Planting Tests are shown in Figure 1."

Page 3: Cooperating agencies and personnel for the Southern States, begins:

"Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Forage Crops and Diseases: William J. Morse, Jackson L. Cartter, Paul R. Henson, Robert B. Carr, C. Roy Adair, Edgar E. Hartwig, George E. Ritchey, S.L. Stephens, T.F. Akers, T.L. Moore, and E. E. McGee.

"Alabama Agricultural Experiment Station Agronomy Department: H.R. Albrecht

"Arkansas Agricultural Experiment Station Agronomy Department: C.K. McClelland

"Florida Agricultural Experiment Station Agronomy Department: George E. Ritchey

"Georgia Agricultural Experiment Station Agronomy Department: U.R. Gore Louisiana Agricultural Experiment Station Agronomy Department: J.P. Gray

Pages 4-5: Location of cooperative nurseries and cooperators.

Page 6: Map of southern states (divided by a curving line into Upper South and Lower South) showing location of cooperative uniform tests, 1943, A small circle indicates Uniform variety tests. A + indicates Uniform dates of planting tests.

Page 7: Methods: Tells how the following are measured: Yields. Chemical composition. Lodging. Shattering. Height (of plants). Maturity. Seed quality (rated from 1 to 5). Statistical analysis (by analysis of variance). Address: 1. Principal Agronomist; 2. Senior Agronomist; 3. Agronomist; 4. Asst. Agronomist; 5. Agent: All: Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S.D.A.

1052. Morse, W.J. 1945. Soys in food: Future of vegetable varieties. *Soybean Digest.* Sept. p. 35, 58.

• ***Summary:*** "The present and future of soy foods from several standpoints is discussed in the following pages."

"One of the chief factors in the retarded progress in the use of the soybean for food in this country has been the lack of varieties suitable for food purposes, although prejudice and food habits have been contributing factors. During World War I, efforts to promote the wider use of soybeans for food were unsuccessful because of the unsuitable varieties and the poor quality of processed soybean foods. The varieties commonly used for forage and industrial purposes are, in general, difficult to cook and have a rather strong bean flavor and, therefore, are not particularly suitable for food."

"During the period 1929 to 1931 a large collection of oriental varieties used solely for food purposes was introduced by the United States Department of Agriculture. The term 'vegetable' varieties has been applied to these introductions to differentiate them from varieties grown for other purposes... Results have shown these varieties to be much superior to the field varieties in ease of cooking, flavor, and texture, and they differ markedly among themselves in

these qualities." Address: USDA, Washington, DC.

1053. *Soybean Digest.* 1945. Australian studies U.S. bean crop. Oct. p. 16.
• ***Summary:*** Donald Shand, special agricultural investigation officer of the Commonwealth of Australia, recently made an inspection of the U.S. soybean industry, arriving on May 23. Mr. Shand runs a farm of 4,500 acres in the New England section of New South Wales, about 350 miles north of Sydney. Since the outbreak of World War II, Australia has made great progress in expanding production of row crops, however at present only about 200 acres of soybeans are grown in the entire Commonwealth. Yet he was recently notified by his government that 300 farmers have indicated their desire to cooperate in testing varieties which he plans to send back from the USA.

Mr. Shand said that the rapid development of the soybean industry in America is "an outstanding example of what co-operation between the agricultural scientists, manufacturers and farmers can do... Mr. Shand paid a special tribute to the kindness extended to him by Dr. W.J. Morse, whose untiring efforts in the soybean industry have meant much to its development."

A photo shows Donald Shand.

Note: This is the earliest document seen (March 2010) that gives soybean production or area statistics for Australia (200 acres), or for any country in Oceania.

1054. *Soybean Digest.* 1945. USDA men who have contributed to soybean development: O.E. May. Nov. p. 24.
• ***Summary:*** "Among the men who have made valuable contributions to the development of the soybean is Dr. O.E. May, chief of the Agricultural Research Administration's Bureau of Agricultural and Industrial Chemistry.

"Born and reared in a farming section of northeastern Iowa, now one of the leading soybean-producing states, Dr. May has spent most of his life searching for industrial outlets for farm products. It was the industrial fermentation work carried on by Dr. May and associates at Department of Agriculture's old Arlington Farm, Virginia, that supplied the background experience that enabled the Northern Regional Research Laboratory at Peoria, Illinois, which Dr. May formerly directed, to increase the yield of penicillin so that it could be put into immediate large-scale commercial production.

"It was this same background experience that caused him to be selected to head the Bankhead-Jones Soybean Industrial Products Laboratory at Urbana, Illinois. He was its first director, and served from March 9, 1936, to August 16, 1938. In this short time he assembled a staff of investigators of marked scientific attainments and established for the laboratory a place of high regard with the state agricultural experiment stations as well as the soybean and chemical industries.

"When the laboratory was established there was urgent need for more information on the chemistry of beans and on the chemical and physical properties of their constituent materials. Information was needed on the protein and oil contents of the different varieties, as well as on the composition and properties of the proteins, phosphatides, oil, minerals, and carbohydrates. Plant breeders needed to know more about the grain varieties being crushed for oil, and more about the effect of rate, date, and method of planting on yield and composition. Farmers needed to know what grain varieties are best adapted for industrial purposes. These are some of the problems that the laboratory tackled while Dr. May was directing its activities. They have not all been solved, to be sure, but considerable and very worth-while progress is being made. The laboratory's pilot-plant equipment enabled it to carry promising test-tube research to the semi-commercial production stage where it can be properly evaluated.

"Research on the industrial utilization of soybeans is still carried on under Dr. May's general supervision at the Bureau's Peoria Laboratory, where that phase of the work was transferred by an act of Congress in 1942. The agronomic work is conducted at Urbana and at cooperating state agricultural experiment stations.

"Dr. May insists that any accomplishments attributed to him are due even more to the work of the men who have been associated with him. These include such men as R.T. Milner, W.B. VanArsdal, W.H. Goss, K.S. Markley, G.H. Brother, and A.K. Smith, now employed in the Regional Research Laboratories, J.L. Cartter and W.J. Morse of the Bureau of Plant Industry, Soils, and Agricultural Engineering, as well as persons connected with the agricultural experiment stations and the soybean industry.

"May feels that the successful results of soybean research in the last 10 years have been due largely to cooperation and teamwork among the various individuals and agencies interested in the constructive development and expansion of the soybean industry.

"Soybeans are used now largely for food products because of the war, but when the war is over it is hoped that new and wider outlets and markets will be developed in both the food and the industrial fields."

A photo shows Dr. May.

1055. Lager, Mildred. 1945. Preface (Document part). In: Mildred Lager. 1945. The Useful Soybean: A Plus Factor in Modern Living. New York and London: McGraw-Hill Book Company, Inc. xii + 295 p. See p. vii-ix.
• ***Summary:*** "We of the occidental world are just discovering that soybeans are indeed nuggets of gold in our modern civilization. During the last twenty-five years [i.e., since 1920], they have mushroomed from an almost unknown forage crop to one of our most important cash crops, vital to the fields of agriculture, commerce, nutrition, and industry.

Nutritionally soybeans have become a vital food for a world at war and a postwar world at peace. Industrially they are a challenge to the chemists' flasks and test tubes; for more than two hundred commercial products have been made from the little beans. Hence soybeans and soybean products are indeed destined to be a vital plus factor in our world of tomorrow.

"Food has always been my hobby. When Fate, that unseen hand that sometimes guides us to our rightful groove in life, gave me firsthand experience with the miracles of proper diet, teaching fundamental facts on nutrition became my goal. I have tried to pass on the message of better eating via the platform, the printed page, and the radio, and for the last dozen years have enjoyed the unusual opportunity of occupying a vantage point on a busy crossroad of nutrition. I have seen, too, the value of soybeans in the so-called 'corrective regime,' and it has convinced me of their rightful place in the average diet.

"I experimented with soy as a food, secured special soy products for special diets, made up recipes, and in my classes taught the cooking of soybeans when they were practically unknown, when soy was eaten because it was soy and regardless of taste or palatability. In 1942, when soybeans became prominent as a war emergency food, a collection of these recipes was published under the title of '150 Ways to Use Soybeans.'"

"Because my main interest in soybeans and soy products is nutritional, the purpose of this book is to help bridge the gap from the unusual to the usual. I have tried to present the story of Asia's ancient food in a true, authentic manner–to give credit where credit is due. I am not a vegetarian, not affiliated with any organization or group advocating a meatless diet. I believe that proper nutrition and common-sense living are man's best medicine."

"I want to acknowledge the material, encouragement, and help that I have received from the men and women of medicine, research, industry, and business as well as homemakers and friends. I am especially grateful to

"Edward J. Dies, Soy Flour Association, Chicago, Illinois.

"E.L. Rhoades, Soy Flour Association, Chicago, Illinois.

"Kent Pellett, Soybean Digest, Hudson, Iowa.

"Edward Kahl, Los Angeles, California.

"National Soybean Processors Association, Chicago, Illinois.

"Dr. Walter C. Alverez, Mayo Clinic, Rochester, Minnesota.

"Dr. Francis Pottenger, Jr., Monrovia, California.

"Dr. Irving D. Ewart, Hollywood, California.

"Dr. J.A. LeClerc, U.S. Department of Agriculture, Washington, D.C.

"W.J. Morse, Department of Agriculture, Washington, D.C.

"Dr. Louise Stanley, Chief, Bureau of Home Economics, Washington, D.C.

"Donald S. Payne, Chief of Soya Products Section, Food Distribution Administration, Washington, D.C.

"Dr. Clive M. McCay and Mrs. Jeanette McCay, Cornell University, Ithaca, New York.

"Dr. H.W. Miller, International Nutrition Laboratory, Mount Vernon, Ohio.

"Col. Rohland A. Isker, Quartermaster Corps, Chicago, Illinois.

"Prof. Oscar Erf, The Ohio State University, Columbus, Ohio.

"National Farm Chemurgic Council, Columbus, Ohio.

"Agricultural Experiment Station, University of Illinois, Urbana, Illinois.

"Agricultural Experiment Station, Iowa State College, Ames, Iowa.

"Purdue University, Lafayette, Indiana.

"College of Agriculture, University of California, Berkeley, California.

"Department of Home Economics, University of Illinois, Urbana, Illinois.

"Bureau of Home Economics, U.S. Department of Agriculture.

"A.A. Levinson, Glidden Company, Chicago, Illinois.

"H.A. Olendorf, Spencer Kellogg & Sons, Inc., Decatur, Illinois.

"James L. Doig, Floya Milling Company, Montreal, Canada.

"J.A. Audiss and L.E. Bauer, Loma Linda Food Company, Arlington, California.

"Russell G. East, The Pennsylvania Railroad, Richmond, Indiana.

"Ollie Jones, Los Angeles, California.

"Madison College, Madison College, Tennessee.

"Ford Motor Company, Dearborn, Michigan.

"The Fox Valley Canning Company, Hortonville, Wisconsin.

"The Michigan Paper Company, Plainwell, Michigan.

"I.F. Laucks, Inc., Seattle, Washington.

"The Baltimore & Ohio Railroad, Baltimore, Maryland.

"John Deere, Moline, Illinois.

"Hawaiian Sugar Planters' Association, Honolulu, Hawaii.

"Maren Elwood, Hollywood, California (for her help in editing the manuscript).

"Ellender McGraw, my secretary." Address: Southern California.

1056. Swingle, Walter T. 1945. Our agricultural debt to Asia. In: Arthur E. Christy, ed. 1945. The Asian Legacy and American Life. New York: The John Day Co. x + 276 p. See p. 84-114. Index. 21 cm. Also published by The Asia Press, 1942. [2 ref]

• ***Summary:*** "The beginning and foundation of the Library of Congress Orientalia Collection was the great Chinese

encyclopedia, the *Ssu k'u ch'uan shu,* a gift of the Empress Dowager of China.

"About 1914, Dr. Swingle, then head of the Office of Crop physiology and Breeding, Bureau of Plant Industry, U.S. Dept. of Agriculture, was able to secure the services of a Cornell graduate, Dr. Hing Kwai Fung, to make abstracts and/or translations of information in the *Ssu k'u ch'uan shu* regarding economic plants. Dr. Swingle interested Dr. Herbert Putnam, Librarian of Congress in increasing the holdings of Chinese books, especially gazeteers [sic, gazetteers] which contain local information. When Dr. Fung returned to China, he was given a modest sum for purchasing books. Dr. Fung was able to persuade the Commercial Press (the largest publishing firm in China, located in Shanghai) to act as receiving agent for books for the Library of Congress, and to ship them to Washington [DC]. Soon after, Dr. Swingle was sent to the Orient–in March 1918–by the Dept. of Agriculture." There he made arrangements for collecting books in Tokyo and Shanghai.

"As American merchants and missionaries gradually penetrated into China, they sent home more and more plants and trees. The Arnold Arboretum, organized and directed by the great tree expert, C.S. Sargent, financed extensive trips to the Orient to obtain botanical specimens and seeds of ornamental trees and shrubs as well as photographs of them as they grew in their native habitat. These trees and shrubs revolutionized the garden and park plantings of the northern parts of the United States. The illustrated popular books of E.H. Wilson, who made many trips to the Orient for the Arnold Arboretum, helped to arouse interest in the very rich arboreal flora of China...

"The Plant Introduction Service of the U.S. Department of Agriculture was organized by David Fairchild in 1897; he did very extensive exploring for foreign economic and ornamental plants from 1898 on, and directed the Plant Introduction Service from 1909 to 1928. I was fortunate enough to be one of the first 'agricultural explorers.'" Of these men Frank N. Meyer and P.H. Dorsett were outstanding, not only for the number and value of the plants they secured, but also for the detailed and accurate descriptions of every plant they sent to Washington.

"P.H. Dorsett some years later, during the twenties, traveled widely in North China taking many fine photographs of Chinese crop plants and writing descriptions of the culture, harvesting and curing of each. On these trips he collected many varieties of soy beans largely through the utilization of a new and potent method of securing the willing cooperation of all educated Chinese people. A complete translation, prepared by Michael J. Hagerty under my direction in 1917 of the chapter on soy beans contained in a standard Chinese work on economic plants (the *Chih Wu Ming T'u K'ao* by Wu Ch'i-chun) had been furnished the plant explorers looking for soy bean varieties. This translation, covering eighty-two pages, discussed several hundred varieties, telling where they were largely grown. In all cases the name of the variety and the name of the locality where it was grown were not only spelled out in English but also written carefully in Chinese characters. An index made it easy to turn to any variety under discussion and see what was said about its culture.

"This was a turning point in field explorations in China. Such indexed translations in the hands of foreign plant explorers insured the attention of all educated Chinese, who gladly directed the explorer to the nearest source of the various named varieties. I had learned this at first hand in 1915 when studying varieties of Citrus in southern China. Surprise and skepticism about the foreigners knowledge of Chinese books gave way to astonishment and warm approbation."

"The soy bean is a striking example of the introduction of a new crop... Soy beans were sent from China to France as early as 1740 and from 1779 were grown in the famous Botanic Garden of Paris. Benjamin Franklin, who had been a member of the French Academy of Sciences since 1772, sent seeds back to the United States and urged that they be given a trial. But in spite of his plea, the soy bean remained merely a curiosity in this country for more than a century.

"In the late eighties [sic, 1890] Prof. C.C. Georgeson brought soy bean seeds from Japan, where he had been teaching at the Agricultural College at Komaba, and planted them in a field on the campus of the Kansas State Agricultural College. I could see the stunted soy bean plants from the windows of the botanical laboratory where I was a teen-age research assistant. This variety, adapted to the perpetual spring climate of Komaba near Tokyo, did not do well on the bare Kansas hills, often swept by hot dry winds. And nothing happened. Soy beans did not arouse interest among Kansas farmers until many years after this failure.

"In the third decade of the twentieth century Dorsett sent to Washington more than 800 named soy bean varieties from China, Manchuria and Japan. These together with shipments secured by Dr. David Fairchild from his numerous correspondents in the Old World, especially in Asia, amounted by 1928 to a total of more than 2800 packages of soy beans, almost all named varieties but many of them duplicated, some of them many times. Meantime tests made by W.J. Morse, in charge of soy bean culture for the Bureau of Plant Industry, showed that many varieties had a narrow range of adaptability. Accordingly, from 1929 to 1931, Morse joined Dorsett in the Orient and these two experts, with trained Chinese helpers, brought to this country the largest single collection of soy bean varieties ever assembled. As soon as Morse returned from studying soy beans in Asia and attacked the problem of finding which Asiatic varieties adapted to the different regions and selecting and breeding to make them fit various American soils and climates, a remarkable change occurred in soy bean culture. Yields went up and plantings increased year by year...

"One of the best-known industrial uses for soy bean proteins is for making water-resistant glue. No less than 30,000 tons of soy bean glue were made in 1942 by a single firm and its licenses annually, most of it being used in the rapidly growing plywood industry. Soy bean proteins have been enthusiastically used by Henry Ford in his automobiles, being mixed with the more expensive phenolic resins, thereby reducing costs and also yielding a more plastic, freer-flowing mixture which takes dyes better...

"As long ago as 1917-1918 Dr. Yamei Kin set up under my general supervision for the U.S. Department of Agriculture a soy bean mill in New York City in the hope of supplying tofu to increase the bulk and food value of meat dishes served to soldiers in training at near-by camps. Dr. Kin succeeded in making excellent tofu. She even served to a group of army officers a meal composed entirely of soy bean dishes! However, it proved impossible to test tofu on a large scale at that time, since we could not get priority for transportation of soy beans from North Carolina, then the nearest region where they were grown on any considerable scale.

"A splendid example of a double fermentation is the soy bean cheese called *nam yüe* by the Cantonese and *sufu* in North China. It is preferred even to the best Roquefort as a salad dressing constituent by those who have had the opportunity to try it. It is made by Chinese masters of the cheesemaker's art who believe that its fermentation is an insoluble mystery.

"Shih Chi-yien, then working in the American University of Soochow, published in 1918 the first English account of the most important fermented bean foods. He traced the making of *tofu* from soy beans back to the Han dynasty (A.D. 22). Ten years later Wai Ngan-shou [Nganshou; pinyin: Wei Yanshou, who was from Ningpo], one of the first scientifically-trained Chinese microbiologists and fermentation experts, was able to isolate and identify as a new species of Mucor the mold that makes possible the *nam yüe* fermentation. It is a curious fungus, *Mucor sufu,* distantly related to the miraculous *Penicillium notatum* whose marvelous curative action has only recently been discovered. A third fermentation expert, Shih You-kuang [pinyin: Shi Jiyan], studied another soy bean fermentation product, *meitauza,* made by another species of Mucor, and published an illustrated account of it in German in 1937. In his review of the literature of Mucor fermentations, Shih You-kuang cites no fewer than thirty articles by eighteen authors all based on Chinese fermentations...

"Miss Elizabeth Groff, under my direction in 1918, made a thorough study of the fermentation of soy sauce in the famous factories of Canton, China, and published the first detailed account of the process in the *Philippine Journal of Science* for 1919."

"It has been my privilege to assist in building up a great Chinese library in the Library of Congress, under the enlightened policy of Dr. Herbert Putnam, beginning in 1912. The Orientalia Division, headed by Dr. Arthur Hummel, is now the largest Chinese library outside of Asia and is probably larger than all the European libraries of Chinese books combined. It now contains, Dr. Hummel estimates, about 230,000 Chinese volumes (*Chüan*) and some 20,000 more will soon be added in the form of bibliofilm [a type of microfilm] copies of very rare works from the Chinese National Library, sent to Washington for safekeeping."

Note 1. This is the earliest secondary document seen that mentions the early introduction of soybeans to America by Benjamin Franklin.

Note 2. This is the earliest English-language document seen (Oct. 2011) that uses the term *nam yüe* to refer to Chinese-style fermented tofu. It is 2nd earliest English-language document seen (Oct. 2011) uses the word "sufu" to refer to Chinese-style fermented tofu, and the first such document written by a Westerner. Photos show Dr. Walter Tennyson Swingle, and his wife Maude K. Address: Collaborator, Bureau of Plant Industry, USDA; Consultant on Tropical Botany, Univ. of Miami, Florida.

1057. William Morse (Photograph). 1945.
• ***Summary:*** See next page. This digital photo, dated 1940s, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1058. William Morse (Photograph). 1945.
• ***Summary:*** These digital photos, taken in the mid-1940s, were sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004). They are both from the same photo session.

1059. *Soybean Digest.* 1946. Illinois pioneer John T. Smith

passes. Jan. p. 6.
• ***Summary:*** Smith, one of the Midwest's pioneer soybean growers, died at age 65. "'John T.,' as everybody acquainted with soybeans affectionately knew him, started with the crop in 1908, when he procured seed of two different varieties from Dr. [sic] W.J. Morse of the U.S. Department of Agriculture."

1060. U.S. Regional Soybean Laboratory. 1946. Second work planning conference of the U.S. Soybean Regional Laboratory for the Southern States region, Stoneville, Mississippi, February 13-15, 1946. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 133. April 8. 19? p.
• ***Summary:*** "The southern soybean program conducted in cooperation with the U.S. Regional Soybean Laboratory and the 12 Southern States began with the 1943 growing season. The completion of the 1945 tests concludes three years of testing soybean varieties on a uniform basis in the Southern States. A very good picture of the adaptation and relative industrial value of the many varieties and strains is evident from these tests. During this period breeding programs have been underway in the various states. A number of new strains are coming out of these programs and are available for entry in Uniform Tests in 1946. Many varieties tested two or more years over wide areas will be dropped to make room for new strains. We may well consider that the preliminary phases of the soybean program in the South are over and that the breeding, testing and development of new strains of soybeans for industrial utilization is definitely under way.

"Wednesday, February 13–P.R. Henson, Chairman

"The conference was called to order at 9 a.m. by Mr. P.R. Henson, who introduced Dr. J.E. Adams, Director of the Delta Experiment Station. Dr. Adams welcomed the collaborators to the Station and invited them to visit the various projects at the Station in which they might be interested.

"Dr. Dorman, Director of the Mississippi Experiment Station at State College, gave a brief review of the experimental work at the state and Delta experiment stations. He also discussed the various possibilities of the Pace Bill.

"The following state and federal personnel were in attendance:

"Aamodt, O.S., Head Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

"Adair, C.R., Agronomist, U.S.D.A., Rice Branch Station, Stuttgart, Arkansas.

"Adams, J.E., Director, Delta Branch Station, Stoneville, Mississippi.

"Adams, W.E., Agronomist, Soil Conservation Service, Watkinsville, Georgia.

"Allington, W.B., Pathologist, Forage Crops & Diseases, Urbana, Illinois.

"Carr, R.B., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi.

"Cartter, J.L., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"Chilton, S.J.P., Pathologist, Louisiana Experiment Station, University, Louisiana.

"Cralley, E.M., Pathologist, Arkansas Experiment Station, Fayetteville, Arkansas.

"Dorman, C., Director, Mississippi Experiment Station, State College, Miss.

"Gore, U.R., Agronomist, Georgia Experiment Station, Experiment, Georgia.

"Gray, J.P., Agronomist, Louisiana Experiment Station, University, Louisiana.

Page 2: "State and Federal Personnel in. Attendance (continued):

"Hartwig, E.E., Agronomist, U.S. Regional Soybean Laboratory, Raleigh, North Carolina.

"Henson, P.R., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi.

"Lehman, S.G., Pathologist, N.C. Experiment Station, Raleigh, North Carolina.

"Marston, H.W., Agricultural Research Administration, U.S.D.A., Washington, D.C.

"McVickar, M.H., Agronomist, Virginia Experiment Station, Blacksburg, Va.

"Milner, R.T., Chemist, Northern Regional Research Laboratory, Peoria, Illinois.

"Morse, W.J., Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

"O'Kelly, J.F., Agronomist, Mississippi Experiment

Station, State College, Mississippi.

"Paden, W.R., Agronomist, S.C. Experiment Station, Clemson, South Carolina.

"Pitner, John, Agronomist, Delta Experiment Station, Stoneville, Mississippi.

"Presley, J.T., Pathologist, Mississippi Experiment Station, State College, Mississippi.

"Reynolds, E.B., Agronomist, Texas Experiment Station, College Station, Texas.

"Rigney, J.A., Agronomist, N.C. Experiment Station, Raleigh, North Carolina.

"Staten, H.W., Agronomist, Oklahoma Experiment Station, Stillwater, Oklahoma.

"Stephens, J.L., Agronomist (U.S.D.A.) Coastal Plain Experiment Station, Tifton, Georgia.

"Strand, E.G., Economist, U.S.D.A., Washington, D. C.

"Washko, J.B., Agronomist, Tennessee Experiment Station, Knoxville, Tennessee.

"Weimer, J.L., Pathologist, U.S.D.A., Georgia Experiment Station, Experiment Georgia.

"Williams, L.F., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"York, H.A., Agronomist, Mississippi Branch Station, Raymond, Mississippi.

"Reports of Collaborators

"Each collaborator was asked for a report of the general soybean situation in his state and a resumé of the soybean research work that was being conducted. These reports follow:

"Alabama–Mr. E.F. Schultz was unable to be present due to an experiment station conference.

"Arkansas report by C. Roy Adair–In 1945, Uniform Test Groups VI and VII were grown at six locations and Uniform Test Group VIII was grown at three locations. Additional variety tests were also grown at four locations. Approximately 425 hybrid lines were grown at Stuttgart. Plant selections were made from 96 of those lines.

"The objectives in the breeding work are for:

"(1) A satisfactory variety that is a couple of weeks earlier than Arksoy.

"(2) A variety that matures at the same time, and is equal to or better than Ogden in yield and oil content, and which does not shatter as badly as Ogden.

"More work should be done on dates of planting as the results obtained indicate that most soybeans in this state are planted too late.

Page 3: "Arkansas report by C. Roy Adair (continued)–The principle soybean growing sections of the state are in the cotton growing areas of the Delta in eastern Arkansas and the Arkansas and Red River Valleys and in the rice section in east-central Arkansas. Soybeans must compete with cotton and corn in the cotton growing sections of the State. In the rice section it is a good practice to follow a three-year rotation with the land in rice one year in three. Under that system of management, soybeans do not compete with rice for the land, but the crop does compete with lespedeza and in some cases with winter oats.

"Florida–Mr. G.E. Ritchey was unable to be present, due to an experiment station conference.

"Georgia, Coastal Plain, report by J.L. Stephens–This report covers tests made at Blackville, South Carolina; Millen, Georgia; Richmond Hill, Georgia; and Tifton. Georgia. Plantings were made around May 1st. Seasonal conditions were generally favorable. Good stands were secured at all locations and vegetative growth was normal.

"Blackville, South Carolina–Planting was made on Orangeburg sandy loam soil of medium fertility. Soybean yields were fair. Some leaf diseases were noted but none of serious proportions. Nematode damage was very light.

"Millen, Georgia–Planting was made on extra good Ruston sandy loam. Vegetative growth of soybeans was exceptionally large with many varieties attaining five to six feet. Vegetative growth continued throughout the summer so that fruiting was retarded. Many bean pods 'blasted' and only a few varieties matured seed before frost of either Group VII or VIII. Those groups were not harvested this year, because of the serious blasting and incomplete maturity. It is believe that earlier maturity and better seed production would have been secured if plot location had been on poorer soil.

"Richmond Hill, Georgia–This location is near the coast and on a Norfolk sand of Hammock type or a sandy soil of relatively high organic content. Soybean growth is always good on this type of soil early in the season. Later in the season, however, nematodes become a serious factor and in many instances entire plots are destroyed by them. This year nematodes did more damage at this location than any other here being reported on. Groups VII and VIII were grown.

"Tifton, Georgia–Groups VII and VIII were grown and in addition dates of seeding tests. Selections from North Carolina were also grown. The soil where all plots were located was Tifton sandy loam in a fair to good state of cultivation. Nematode damage was slight this year. Growth of beans was good and on the average, the highest yield of beans was secured at this location.

"Georgia, Experiment, report by U.R. Gore–Soybeans are grown in Georgia for hay, 96,000 acres with a yield of 0.9 ton per acre, and beans 13,000 acres with a seed yield of 6.5 tons per acre. Seed yields of beans are generally too low to prove profitable to farmers.

"The new soybean variety, Gatan, is a result of the soybean breeding program of the Georgia Experiment Station. It originated from a natural cross with Otootan, which has been selected until practically uniform. Gatan produces..." Continued. Address: U.S. Regional Soybean Industrial Products Lab., 205 Old Agricultural Building, Urbana, Illinois.

1061. U.S. Regional Soybean Laboratory. 1946. Second

work planning conference of the U.S. Soybean Regional Laboratory for the Southern States region, Stoneville, Mississippi, February 13-15, 1946 (Continued–Document part IV). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 133. April 8. 19? p.

• ***Summary:*** Page 17: "Dates of Planting Studies

"All agreed that additional information was needed on dates of planting. There was, however, a wide divergence of opinion on the method to use. One method suggested was to plant all uniform groups at two or three dates. This method would give valuable information on the intervarietal response to date of planting but it did not meet with the general approval of the group because of the lack of labor to handle the added work involved. It was also felt by some of the men that this method would not give all the information needed.

"In some areas it is a customary practice to plant soybeans after early crops, such as potatoes and small grains. It was the opinion of the men from those areas that an experiment should be conducted in which the late date of plantings should actually follow the early crop. The general opinion seemed to be that in a case of this kind, that at least one entire uniform group should be used.

"There were others in the group who thought that this test should be continued about the same as it has been in the past. The method would be to use three or four varieties adapted to that area and plant at several dates. Sufficient dates would be used to find the extremes in planting dates.

"Since there were so many suggestions on methods of conducting the date of planting experiment, it was decided not to try to conduct a uniform plan. In each state where it is thought necessary to work on this problem, an experiment will be conducted that best suits that area.

"Thursday evening, February 14

"W.J. Morse gave an illustrated talk on soybean culture, marketing, and utilisation in the Orient. Dr. J.S. Adams showed a colored motion picture on the flame cultivator used in killing weeds in cotton and to a small extent in soybeans. In the use of the flame cultivator on soybeans two years ago it was found that with slow speed the soybean plants were injured more or less, cracking open the stems. With high speed, there was much less injury. During the past summer tests with the flame cultivator on soybeans showed no injury.

"Friday, February 15–H.Y. Marston, Chairman

"Report of the Soybean Pathological Work During the Past Season and. Plans for the Coming Year presented by W.B. Allington.

"The following members participated in the pathological conference:

"S. Chilton

"E.M. Cralley

"S.G. Lehman

"J.L. Weimer

"W.B. Allington

"Soybean seed treatments in 1945 increased stands in most instances but increases in seed yield were not significant. Arasan proved to be consistently better than the other chemicals used. Dr. Cralley reported one case in Arkansas where N.I. Ceresan was outstanding in increasing the stand as contrasted to the other chemicals. It was agreed that the seed treatment test should be revised in 1946 and that 5 seed lots be used, each lot being affected by a specific disease or condition. Only one chemical, Arasan, is to be used at the 2 oz/bu. rate. Three dates of planting are to be recommended but the number of dates at each location was left to the judgment of the cooperator. Notes are to be taken on stand and disease control but the harvesting for yield is optional. The question was discussed relative to the possibility of recommending a lower rate of seeding of soybeans in combination with seed treatment but no specific conclusion was reached. Dr. Lehman reported that his data indicated a differential response of varieties to seed treatment, the variety Herman responding better than most others.

"The testing of varieties for resistance to *Sclerotium rolfsii* by Dr. Weimer at Experiment, Georgia, has disclosed no resistance. Most of the varieties in all the uniform yield nurseries have been tested. The method used consists of growing the inoculum on sterile oats in giant cultures and placing the inoculum in contact with the base of the plants, covering it later with a small amount of soil. In 1944, a few plants in several varieties survived. Seed was saved from these plants and planted in 1945 in plant rows which ware inoculated. All of these plants were readily killed by the fungus, indicating that the plants had merely escaped and had no resistance of importance. In another test, plants were grown at various spacings in the row which was inoculated at one end by the same method. The plants at the point of inoculation were killed but the infection failed to spread along the row, even in cases where the plants were so thick that they were almost in contact with each other. This indicates that the soil environment was not too favorable for the disease, since in nature the fungus is commonly observed to spread from plant to plant on the surface. There is a question, however, as to whether the method used for inoculation is not too drastic, covering up some useful resistance. It was agreed that the present method was rapidly eliminating all the varieties as a source of resistance, and that if none are found to be resistant, the method might then be revised if possible and the tests made over again.

"The nematode resistance tests at Experiment, Georgia, were not productive in 1945 due to lack of infection. It was agreed that the test should be abandoned at that location and that Dr. Weimer and Mr. Stephens make tests at or near Tifton, Georgia, where nematode infection is more dependable. The possibility of biologic races of nematodes affecting varieties differently was recognized and discussed. It is the plan that a test will be made also in 1946 at Raleigh,

North Carolina, under the direction of Dr. Lehman.

"The work on bacterial leaf spots (i.e. bacterial pustule and bacterial blight) was discussed by Drs. Lehman and Allington. The use of a power sprayer in field planted nurseries, delivering the bacterial suspension against the leaves with considerable force, was effective in inducing epidemics suitable for disease resistance evaluation. The time of day of inoculation. however, was shown to be very important. The main consideration apparently was to be sure to inoculate when stomata are wide open which, on the varieties tested, proved to be during the brightest part of the day. By using this method heavy infection was easily secured and disease resistance evaluation could be made about ten days later. The variety C.N.S. displayed extreme resistance to bacterial pustule at Raleigh. North Carolina, Columbia, Missouri, and Urbana, Illinois, where it was tested in artificially inoculated nurseries. Unfortunately it is very susceptible to bacterial blight. The variety Ogden also has considerable resistance to bacterial pustule but apparently a different type than C.N.S. The Missouri strain S55-19 showed slight resistance to bacterial blight at Urbana. At Raleigh, North Carolina, an experiment was conducted to measure the damage caused by bacterial pustule. Certain rows in the field were protected from infection by the use of copper dusts. Highly significant increases in yield were obtained in the protected rows. Certain dust failed to give much protection. It was not entirely clear as to whether the increase in yield was entirely due to protection or to stimulation by copper. This work will be continued by Dr. Lehman. The work in Dr. Lehman's laboratory on purple spot caused by a *Cercorpora* has shown that by proper inoculation under high humidity conditions the fungus infects the pods and induces the purpling of the seed. The external symptoms on the pods are minute necrotic spots and are apparently difficult to see. Heretofore it has not been known to infect the pods. The information on brown stem rot, found in 1944 and 1945 in the midwest, was presented. The symptoms, consisting of browning of the stem pith and eventual lodging and dying of the plants, was discussed. The identity of the fungus responsible is unknown. Brown stem rot was the cause of complete loss in some fields of Illinois in 1945 and it is estimated that the central part of the state sustained at least a 10 percent loss from this disease. It is doubtful if this disease will appear in the South because of its apparent low temperature requirements for development as observed under artificially controlled conditions.

"Dr. Chilton at Baton Rouge [Louisiana] will direct work on soybean diseases at that location starting in the near future. He will be more interested at first in a survey type of study in order to gain more information as to which diseases are most damaging and most urgently need control measures.

"Diseases were not serious in any areas of the South in 1945. Bacterial blight was quite prevalent as contrasted to previous years, apparently because of the cool season. Bacterial pustule was less severe than usual except in isolated cases.

"Submitting Sales for Chemical Analysis.

"The work at the Laboratory can be speeded by (1) Screening the samples over a hand sieve (8/64 x 3/4 suitable for most varieties) to clean out split seeds, dirt, and other foreign material and (2) include agronomic data sheets in the package with the samples. Where an extra variety is included in a uniform group, that variety with the agronomic data should be inserted at the bottom of the page on the sheet giving the data for that group. Blank data sheets can be obtained from the Laboratory to use to give the data for supplemental tests, seed, of which are sent in for analysis." Address: U.S. Regional Soybean Industrial Products Lab., 205 Old Agricultural Building, Urbana, Illinois.

1062. Probst, A.H. 1946. Third work planning conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois, February 20, 21, 22, 1946. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 135. April 29. 37 p. • ***Summary:*** Note: This is a typewritten report.

"A conference of the North Central States technical collaborators of the U.S. Regional Soybean Laboratory was held, at Urbana, Illinois, on February 20-22, 1946, to review the accomplishments of the cooperative work and to plan future soybean investigations. This conference marked the tenth year of the cooperative work of the Laboratory. In addition to the planning of agronomic and plant breeding research, the presence of cooperating plant pathologists made possible an integration of disease studies with the other work for the benefit of the entire program.

"Wednesday, February 20–J.L. Cartter, Chairman

"The conference was called to order at 9:00 a.m. in Room 314 Illini Union Building at the University of Illinois. The following State and Federal personnel were in attendance:

"Aamodt, O.S., Head Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

"Albrecht, H.R., Agronomist, Indiana Experiment Station, Lafayette, Indiana.

"Allington, W.B., Pathologist, U.S.D.A., Forage Crops and Diseases, Urbana, Illinois.

"Burlison, W.L., Agronomist, Illinois Experiment Station, Urbana. Illinois.

"Caldwell, R.M. Pathologist, Indiana Experiment Station, Lafayette, Indiana.

"Cartter, J.L., Agronomist, U.S. Regional Soybean Laboratory, Urbana.

"Chamberlain, D.W., Pathologist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"Collins, F.I., Chemist, U.S. Regional Soybean Laboratory, Urbana, Illinois. Crall, J.H., Pathologist, Missouri Agricultural Experiment Station, Columbia,

Missouri.

"DeTurk, E.E., Agronomist, Illinois Experiment Station, Urbana, Illinois.

"Englehorn, A.J., Agronomist, Iowa Experiment Station, Ames, Iowa.

"Erickson, E.L., Agronomist, South Dakota Experiment Station, Brookings, S.D.

"Feaster, C.V., Agronomist, U.S. Regional Soybean Laboratory, Columbia, Missouri.

"Frank, F.A., Agronomist, Indiana Agricultural Experiment Station, Lafayette, Indiana.

"Fuelleman, R.F., Agronomist, Illinois Experiment Station, Urbana, Illinois.

"Hackleman, J.C., Crops Extension, Illinois Experiment Station, Urbana, Illinois.

"Henson, P.R., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi.

Heusinkveld, D., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"Jones, F.W., Pathologist, U.S.D.A., Wisconsin Experiment Station, Madison, Wisconsin.

"Kalton, R.R., Agronomist, U.S. Regional Soybean Laboratory, Ames, Iowa.

"Koehler, B., Pathologist, Illinois Experiment Station, Urbana, Illinois.

"Krober, O.A., Chemist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"Lambert, J.W., Agronomist, Minnesota Experiment Station, St. Paul, Minn.

"Lang, A.L., Agronomist, Illinois Experiment Station, Urbana, Illinois.

"Lefebvre, C.L., Pathologist, U.S.D.A., Forage Crops & Diseases, Beltsville, Maryland.

"McAlister, D.F., Physiologist, U.S. Regional Soybean Lab., Urbana. Illinois.

"Marston, H.W., A.R.A., U.S.D.A., Washington, D. C.

"Milner, R.T., Chemist, Northern Regional Research Laboratory, Peoria, Illinois.

"Morse, W.J., Agronomist, U.S.D.A., Forage Crops & Diseases, Beltsville, Maryland.

"Nelson, L.V., Agronomist. Michigan Experiment Station, East Lansing, Mich.

"Probst, A.H., Agronomist, U.S. Regional Soybean Laboratory, Lafayette, Indiana.

"Rusk, H.P., Director, Illinois Experiment Station. Urbana, Illinois.

"Saboe, L.C., Agronomist, U.S. Regional Soybean Laboratory. Columbus, Ohio.

"Sears, O.H., Agronomist, Illinois Experiment Station, Urbana, Illinois.

"Slatensek, J.M., Agronomist, U.S.D.A., Forage Crops & Diseases, Lincoln, Nebraska.

"Smith, Jean J., Pathologist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"Stoa, T.E., Agronomist, North Dakota Experiment Station, Fargo, N.D.

"Tervet, I.W., Pathologist, Minnesota Experiment Station, St. Paul, Minn.

"Torrie, J.H., Agronomist, Wisconsin Experiment Station, Madison. Wisconsin.

"Tucker, C.M., Pathologist, Missouri Experiment Station, Columbia, Missouri.

"Van Doren, C.A., Agronomist, Soil Conservation Service. Urbana, Illinois.

"Weiss, M.G., Agronomist, Iowa Experiment Station, Ames, Iowa.

"Welch, A., Pathologist, Iowa Experiment Station, Ames, Iowa.

"Williams, L.F., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois.

"Woodworth, C.M., Agronomist, Illinois Experiment Station, Urbana, Illinois.

"Zahnley, J.W., Agronomist, Kansas Experiment Station, Manhattan, Kansas.

"The first speaker was Director H.P. Rusk who welcomed the collaborators on behalf of the North Central States Experiment Station Directors. Director Rusk expressed his enthusiastic endorsement of this type of cooperative attack on a problem of vital importance to the region. He pointed out that the Experiment Station Directors of the North Central region were endeavoring to approach all their common problems in the spirit of helpful cooperation. Director Rusk spoke briefly on the Morrow plots started at the Illinois Agricultural Experiment Station in 1867 and mentioned that very little work had been done to measure the effect of soil fertility programs and cropping practices on the quality of the crop produced. He emphasized the necessity for research to study the effect of crop quality on animal and human nutrition.

"A Word of Welcome to the Regional Soybean Conference by W.L. Burlison–It affords me real pleasure to add my word of welcome to what Dean Rusk has already said. If there is anything we here at the University can do to make your stay pleasant and profitable, I am sure you will give us this opportunity to serve you.

"The Regional Soybean Laboratory was established at the University of Illinois 10 years ago. Much has been accomplished in soybean research during this past decade. Herbert Hoover once said,

"'Discovery and invention do not spring full grown from the brains of men. The labor of a host of men, great laboratories, long, patient, scientific experiment build up the structure of knowledge, not stone by stone, but particle by particle. This adding of fact to fact some day brings forth a revolutionary discovery, an illuminating hypothesis, a great generalization, or a practical invention.'

"The establishment of the Regional Soybean Laboratory was one of the first of the nine Bankhead-Jones laboratories

to be launched. It was a new adventure in cooperation. I think we all agree that we have learned much about what the word 'cooperation' means between Federal and state workers. In speaking to the Fifty-Fourth Annual Convention of the Association of Land-Grant Colleges and Universities at Chicago on November 11, 1940, President Farrell of Kansas sounded a warning that is always worth remembering whenever Federal and state scientists are working cooperatively on research problems such as is represented by the U.S. Regional Soybean Laboratory. President Farrell said in referring to our dual system of government:

"'The Federal-State system is clumsy, slow, sometimes inefficient, irritating but supremely desirable. The welfare of the whole nation requires that both the Union and the individual states be strong and vigorous; the Union to perform those functions that unity implies and requires; the individual states and the people to perform all other functions. If either the Union or its component parts should become impotent, the whole national structure would collapse...'

"'In our dual system of government, each side sooner or later must work harmoniously with the other. Each must recognize that the other has an indispensable function to perform if the whole nation is to benefit. Each must be actuated by a spirit of generosity, fairness and good will and by an honest desire to serve the common weal. Each must recognize that the parts must be strong and responsible if the whole is to endure.'

"If we keep in mind these admonitions, our cooperative efforts will continue to grow and our endeavors, of course, will be ever more productive.

"General Discussion of Soybean Fertility Problems

"Dr. E.E. DeTurk of the Illinois Agricultural Experiment Station led a discussion on the soil fertility problem as it relates to soybean production. In the course of the discussion he called on several agronomists and soils men from neighboring state experiment stations. The discussion by Dr. DeTurk was divided into two phases: I. Chemical Changes During Growth, and II. Comments on Plant Feeding.

"I. Chemical Changes During Growth. Soybeans were grown on untreated soil and also with superphosphate (0-20-0) and with a phosphate-potash (0-20-20) fertilizer. Samples were taken at weekly intervals from emergence to maturity and cotyledons, leaves, stems, seeds and pods were analyzed for nitrogen, phosphorus, potassium, and calcium. Some noteworthy observations were:

"1. At the age of six weeks growth (gain in dry weight) ceased for a week. This stage marked the peak of synapsis. A sharp drop in leaf weight and a slight drop in stem weight began at the end of the 9th week, at the initiation of seed enlargement. Seed weight per plant increased at a steep gradient until the 13th week and then more slowly until the 15th (maturity).

"2. Nitrogen uptake proceeded at a rapid and uniform rate from the end of the 6th to the end of the 12th week from emergence except during the 7th..." Continued. Address: U.S. Regional Soybean Lab., Lafayette, Indiana.

1063. Probst, A.H. 1946. Third work planning conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois, February 20, 21, 22, 1946 (Continued–Document part III). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 135. April 29. 37 p.

• ***Summary:*** (Continued): Page 18:

"Comments on the Origin, Objectives and Present Status of the U.S. Regional Soybean Laboratory by O.S. Aamodt–The nine Bankhead-Jones Regional Research Laboratories were established ten years ago to carry on fundamental research on regional problems not provided for at the time, or contemplated in the future, on regular funds or state funds provided by the Federal Government. Sixty percent of the funds provided by Congress was allotted to the States and 40 percent to the Secretary of Agriculture for the establishment of Regional Research Laboratories and for special studies. The Experiment Station directors in each region on consultation with the U.S. Department of Agriculture selected the most urgent problems in their region. A Regional Soybean Laboratory was suggested by the North Central Directors. The Laboratory was developed cooperatively by the Bureaus of Chemistry and Plant Industry with an Advisory Committee of the North Central Experiment Station Directors. When the Northern Regional Research Laboratory was developed at Peoria, the research on industrial utilization and processing was transferred to the new laboratory there. The production and improvement program and the analytic laboratory remained at [page 19] Urbana as the U.S. Regional Soybean Laboratory. You as technical collaborators representing the 12 cooperating North Central States, together with the laboratory staff and representatives of the Division of Forage Crops and Diseases of the Bureau of Plant Industry, Soils, and. Agricultural Engineering, are responsible for the planning and conducting of the work. This is a 'work planning conference.' We have associated with us this year a group of plant pathologists operating on regular and state funds. We expect to integrate completely the activities of the two groups as mutually supporting phases of work toward a common objective. Several informal regional conference groups are also operating in different sections of the country, such as the alfalfa improvement conference, the corn breeders' conference, the spring wheat improvement conference, etc. These groups, having a common interest and purpose, gather around the table as their activities require to consider objectives and methods for attaining them. Their procedure is somewhat as follows: Collect and review the available information concerning the past, current, and proposed research work relating to the problem under consideration;

study and correlate the information by means of individual and group conferences or special committees; prepare reports and make recommendations to the cooperating agencies; plan a coordinated program or research; arrange for essential materials, equipment and personnel; avoid undesirable and unnecessary duplication of effort; and secure greater economy and efficiency in the expenditure of funds.

"It is important to recognize that no one plan for organization can be final in all details. The nine U.S. Department of Agriculture Bankhead-Jones Laboratories are not organized and operated on the same lines. Neither are the many informal conference groups operating in all sections of the country. Each one has adapted its organization and activities to its dominating requirements. facilities, and personnel at hand.

"It is also important to recognize that no one research plan can or will be final. To be useful a regional research program must be dynamic, changing with every new need or advance. It must permit the investigator to make adjustments from old or less promising fields to newer and more fertile opportunities or possibilities. The important thing is to arrange all activities so that they may be quickly responsive to the needs of the future. It is unlikely that the research and educational patterns of today are likely to fit the needs of tomorrow.

"One of the most serious problems in meeting the needs of tomorrow is financial limitations. The funds allotted to the Federal Government are limited by the Congressional appropriations which, together with budget reductions and increased operating costs, make it impossible for research work to expand to meet natural growth requirements. All of the funds for Bankhead-Jones Laboratories are obligated to be spent in the field. The administrative subject matter Division is not permitted to expend any of the funds in Washington. To help keep our finances straight all payrolls, vouchers, etc., on Bankhead-Jones funds are first cleared through the Urbana Laboratory. The new disease expenditures clear directly through the Division of Forage Crops at Beltsville, Maryland. The entire program is a function of the cooperative regional organization. It is desirable that each of you keep your own director fully informed of developments not only in subject matter but organization and finances as well. We are delighted to have Dean Rusk with us this year as the official representative of the North Central Experiment Station Directors.

Page 20: "Wednesday evening, February 20

"The evening session convened, at 730 p.m. in the Mini Union Building, and the families of the Laboratory personnel and the agronomy Department were invited.

"The first part of the evening program was an illustrated talk by Dr. R.T. Milner of the Northern Regional Research Laboratory, Peoria, Illinois, describing the work of that laboratory with special emphasis on the research problems on the utilization of soybeans in industry. Dr. Milner pointed out the importance of soybean oil in foods and indicated that industrial oil users were looking for an oil with low iodine number.

"Mr. Morse of the Division of Forage Crops gave an illustrated talk on the culture and utilization of the soybean and its products in China and Japan.

"Thursday, February 21–L.F. Williams, Chairman

"Arranging of the Uniform Nursery Test. 1946

"Mr. Cartter prefaced the discussion on the Uniform Tests for 1946 by presenting a graph showing the relation between iodine number of soybean oil and the percentage of the principal fatty acids. Percentage of linolenic acid decreases from approximately 6 percent in oil with an iodine number of 150 to 3 percent in an oil with an iodine number of 100, indicating the difficulty of reducing the linolenic acid content to a negligible amount as has been requested by some manufacturers who are using the oil for edible purposes. The reason for the interest is that linolenic acid is said by some investigators to be the cause of 'flavor reversion' in the oil.

"Any improvement in flavor and keeping quality that can be obtained through plant breeding will result in wider use of soybean oil in the edible field. The Laboratory will continue to determine iodine number of oil on all breeding samples and attention will continue to be directed toward selecting for oil quality as well as quantity in the breeding program.

"Further work will be undertaken, in cooperation with the Northern Regional Research Laboratory at Peoria, and one or two of the commercial users of soybean oil to study the effect of iodine number on keeping quality. All new strains will be evaluated for industrial use as well as for agronomic superiority before release.

"Cooperative work in the Southern States by P.R. Henson–Southern farmers, until in recent years, have harvested a very low percentage of their total soybean acreage for seed. As late as 1941, only 15.5 percent of the total soybean acreage in 11 southern states was combined. While the percentage of total southern acreage of soybeans harvested as an oil crop has more than doubled in recent years, the major portion is still utilized for other purposes. The failure of present varieties to produce satisfactory yields of seed consistently has been in part responsible for the small acreage of oil beans. The average yields of the area 11.1, 13.4, 9.9. and 12.6 bushels per acre for the 4 years, 1941-44 respectively, are entirely too low for economic production of oil beans" (Continued). Address: U.S. Regional Soybean Lab., Lafayette, Indiana.

1064. Marquis, Arnold. 1946. Re: Pacific story script. Letter to John Baker, Department of Radio, USDA, Washington, DC, May 13. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Here are two copies of the Pacific Story script for Sunday, June 2, on Soya Beans.

"Will you please have Mr. Morse retain once script and return the other to me with such changes as he feels necessary in the interests of accuracy. Also, will you please have Mr. Morse send me his five-minute commentary at the earliest possible.

"Mr. Morse will speak, of course, only on the first show, that is, for the East. For the second show, his commentary will be read as a message from him on the coast.

"Sincerely yours,..." AM:he Enc (2). Address: Writer-producer of the Pacific Story, National Broadcasting Company, Inc., A Service of Radio Corporation of America, Sunset and Vine, Hollywood 28, California. Phone: Hollywood 6161.

1065. 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 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.

1066. 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 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.

1067. *Soybean Digest.* 1946. Increase Australian soybean acreage. June. p. 6.
• ***Summary:*** According to Donald Shand, about 10,000 acres of soybeans will be planted in Australia this year as a result of the trip that he made to America in 1945. The soybeans grown in Australia will be used for oil extraction and livestock feeding. In a recent speech at a farmer's conference at Armdale, New South Wales, Mr. Shand said: "The story of the soybean is one which fascinates any visitor to the States." He especially praised the work of Dr. W.J. Morse.

1068. Left to right –"Soybean" Johnson, W.J. Morse, W.L. Burlison, unknown man, at the American Soybean Association's annual meeting, St. Louis, Missouri, in the Hotel Jefferson (Photograph). 1946. Aug.
• ***Summary:*** This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1069. Henson, Paul R. 1946. The southern regional soybean variety program. *Soybean Digest.* Sept. p. 37-39.
• ***Summary:*** "The regional soybean program in the South covers 12 southern states beginning with Oklahoma and Texas on the western end of the region, extending eastward to the coast, including the states of Tennessee and Virginia. The work is being carried on as a cooperative project with the U.S. Regional Soybean Laboratory and the agricultural experiment stations of these 12 southern states. Headquarters for the southern section are located at the Delta Experiment Station, Stoneville, Mississippi.

Footnote: The U.S. Regional Soybean Laboratory is: "An organization participated in by the Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, U.S. Dept. of Agriculture, and the Agricultural Experiment Stations of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota. Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Virginia, and Wisconsin. The culture of soybeans as an oil crop is not new to the South. In 1920, the four leading states in the production of soybeans for seed were: North Carolina, Virginia, Alabama and Missouri. In 1931, of the Southern states, only North Carolina remained in this top group. Since that time the production in the southern states in percent of the total U.S. crop has steadily declined. The lack of adapted varieties suitable for bean production, the conflict with cotton for labor, the absence of adequate farm machinery on the cotton and tobacco farms, and the adverse climatic conditions over much of the South during the late fall and early winter when soybeans are ready for harvest, are factors which have discouraged the production of soybeans as an oil

crop.

"The regional soybean program in the South has as its objective the development of better adapted, higher yielding strains of soybeans for industrial utilization. Varieties must be developed that are high yielding, resistant to shattering, lodging, diseases, and have a content of oil and protein most desirable for industrial utilization.

"The varied rotations and cropping practices characteristic of different sections of the South necessitate the development of adapted varieties covering a wide range in maturity. Cotton farmers of the Mississippi Delta section of Tennessee, Arkansas, Mississippi and northern Louisiana, desire a variety which will mature in August or early September, in order to utilize their labor supply more efficiently. There is a definite need over much of the South for a variety that will mature in September or early October, in order that winter grains or alfalfa may be planted after the soybeans are harvested. In the Southeast, where it is a common practice to plant soybeans after small grains, and in south Alabama after early potatoes, a somewhat different variety may be needed. The farmers of certain sections of Oklahoma and Texas want a high yielding drought resistant variety that will set and develop seed during the hot dry summer months. These factors are being considered in the development of better varieties for the different sections of the South.

"Breeding and selection work to develop better varieties is under way at a number of the southern agricultural experiment stations in the cooperative improvement program. New strains as rapidly as they are developed, are entered in uniform variety tests and are grown across the southern region. The varieties of similar maturity are grouped in uniform tests according to a system established by the U.S. Regional Soybean Laboratory in 1938.

"The southern varieties and strains are entered in the progressively later maturing groups of VI, VII, and VIII. Through the middle South, the strains of group VI normally mature from October 1 through 15, those of group VII, October 16-31, and Group VIII, in early November. The maturity of these groups is a few days later across the upper South and earlier in the lower South. Because of the interest in early maturing soybeans, the uniform test, Group IV, is being grown at a number of locations across the upper South. Yields with other agronomic data are taken by the cooperators in the region. Seed samples from the tests are sent to the U.S. Regional Soybean Laboratory for chemical analyses."

The rest of the article discusses particular varieties developed for the U.S. South. Contains 4 tables.

A photo shows 13 men, all dressed in coats and ties, seated or standing. The caption: "When Regional Laboratory and university agronomists get together, at ASA convention in St. Louis. From left to right, back row: Robert B. Carr, Stoneville, Mississippi; L.F. Williams, Urbana, Illinois; Dr. Howard W. Johnson, Beltsville, Maryland.; Paul R. Henson, Stoneville; Dr. W.B. Allington, Urbana; Dr. Donald W. Chamberlain, Urbana. Front row: J.L. Cartter, Urbana; C.R. Weber, Ames, Iowa; Dr. D.F. Beard, Ohio State University, Columbus. Ohio; Dr. W.J. Morse, Beltsville, Maryland; Dean F. McAlister, Urbana; Dr. Lewis C. Saboe, Columbus; and Carl V. Feaster, Columbia, Missouri." Address: Agronomist, U.S. Regional Soybean Lab., Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Delta Branch Experiment Station, Stoneville, Mississippi.

1070. Morse, W.J.; Johnson, H.W. 1946. Organization of soybean disease research in the U.S. Department of Agriculture. *Soybean Digest.* Sept. p. 49.

• ***Summary:*** "Since July 1, 1945, when additional funds were made available by Congress to the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, U.S. Department of Agriculture, for soybean disease investigations, plant disease specialists have been employed at a number of strategic locations in the United States to carry on a coordinated program of pathological research. The organization that has been set up is outlined briefly in the following paragraphs.

"Since the Cornbelt is the major soybean producing area of the United States, first consideration has been given to organizing the work in that region. Dr. William B. Allington, plant pathologist of the U.S. Regional Soybean Laboratory, was assigned to the new project on October 8, 1945 as a coordinator of the soybean disease work in the Corn-belt. He retained his headquarters at Urbana, Illinois, where he works in close cooperation with the Illinois Agricultural Experiment Station and the staff of the U.S. Regional Soybean Laboratory. On January 14, 1946, Dr. Donald W. Chamberlain was appointed at Urbana, Illinois, to work with Dr. Allington on the numerous soybean disease problems being investigated there, thus continuing and broadening the research program at this location.

"Other centers of investigation have been established in cooperation with the state agricultural experiment stations and agricultural colleges of the Middle West at the following locations: Columbus, Ohio; Lafayette, Indiana; Ames, Iowa; Columbia, Missouri; Madison, Wisconsin; and St. Paul, Minnesota. Fungus, bacterial and virus diseases of the soybean are being studied by this staff of trained investigators and their work is being integrated closely with that of the plant breeders, both state and federal, engaged in producing new, superior soybean varieties.

"It is believed that through this coordinated program of breeding and disease research, improved disease-resistant soybean varieties will eventually be made available to the growers. This will provide a disease control measure that is now largely lacking to soybean producers.

"A second major soybean-producing area is the South,

especially the Delta region of Mississippi, Arkansas, and Louisiana. Consideration has been given also to organizing the work in that region. A coordinating center for the soybean disease work in the South has been established at the Delta Branch Experiment Station, Stoneville, Mississippi, which is likewise the headquarters of the work of the U.S. Regional Soybean Laboratory in the South. Dr. Howard W. Johnson has been assigned to this position as coordinator of the soybean disease work in the South.

"Other centers of investigation have been established in cooperation with the state agricultural experiment stations and agricultural colleges of the South at the following locations: Raleigh, North Carolina; Experiment, Georgia, and Baton Rouge, Louisiana. Root-knot [nematode], southern blight, and other diseases of the soybean are being investigated in this region.

Drs. W. J. Morse and W. L. Burlison acknowledge honorary life memberships

"Here, as in the North, the plant disease studies are being closely integrated with the work of the plant breeders with the objective of producing improved, disease-resistant soybean varieties.

"Overall coordination for the entire program is supplied from the national headquarters of the Division of Forage Crops and Diseases at Beltsville, Maryland, by Dr. J. Lewis Allison, head of our project on forage crops diseases. Research on soybean diseases is conducted at this location by Dr. C. L. Lefebvre, who has been assigned part time to the soybean disease project.

"In summary, we feel that during the past 14 months an adequate organization has been set up and qualified personnel have been employed to make possible a vigorous attack on soybean disease problems in the major soybean producing areas of the United States. This organization has been integrated closely with existing state and federal organizations devoted to soybean breeding and disease work. It is believed that through this enlarged, coordinated program faster progress will be possible in developing control measures for soybean diseases, particularly through the development and release to the growers of improved, disease resistant soybean varieties."

A photo shows some the USDA men working on soybean diseases who attended the ASA convention. From left to right: Dr. Donald W. Chamberlain, U.S. Regional Soybean Laboratory, Urbana, Illinois; J.M. Crall, pathologist for the University of Missouri and USDA; Dr. Howard W. Johnson, Bureau of Plant Industry, Beltsville, Maryland; Dr. W.B. Allington, U.S. Regional Soybean Laboratory, Urbana. Address: 1. Principal Agronomist; 2. Senior Pathologist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U.S. Dep. of Agriculture.

1071. *Soybean Digest.* 1946. Honorary life members [American Soybean Assoc.]: Morse and Burlison (Photo caption). Sept. p. 18.

• ***Summary:*** Separate photos show Morse and Burlison, each standing and apparently speaking, probably at the annual convention. The lower caption reads simply: "Drs. W.J. Morse and W.L. Burlison acknowledge honorary life memberships." No story accompanies these photos. Morse, a USDA agronomist and past president of the ASA, looks quite thin. Burlison is chief of the agronomy division, University of Illinois, and past president of the ASA.

George Strayer wrote in Dec. 1980 (in a letter to William Shurtleff) that the awards were presented in September 1946 at the convention held in the Jefferson Hotel in St. Louis, Missouri.

Note 1. This is the earliest document seen (Oct. 2004) that mentions honorary life members of the American Soybean Association. Morse and Burlison, both soybean pioneers, were the first to be elected. Thereafter, honorary life members were announced at ASA's annual meeting each year until 1976. However in late 1944 the *Soybean Digest* published tributes (with portrait photos) that recognized soybean pioneers: September–Pioneers recognized: Fouts, Ostrander, Meharry, Hurrelbrink, Burlison, Morse, Christie, Wilkins. November–Pioneers: [John T.] Smith, [Bert S.] Strayer, [Frank] Hurrelbrink. These recognitions were the predecessors of the honorary life members concept. Some of

the pioneers (such as Meharry) were no longer living at the time of recognition. Note that Morse and Burlison were both in the first group of pioneers recognized.

Note 2. Morse did not have a PhD degree; he was Mr. Morse. However many people preferred to call him Dr. Morse because of their great respect for him and his knowledge of the soybean. Address: USDA.

1072. Roland McKee, P.L. Ricker, W.J. Morse of USDA, seated and looking over documents (Photograph). 1946.
• ***Summary:*** This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1073. *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.

1074. W.J. Morse seated with two Australian agriculture officials who came to study soybeans in the U.S. in 1946 (Photograph). 1946.
• ***Summary:*** This full-page digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1075. 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.

1076. Adair, C. Roy. 1947. Third work planning conference of the U.S. Soybean Regional Laboratory for the Southern States region, Memphis, Tennessee, February 5-7, 1947. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 142. Undated. 29 p.

• ***Summary:*** "The third work planning conference of the collaborators conducting the soybean improvement program in cooperation with the U.S. Regional Soybean Laboratory was held at Hotel Peabody, Memphis, Tennessee, on February 5-7, 1947. The conference was called for the purpose of reviewing accomplishments during the past season and planning the research program for the coming year. The two previous conferences were held at the Mississippi Agricultural Experiment Station, Delta Branch Station, Stoneville, Mississippi, the headquarters of the southern section of the Laboratory. However, it was decided to hold this third meeting in Memphis to effect a saving in time and travel expense for the conference members.

"Wednesday, February 5–P.R. Henson, Chairman

"The conference was called to order at 9:00 a.m. with the following State and Federal men in attendance:

"Aamodt, O.S., Head Agronomist, Forage Crops & Diseases, USDA, Beltsville, Maryland

"Adair, C.R., Agronomist, U.S.D.A., Rice Branch Station, Stuttgart, Arkansas

"Allington, W.B., Pathologist, Forage Crops & Diseases, Urbana, Illinois

"Carr, R.B., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi

"Cartter, J.L., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Chance, F.S., Director, Tennessee Agr. Exp. Station, Knoxville, Tenn.

"Collins, F.I., Chemist, U.S. Regional Soybean Laboratory. Urbana, Illinois

"Dameron, J., Agronomist, Cotton Branch Station, Marianna, Arkansas

"Erdman, L.W., Bacteriologist, U.S. Department of Agriculture, Beltsville, Maryland

"Feaster, C.V., Agronomist, U.S. Regional Soybean Laboratory, Columbia, Missouri.

"Gore, U.R., Agronomist, Georgia Experiment Station, Experiment, Georgia

"Gray, J.P., Agronomist, Louisiana Experiment Station, Baton Rouge, La.

"Hartwig, E.E., Agronomist, U. S. Regional Soybean Laboratory, Raleigh, North Carolina

"Henson, P.R., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi

"Holman, L.E., Agricultural Engineer, Div. Agr. Engineering, U.S.D.A., Urbana, Illinois

"Johnson, H.W., Pathologist, Forage Crops & Diseases, U.S.D.A., Stoneville. Mississippi

"Long, O.H., Agronomist, Tennessee Agr. Exp. Station, Knoxville, Tennessee

"McVickar, M.H., Agronomist, Virginia Agr. Exp. Station, Blacksburg, Virginia

"Marston. H.W., Agricultural Research Administration, USDA, Washington, D.C.

"Milner, R.T., Chemist, Northern Regional Research Laboratory, Peoria, Illinois

"Morse, W.J., Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland

"O'Kelly, J.F., Agronomist, Mississippi Exp. Station, State College, Mississippi

"Sayre, C.R., Agronomist, Delta Experiment Station, Stoneville, Mississippi

"Schember, V.E., Agronomist, Texas Agr. Exp. Sta., College Station, Texas

"Sprague, H.B., Agronomist, Texas State Research Foundation, Dallas, Texas

"Staten, H.W., Agronomist, Oklahoma Agr. Exp. Station, Stillwater, Oklahoma

"Williams. L.F., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois

Page 2: "A Coordinated Approach to Regional Research Problems in the Southern States by F.S. Chance–The first speaker on the morning program was Director F.S. Chance of the Tennessee Agricultural Experiment Station who welcomed the collaborators to the State. Dr. Chasse discussed the aim of the Southern Station Directors to coordinate their programs on mutual problems to the extent that work at the stations will be replication and not duplication.

"Several proposed Flannagan-Hope projects were discussed. Marketing projects on the problems of cotton and tobacco have been more difficult to outline than projects on poultry and dairy products, or on marketing of perishable products. Among the present projects under Flannagan-Hope, those on marketing will get first consideration. The southern stations are joining in the printing of research bulletins covering certain phases of activity, among these being the work at the Vegetable Breeding Laboratory. The Southern Directors are looking forward to continued cooperation of this kind.

"The Place of Soybeans in an Efficient Agriculture in the South by C.R. Sayre–In general farm incomes for 1946 averaged three times those received in 1935-39. This reflects a strong purchaser demand for farm products which

is likely to continue for most commodities through much of 1947. Fats and oil prices are apt to be maintained at favorable levels relative to other products. When a world market perspective is used, there is a shortage of fats and oils of startling proportions. Assuming pre-war levels of consumption, the requirements in 1946 were 5 to 6 million tons. Supplies of fats and oils available for export from all sources were about 3 million tons. The extent to which this world-wide demand is satiated depends upon the accumulation of purchasing power through favorable trade balance, loans, or relief allocations for many war-torn countries. It is of interest in passing that the United States became a net exporter of fats and oils for the first time during World War II. Our expanded production–particularly of soybeans–and restricted consumption resulted in the shift.

"It is estimated that this country could have used an additional million tons of fats and oils in 1946 had supply conditions permitted. Unless extremely chaotic conditions develop from industrial descriptions, demand for farm products in general should remain at a high level, and, a large crop of soybeans in 1947 could probably be moved at favorable prices.

"So far soybeans have been 'on the third team' when you consider the prevailing farming systems in most parts of the South. This, of course, does not detract from their importance as an enterprise for research and improvement, but it is reflected in the attitude toward the crop in many sections. This exists in the minds of many agricultural workers as well as farmers. Some of it has grown out of early disappointments when soybeans did not attain the spectacular yield levels nor have quite all the soil-building qualities which were included in their 'advanced billing.' Then, too, many people appraise a crop by looking at historical acreages, yields, and volume of production. These in no way reflect the future potentialities of soybeans, if they are improved in the future, in balanced and efficient farming systems in many parts of the South.

"We should appraise the enterprise in terms of their place in the best adapted farming systems in each major production situation in each production area of the South. Space limitations permit mentioning only three. In the Mississippi Delta it is estimated that 75 percent of the farming systems would be cotton, cash grain (including soybeans), and roughage systems in an efficient agriculture. Soybeans would be one prospect for some of the land which is not of top-notch quality for cotton. On farms where soybeans, small grains, and possibly combinable sorghums were grown, machinery costs for these crops could be kept at a minimum.

"In the Tidewater area of Virginia and North Carolina, commercial soybeans have been fitted in to good advantage. There is little cotton grown on farms in the area, and soybeans help to balance out the utilization of both labor and equipment."

Note: The Tidewater area or region of these two states is the low-lying Atlantic coastal plain in southeast Virginia and northeast North Carolina. In these areas, the water level rises when the tides come in.

"The Piedmont [foothills, between the Tidewater area and the Blue Ridge Mountains] presents a different situation. It is difficult to expect economic success with a cash crop alternative that is not a high-valued labor-intensive enterprise in most parts of this area. Grain crops for feed for livestock appear to present a more favorable opportunity, and in most instances they would contribute less to erosion than do soybeans.

"Work of the Northern Regional Research Laboratory, by R.T. Milner–The work of the Northern Regional Research Laboratory on other commodities, such as agricultural residues and cereal crops, was first summarized. From agricultural residues, there have been produced (1) Noreseal, a cork substitute, now being tried on a commercial scale with 70,000 bottles; (2) a soft grit blasting process for cleaning machinery, now in commercial use; (3) Noreplast, a plastic molding powder containing up to 50 percent of residues; (4) furfural products of interest to synthetic chemical producers; (5) a new process of pulping straw, now being given commercial trial in Holland and of much interest here; and (6) synthetic liquid fuels, with a semi-works plant using one ton of corncobs per day, now in experimental operation at this Laboratory.

"Cereal crops work is in progress on (1) study of starch granules at different stages of maturity; (2) alcohol as a motor fuel; (3) improved feed and food products from fermentation processes; (4) fibers both from zein, a corn protein, and from amylose or acetylated amylose; (5) better steeping agents; (6) glucose sirup from wheat flour; and (7) a survey for better antibiotics.

"The most important soybean research project of the Northern Laboratory has been a study of the flavor stability of the oil. For this purpose, a great deal of work has been required to establish a means of testing reversion. No chemical method could be found so a taste panel of ten experienced tasters was established. This group meets twice daily and their results are evaluated statistically. The results to date are inadequate to solve the problem, but are more hopeful than at any time during the eleven years the laboratory has been working on the stability problem. It is clear that soybean oils produced commercially differ markedly in stability, that part of these differences are caused by bad practices in processing the beans, that many oils are greatly benefited by use of 0.01 percent citric acid during deodorization, and that this treatment improves both expeller and extracted oils" Continued. Address: Secretary of the Conference, Memphis, Tennessee; U.S. Regional Soybean Laboratory, Urbana, Illinois.

1077. Adair, C. Roy. 1947. Third work planning conference

of the U.S. Soybean Regional Laboratory for the Southern States region, Memphis, Tennessee, February 5-7, 1947 (Continued–Document part III). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 142. Date? 29 p.

• ***Summary:*** (Continued): Page 20: "Thursday afternoon, February 6–R.W. Marston, Chairman Special Topic–Factors Affecting Soybean Production

"Legume Inoculation in the South with Special Reference to Soybeans by Lewis W. Erdman–Data taken from New Jersey Station Bulletin 607 were given to picture the nitrogen balance in the soils of the United States. The annual additions of 5,464,566 tons of nitrogen fixed by symbiotic bacteria in legumes (including 1,698,794 tons for harvested crops; 2,320,772 tons for pastures in farms; and 1,445,000 tons for pastures not in farms) plus 4,366,170 tons fixed by non-symbiotic microorganisms represented roughly 9/16 of the total nitrogen income from all sources amounting to 16,450,000 tons. Total annual losses amounted to 23,660,000 tons, making a net annual loss of 7,210,000 tons.

"Since 1930 these losses have been reduced considerably, due to the efforts of the Soil Conservation Service. Likewise, additions of nitrogen have been materially increased due to the huge increase in acreages of inoculated legumes, especially during the war years.

"In 1929 estimated total production of legume bacteria cultures for all cross inoculation groups was around 1,500,000 bushel units. Now the estimated annual production of legume inoculants is around 22,500,000 bushel units. It was further estimated that of this total, about 15,000,000 bushels have been prepared for the inoculation of soybeans. Soybean bacteria (*Rhizobium japonicum*) are specialists–some do better on certain varieties, and there is evidence that adaptation of strains of bacteria for different varieties in a given locality may be an important factor. Also, the problems of breeding for increased quality, oil content, etc., may influence the genetic factors within the plant that carry the ability to be nodulated and to enter into an efficient symbiosis with the Rhizobium. Laredo and Peking soybeans have always presented an inoculation problem to the soil bacteriologist, in that they are more difficult to successfully inoculate than other varieties. Soybeans are grown in corn belt soils at a time when there is a maximum production of NO3 nitrogen by soil organisms. When NO3 is present, soybeans utilize it; and the need for fixation is lessened. This may account for the relatively small amount of nitrogen fixed by soybeans. A 25-bushel soybean crop, requires about 125 pounds nitrogen. It is doubtful if more than 50 pounds per acre are fixed under corn belt conditions, consequently high yields are produced at the expense of soil nitrogen.

"In the south, soils are notably deficient in nitrogen as well as certain other nutrients. Low State averages mentioned in the State reports seem to offer a challenge for better cultural and fertilizer practices and perhaps inoculation research on soybeans.

"There is a need for more accurate data showing the amounts of nitrogen fixed by different legumes growing under different soil and climatic conditions. With the new technique using the stable isotope N15, it will be possible to calculate the effect of various levels of fertility on the amount of nitrogen fixed by various legumes.

Page 24: "Soybean meal for poultry has certain advantages:

"(1) Low price and abundance compared to animal protein supplements.

"(2) Soybean meal has a good proportion of most of the essential amino acids though low in one or two.

"Soybean meal has certain disadvantages;

"(1) lower mineral content than some protein supplements.

"(2) Lower vitamin content (riboflavin especially)

"(3) Heat treatment is desirable to improve biological value, but too much heating is harmful.

"A laying ration containing 30 percent soybean meal was satisfactory for egg production but caused low hatchability and low viability of chicks. This was not true of some strains of poultry. The laying rations and growing rations were improved by addition of fish meal, dried skimmed milk, or fresh cow manure. Green pasture also improved the gains.

"Cottonseed meal cannot be used in laying ration but can be used in growing rations. All this work is being done on expeller and (hexane) solvent meal. The experiments will have to be repeated if alcohol-solvent meal becomes plentiful enough to become generally available.

"Discussion of Cooperative Soybean Projects for the Southern States–Mr. Marston discussed the Flannagan-Hope bill and tentatively defined marketing as anything that happens to a commodity after harvest.

"A request from one of the Experiment Stations for additional research on soybean production problems and on soybean storage and marketing problems in the South was brought to the attention of the conference group. Following a discussion of the need for such work, it was moved by Professor J.F. O'Kelly, Mississippi Agricultural Experiment Station, that two projects, (1) breeding, cultural, and production, and (2) seed storage and marketing for soybeans, be submitted to the Directors of the Agricultural Experiment Stations of the southern states for their consideration as a project under the Flannagan-Hope Research and Marketing Act. This was seconded by Professor H.W. Staten of the Oklahoma Agricultural Experiment Station and carried unanimously.

"The following committees were appointed: (1) Committee to consider seed storage and marketing project:–W.R. Paden, C.R. Sayre, H.W. Marston, W.J. Morse, L.E. Holman, P.R. Henson, and J.L. Cartter; and (2) Committee

to check the production research project:–H.W. Staten, C.R. Adair, John Gray, and W.B. Allington.

"The committees were instructed, to draw up an outline of the proposed project consideration at the afternoon session.

"New Soybean Introductions and Recent Developments Abroad, by W.J. Morse–The introduction of soybeans since 1932 has been at a rather low ebb. From 1932 to 1946, inclusive, 316 samples have been received from foreign countries, of which 100 were from oriental countries–China, Japan, Manchuria, India, and Java. Although these introductions have been tested at several locations, as yet very few have shown any special promise. P.I. 4104,881–Nanksoy, from Nanking, China–has shown some promise as a grain type in Louisiana. In 1946, 105 introductions–very early [page 25] early, and medium early types–were received from the Belgium Department of Agriculture. This collection represented varieties and strains obtained originally from Austria, Canada, Denmark, Netherlands, Portugal, Rumania, Sweden, United States, and U.S.S.R. Some rather interesting strains were noted in the introductions grown at Urbana, Illinois, and Beltsville, Maryland, in 1946. The following table shows the countries from which introductions were received and the number from each country by years:"–Africa, 14 in 1942.

Australia, 7 in 1939.
Belgium, 106 in 1946.
Brazil, 1 in 1936.
Canada, 3 in 1938.
China, 57 in 1933-1937.
El Salvador, 2 in 1946.
England, 1 in 1945.
France, 3 in 1937 and 13 in 1946.
Guatemala, 1 in 1941.
Hawaii, 2 in 1944.
India, 21 in 1936 and 7 in 1937.
Japan, 5 in 1932-1937.
Java, 8 in 1939.
Manchuria, 12 in 1932-1941.
Netherlands, 18 in 1939 and 12 in 1946.
Poland, 8 in 1934 and 1 in 1940.
Spain, 1 in 1934.
Sweden, 1 in 1936.
Tibet, 2 in 1932.
Uruguay, 1 in 1935.
U.S.S.R., 4 in 1933 and 1 in 1934.

Venezuela, 3 in 1940. In reviewing the introductions received during the past several years, it was noted that very few varieties have been obtained south of Nanking, China. Although the number of introductions has been few, several have given good results in the Southern States, such as Biloxi, Laredo, Seminole, Cherokee, Palmetto, Nanksoy, Clemson, Missoy, and others from the Nanking region. It would seem that South China offers an excellent region for exploration of new varieties. Chinese have informed us that the south region does not have an abundance of varieties. However, whenever we do get an introduction from that region, it seems to fit in somewhere in our Southern States and it is believed that there are many varieties and strains in the South China region that would be of value to our southern soybean program.

"As to recent developments abroad with soybeans, it would seem from the numerous foreign visitors to the office and our foreign correspondence that interest in soybean production is world wide. From July 1, 1945, to July 1, 1946, we had at the Division 50 visitors from 20 foreign countries. Some of these spent from one or two months to a year studying all phases of the industry. The foreign requests for experimental lots of seed were numerous. The following table indicates the widespread interest in the crop:" (Continued). Address: Secretary of the Conference, Memphis, Tennessee; U.S. Regional Soybean Laboratory, Urbana, Illinois.

1078. Adair, C. Roy. 1947. Third work planning conference of the U.S. Soybean Regional Laboratory for the Southern States region, Memphis, Tennessee, February 5-7, 1947 (Continued–Document part IV). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 142. Date? 29 p.

• ***Summary:*** (Continued): Page 26: A large table titled "Foreign Countries Sent Experimental Lots of Soybeans During 1944, 1945, and 1946" gives the name of many foreign countries and the number of lots sent to each, as follows:

"Argentina 4
"Australia 11
"Austria 1
"Barbados, B.W.I. [British West Indies], 1
"Belgian Congo 1
"Belgium 4
"Bolivia 1
"Brazil 8
"Canada 2
"Chile 2
"China 1
"Colombia 9
Costa Rica 6
"Cuba 5
"Czechoslovakia 1
"Dominican Republic 1
"Ecuador 4
"Egypt 2
"El Salvador 4
"England 4
"Ethiopia 3
"France 6
"French Equatorial Africa 1

"Germany 1
"Gold Coast, Africa 2
"Guatemala 3
"Haiti 4
"Hawaii 1
"Honduras 4
"India 6
"Iraq 1
"Italy 1
"Jamaica, B.W.I. 1
"Madagascar 1
"Malta 1
"Mexico 12
"Montseret [sic, Montserrat], B.W.I. 1
"Morocco 2
"Nassau, B.W.I. 1
"Netherlands 2
"Nicaragua 3
"Palestine 3
"Paraguay 1
"Peru 6
"Puerto Rico 1
"Scotland 1
"South Africa 1
"Spain 1
"Sweden 1
"Trinidad 1
"U.S.S.R. 3
"Venezuela 7

Note: The meaning of "a lot" of soybeans is unclear. How many soybeans and how many varieties are in a lot?

"Following the talk by Mr. Morse the conference recommended that a project be submitted for exploration in south China to secure introductions for use in the breeding program of the southern states.

"New Research Projects to be Considered–(a) Uniform fertilizer experiments. The outlining of a uniform project on the effect of fertilizers on yield and composition of soybeans is complicated by differences in soils, and levels of fertility among the interested states. The conference decided the problem was worth further study and Dr. W.R. Paden has agreed to serve as chairman of the Uniform Fertilizer Committee to draw up a project outline for consideration by the soybean conference group at the next meeting.

"(b) Collection, storage, and maintenance of foundation stocks of soybeans. No action was taken on this project other than to urge that each collaborator send Mr. Henson samples of any soybean introductions or selections regardless of character. Any size sample between one ounce and one pound will be satisfactory. These may be of value in the search for disease resistant strains.

"(c) Size of samples for chemical analysis was discussed and two recommendations made;

"(1) Sample size should be between 60 and 100 grams.

"(2) All foreign material should be removed from the samples.

"(d) Crosses to be made. Mr. Henson suggested that collaborators write him or Dr. Williams suggesting any crosses that would be of value to the breeding program.

"Friday afternoon, February 7

"Consideration of Proposed Flannagan-Hope Research Projects–The two committees appointed at the morning session submitted for consideration of the collaborators the following two projects entitled: (1) 'Harvesting, storing, and marketing of soybeans, lupines, and other legume seeds in the southern region.' (2) 'Develop improved strains and methods of culture of soybeans for food, forage, and industrial purposes in the Southern States.' It was moved by Professor H.W. Staten of the Oklahoma Agricultural Experiment Station that the reports be adopted and that copies of the proposed new projects be sent to the Directors of the Southern Agricultural Experiment Stations. The motion was seconded by M.H. McVickar of the Virginia Agricultural Experiment Station and carried unanimously. Copies of the proposed project outlines as approved by the Southern States collaborators on the soybean improvement work are attached at the end of this report.

"Industrial Evaluation of Soybean Varieties–A commercial soybean oil refinery has agreed to evaluate a few of the better strains of soybeans that have been developed through the breeding program in order to determine if the high-yielding, high oil strains being developed are suitable for industrial use. It is suggested that seed of the following strains be submitted:

"Group IVS (2 strains): S5100 and Gibson

"Group VI (2 strains): Ogden and Arksoy 2913

"Group VII (4 strains): N44-92, N44-774, Roanoke, Palmetto or C.N.S.

"Group VIII (2 strains): Acadian and Mamloxi

"Mr. Henson will notify the collaborators as to the amount of seed each will be requested to submit to him for preparing the composites for industrial evaluation.

Page 28: "Time and Frequency or Meetings–Time for the next meeting of the group was discussed. and it was decided that perhaps a meeting every two years would be sufficient, with a small group meeting during the alternate year to plan experiments for consideration by the group. It was suggested that some travel funds might be held in reserve to meet with other groups of agronomists to plan new projects.

"C. Roy Adair
"Secretary of the Conference
"Memphis, Tennessee
"February 5-7, 1947." Continued (two attachments). Address: Secretary of the Conference, Memphis, Tennessee; U.S. Regional Soybean Laboratory, Urbana, Illinois.

1079. Agricultural Research Administration, USDA. 1947.

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."

1080. Morse, W.J. 1947. The versatile soybean. *Economic Botany* 1(2):137-47. June.
• ***Summary:*** An excellent overview of the multifaceted soybean, by the world's leading expert on the subject, written at about the time of his retirement. Contents: Introduction. Nomenclature. History. Present day production. Diseases. Use as food. Use as a source of oil. Soybean meal.

In oriental countries, the soybean is used mainly for food; "pressed, it gives oil for cooking; sprouted it gives a fresh vegetable rich in vitamins; picked when green, it makes an excellent green vegetable; ground dry, it makes flour; soaked and ground with water, it provides milk, and the curdled milk furnishes the famous bean curd or tofu–the boneless meat of the Orient–used in the form of various cheeses and as a meat substitute; roasted beans are used as salted beans and in cakes and candies; roasted beans and bean flour enter into numerous health drinks [resembling coffee]; fermented bean pastes are used in soups and for preserving vegetables; and boiled beans are eaten with millet, rice, or kaoliang."

Contains 11 photos. Address: USDA.

1081. *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.

1082. Caldwell, Joseph S.; Culpepper, C.W.; Hutchins, M.C.; Ezell, B.D.; Wilcox, M.S. 1947. Dehydration of green vegetable soybeans: A comparison of quality in nineteen varieties and strains with that of canned green and mature dry beans. *Canner* (*The*) 105(10):13-16, 24. Aug. 30; 105(11):13-14, 16, 26. Sept. 6; 105(12):15-16, 18. Sept. 13; 105(13):35-36. Sept. 20. Summarized in Soybean Digest. March 1948, p. 20-30. [25 ref]
• ***Summary:*** "Japanese horticulturalists classify vegetable soybeans as garden vegetables and have developed and selected about 125 distinct varieties which they grow especially for food purposes... out of a total of about 125 varieties introduced from Japan [to the USA], approximately 25 are fairly well adapted to conditions in some or most of the important soybean-producing districts and combine satisfactory yields and good to excellent quality as fresh green beans."

"The canning of vegetable soybeans on a commercial scale is assuming some importance. Twenty-three canning companies in 12 states included soybeans in the list of products packed in 1944. The number was reduced to 16 in 10 states in 1946" [according to the National Canners Association, Canners Directory, for 1944 and 1946]... Commercial freezing of soybeans, either alone or in combination with sweet corn as succotash, has very recently begun by a few commercial operators.

For the first varieties to reach usable maturity, the green pods were picked from the plants by hand, spread in the laboratory on wire trays to a depth of about an inch, steamed for a few minutes to soften the pods, then shelled in a power-driven pea huller equipped with special screens having openings of suitable size. "This method proved slow and unsatisfactory, as the pods clung together in masses so that many remained unopened even after two or three passages through the machine, while the empty hulls broke up and tended to clog the screens." A much more satisfactory and efficient method is described, still using the pea huller.

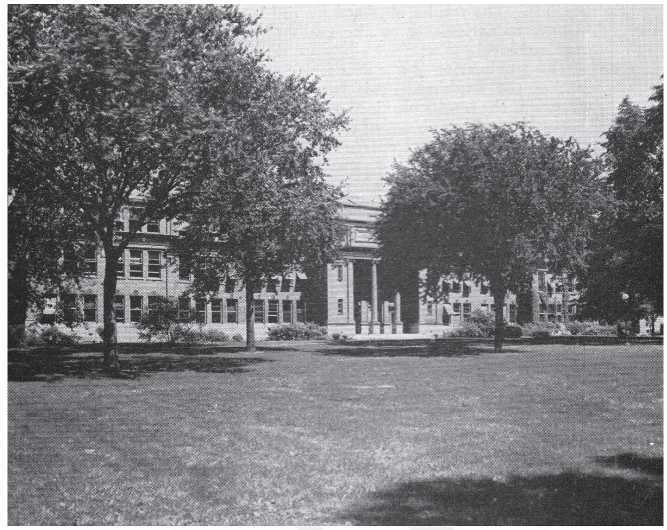
Table 1 shows the 17 varieties of green vegetable soybeans used, date harvested, days from planting screen size, length of blanch, total solids content, ascorbic acid content (hand shelled, or steamed then machine shelled), carotene content, and yield of dry product as a percentage of fresh product. The varieties, listed alphabetically, are:

Aoda, Bansei, Emperor, Etum, Giant Green, Hahto, Imperial, Jogun 2, Kanum, Kanro, Rokusun, Sousei, Tastee, Willomi, and Wolverine. The varieties with the best scores after dehydration were Willomi (strain A), and Etum. Address: USDA.

1083. Lambert, W.V. 1947. Improvement and industrial utilization of soybeans: Research under the Soybean Laboratory program (Continued–Document part II). *USDA Miscellaneous Publication* No. 623. 26 p. Sept. Summarized in Soybean Digest, Nov. 1947, p. 35. [148 ref]

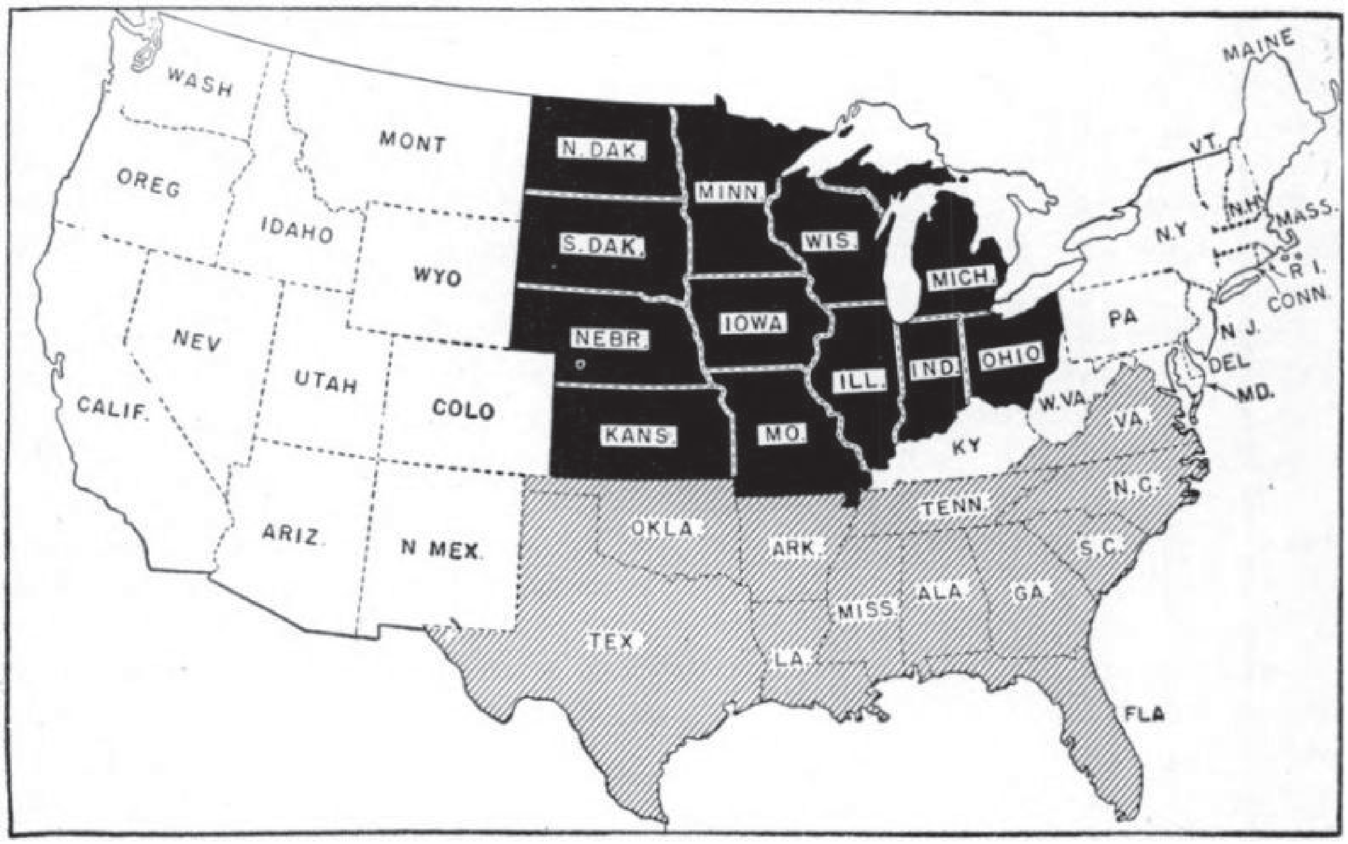
• ***Summary:*** Continued. Page 4: "Organization of the Laboratory: In selecting the location for the Soybean Laboratory, the advantages offered by the University of Illinois at Urbana were considered outstanding. The University, through its research and extension programs, had successfully established a place for the crop in the agriculture of the State. Illinois, in the heart of the north-central soybean-producing area, grows more soybeans than any other State. The offer of laboratory space, storage facilities, plot land, and associated services by the University made possible the immediate establishment of the laboratory at Urbana.

"Since the problems of soybean production and utilization required both biological and technological studies, two bureaus of the Department cooperated with the States in planning the research program of the laboratory. The Bureau of Plant Industry cooperated in the development of plans for



the study of factors influencing the production and quality of the crop, and the Bureau of Chemistry and Soils contributed to the planning of research on the qualities of soybeans desired by industry and the development of industrial processes to extend the uses for soybean products.

"The initial organization of the laboratory called for a director as administrative head and a staff of specialists in agronomy and chemistry. The agronomic work was integrated with the Department's soybean program in the Bureau of Plant Industry, and with work in the States by the establishment of cooperative agents in five States in the



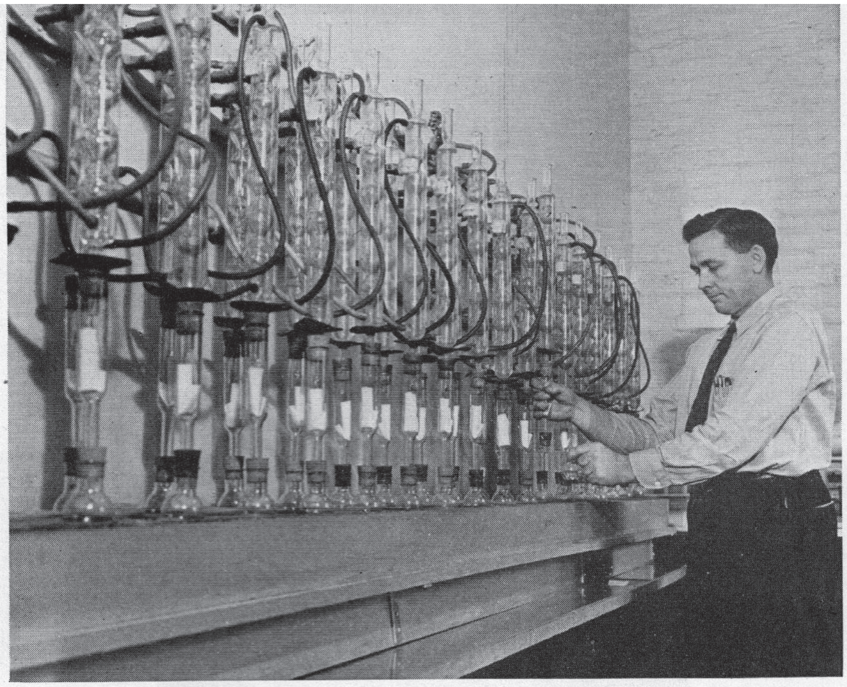


FIGURE 3.—Laboratory equipment for determining the oil content of soybeans of different varieties and strains.

major soil and climatic areas where soybeans were produced.

"The chemical personnel included as project leaders a chemical engineer to serve the processing requirements of the laboratory and to conduct research in this field, a chemist familiar with industrial plastics and other uses for plant proteins, an oil chemist, and an analytical chemist; and in addition, three associate chemists and a number of assistants. Under cooperative arrangements with the Indiana Agricultural Experiment Station, two cooperative agents were appointed for chemical research on soybean products in that institution.

"The understanding between the 12 States and the Department provided for continued joint planning and coordination of the laboratory's research program for the broad regional attack on soybean production and utilization problems. State representatives designated by their respective experiment station directors were appointed collaborators by the Secretary of Agriculture. The collaborators and Department representatives functioned as a planning and integrating group. Representatives of the States agreed to assemble short abstracts descriptive of any work being carried on at their stations which pertained to soybeans.

"On July 1, 1942, the research on utilization of soybeans and their byproducts, which up to that time had been carried on in the laboratory at Urbana, was transferred to the Northern Regional Research Laboratory at Peoria, Illinois. The agronomic studies, including genetics, breeding, and physiology, were continued at the Soybean Laboratory and in the cooperating States. Chemical facilities to serve the breeding and physiological programs also remained in the Urbana laboratory. The soybean was designated as one of the farm commodities for study at the Northern Regional Research Laboratory, and the research program on industrial utilization has been further developed there. As a result of this change the U.S. Regional Soybean Laboratory at Urbana was able to extend the cooperative breeding and research studies to the agricultural experiment stations of 12 Southern States.

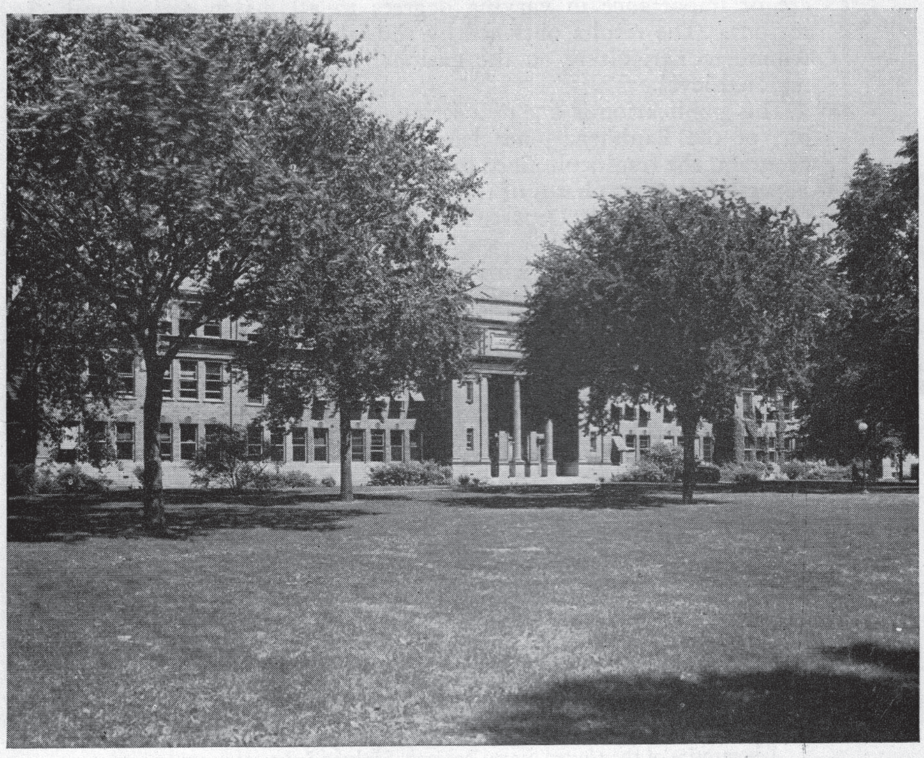
"The Cooperative Research Program: At the first meeting of the collaborators in Urbana on April 22, 1936, consideration was given to the further development of research plans. In fields of chemistry and chemical engineering four groups of projects were outlined. These included studies of (1) soybean oil in food and nonfood uses, (2) soybean meal as a source of industrial products, (3) chemical properties of soybeans and their products, and (4) engineering aspects of processing. Joint agronomic and chemical research was outlined to study the influence of differences in variety, soil type, soil treatment, and climate on the composition of the beans. Agronomic studies were directed to the further selection and improvement of varieties by breeding with special reference to regional adaptation and industrial uses. The soybean production studies were later supplemented with controlled physiological investigations to learn more about the influence of environment on the composition of soybeans, and with studies of soybean diseases and their control by breeding resistant varieties and by other methods.

"The cooperative research planned with the Indiana Agricultural Experiment Station included studies of the chemistry of the phosphatides, sterols, and associated compounds of soybeans and of the isolation, identification, and characterization of the carbohydrates of soybeans.

"Accomplishments of the Research Work: In reviewing the work and accomplishments of the U.S. Regional Soybean Laboratory, it should be remembered that its purpose was specific and that its progress was the result of the splendid cooperation of growers, processors, manufacturers, and educational and research forces in the region. Its founders planned 'to obtain, through basic research, facts and materials applicable to the industrial utilization of the soybean and soybean products and to develop methods whereby these facts and materials may be utilized for the benefit of agriculture.' The plans were unique at the time in that they proposed to integrate research on the production of a farm crop with research for its industrial utilization. It was expected that the closer association of these purposes would result in a clearer understanding of the factors which influence the industrial qualities of the crop. In the present

IMPROVEMENT and INDUSTRIAL UTILIZATION of SOYBEANS

Research under the Soybean Laboratory Program



Miscellaneous
Publication No. 623

U. S. DEPARTMENT OF AGRICULTURE

summary of progress toward this end, consideration is given to improvements in and standardization of the crop as a source of industrial raw material, the advancement of basic knowledge of its components and properties, and the application of this knowledge to the manufacture of useful products."

"Soybeans and Their Industrial Uses: The long and varied use of the soybean in the Orient has developed and preserved varieties suited to a broad range of climate and use. Some of those varieties had been introduced into the United States by representatives of the State experiment stations and were grown on limited areas prior to 1900. The Department introduced a large number of varieties in 1898 and has continued to seek superior strains since that time. The careful study by W.J. Morse, of the Bureau of Plant Industry, of soybeans and their associated industries in the Orient in 1929-31 was fruitful in the selection of soybean varieties suited to special purposes and in the collection of accurate information on the processing and manufacture of soybean products. The results of this study proved valuable to the development of the Soybean Laboratory program and to the solution of emergency problems during World War II.

"Previous studies of available varieties had given some measure of the differences in plant and seed characters of soybeans due to variety. Varietal differences in oil content, oil properties, and protein content had been observed, but the available information on varieties of soybeans adapted to the north-central region did not permit accurate predictions as to their quantitative or qualitative industrial properties. The cooperative research program, therefore, included plans for a systematic study of representative varieties to be grown under the various soil and climatic conditions in the region. These uniform variety tests have been conducted by the State agricultural experiment stations in Ohio, Indiana, Illinois, Iowa, and Missouri since the beginning of the cooperative program in 1936, and all of the North Central States have cooperated in this work since 1942. It was expected that agronomic records of the variety and environment correlated with chemical analysis of the seed would indicate differences due to variety and shed some light on the influence of environment, soil type, soil fertility, and seasonal climatic conditions on the industrial constituents and their properties.

"The initial variety studies of 1936 included the following 8 named varieties and one strain designated by number, arranged according to length of time required to mature, from 100 to 130 days: Mandarin, Mukden, Illini, Dunfield, Manchu, Scioto, T-117, Peking, and Boone. Plantings were made in uniform tests at 43 points representative of soybean-producing areas in Illinois, Indiana, Iowa, Missouri, and Ohio. Additional varieties and strains were included in these tests as promising selections were developed in the breeding program. The variety studies conducted each year since 1936 have provided helpful information on the adaptation of varieties in the region to industrial processing."

Each of the accomplishments outlined in the Contents (above) is discussed here in detail.

Photos and figures show: Cover: The laboratory buildings at the University of Illinois, Urbana. (1) A map of the United States. The States originally cooperating in the work of the Soybean Laboratory are those shown in black. Since 1942 the shaded States also have been cooperating with the laboratory in its research program.

(2) Culture chamber at the Soybean Laboratory where soybeans are grown under controlled environmental conditions. (3) Laboratory equipment for determining the oil content of soybeans of different varieties and strains.

(4) Two men in a field studying the growth of different varieties of soybeans in a nursery at Lafayette, Indiana. (5) A field of Lincoln soybeans in southern Iowa.

(6) Examining a soybean plant that has been inoculated with a known disease and grown under controlled conditions so that the symptoms of the disease can be studied. (7) Making a chemical analysis of some of the constituents of soybeans, The chemical composition of soybeans is an important index to their potential uses.

(8) Soybean flakes freed from oil and ready to make into a plastic material by the use of chemicals, pressure, and heat. (9) Inspecting test panels treated with soybean-oil varnish and exposed to the weather on a 45º rack. Address: Administrator of Agricultural Research.

1084. Office of the Secretary, United States Department of Agriculture (USDA). 1947. Agriculture honors 50 employees for outstanding service (News release). Washington, DC. 9 p. Nov. 12.

• ***Summary:*** "In a special ceremony marking the first annual presentation of U.S. Department of Agriculture Honor Awards, Secretary of Agriculture Clinton P. Anderson today presented 7 Distinguished Service Awards, 43 Superior Service Awards, and 124 Length of Service Awards to individual employees and units of the Department."

"Employees who merit the awards are suggested by individuals and boards in the various agencies comprising the Department. Ultimately, two over-all boards make recommendations to the Secretary of Agriculture" (p. 1).

"Superior Service Awards were presented to the following individual employees:... (p. 3).

"David Breese Jones, Bureau of Human Nutrition and Home Economics, Beltsville, Maryland: For his contribution to science through research into the chemical nature, digestibility, and biological value of proteins and their constituent amino acids" (p. 4).

"William J. Morse, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Maryland: For his contribution to American agriculture by research on soy beans which has resulted in their development as a major agriculture crop" (p. 5). Address: USA.

1085. United States Department of Agriculture (USDA). 1947. Honor awards ceremony (Brochure). Washington, DC: USDA. 9+ p. Nov. 12.

• ***Summary:*** See next page. This ceremony took place on Nov. 12, 1947, at 2:30 p.m. at the Sylvan Theater, Washington, DC.

The Foreword, by Secretary of Agriculture Clinton P. Anderson (New Mexico, under Harry S. Truman), begins: "The presentation today at this ceremony of Distinguished Service Awards, Superior Service Awards, and Length of Service Awards, marks the culmination of a program that has been developing for some years."

A Superior Service Award was presented (p. 9) to "William J. Morse, PISAE [Plant Industry, Soils and Agricultural Engineering], Beltsville, Maryland. For his contribution to American agriculture by research on soy beans which has resulted in their development as a major agriculture crop."

1086. *USDA* (*employee newsletter*). 1947. USDA's honor awards program and other personnel information. 6(23):1-2. Dec. 8.

• ***Summary:*** Under "The Awards Program" we read that William J. Morse (PISAE, Beltsville, Maryland) and David Breese Jones (HNHE, Beltsville, Maryland) were among the 40-plus initial recipients of the initial presentation of Superior Service Awards to USDA employees.

The idea of such awards was suggested more than two decades by a "highly vocal and very distinguished scientist in the Bureau of Animal Industry, Maurice C. Hall–the man who found out how to rid animals and man of that scourge, the hookworm." He "wrote and spoke in praise of the virtues and accomplishments of Federal experts, scientists and nonscientists."

1087. *Soybean Digest.* 1947. Receive USDA Superior Service Award: David Breese Jones and W.J. Morse. Dec. p. 29.

• ***Summary:*** "Two men well known to the soybean industry were presented with the U.S. Department of Agriculture's superior service award by Agriculture Secretary Clinton P. Anderson at ceremonies November 12. They are W.J. Morse, principal agronomist of the Bureau of Plant Industry, Beltsville, Maryland, and David Breese Jones, head of the protein investigations laboratory of the Federal Bureau of Human Nutrition and Home Economics.

"Morse was one of the founders of the American Soybean Association, in which he has been active since its organization." Photos show Morse and D. Breese Jones.

1088. *American Magazine.* 1948. Interesting people (William Morse): Ice cream grows on bushes. Feb. p. 101.

• ***Summary:*** See page after next. Shows a nice full-page photo (by Vincent Finnigan) of William Morse eating soy ice cream. "Ice cream, as indicated here by Dr. Morse, can be made from powdered soybean milk. To launch the soybean in America Dr. Morse spent 2 years in the Orient collecting 5,000 soybean samples." When he returned, he used his wife, daughter, friends and himself as guinea pigs to test the beans. They made entire meals out of soybeans, including soybean wine. The idea gradually caught on. Dr. Morse is a graduate of Cornell University, soft-spoken, shy and at 63 years old, still busy at the Department of Agriculture's experimental farm in Beltsville, Maryland. He feels the surface has hardly been scratched.

The photo was also run in *Soybean Digest,* April 1948, p. 41.

This digital photo was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1089. Ricker, P.L.; Morse, W.J. 1948. The correct botanical name for the soybean. *J. of the American Society of Agronomy* 40(2):190-91. Feb. [11 ref]

• ***Summary:*** "The multiplicity of botanical names applied to the soybean by various authors has created much confusion in the minds of agronomists, and even among many amateur and professional botanists, as to the correct name to use. This confusion has been increased by the use of the name *Glycine soja* in the 1942 edition of Standardized Plant Names (page 275), a work supposedly the last word on such questions. The confusion was also increased by the use of the genus *Glycine* in place of the genus *Apios* in Britton and Brown's 'Illustrated Flora.'"

"Under the International Rules, which require the use of the earliest valid species name for a plant, it becomes necessary to use the species name *max* for the soybean. Therefore, the correct combination for the name of the soybean is *Glycine max* (L.) Merrill." Address: 1. Associate Botanist; 2. Principal Agronomist. Both: Div. of Forage Crops and Diseases, Plant Industry Station, Beltsville, Maryland.

1090. U.S. Regional Soybean Laboratory. comp. 1948. Results of the Cooperative Uniform Soybean Tests, 1947: Part I. North Central States. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 146. Feb. 99 p. https://www.ars.usda.gov/arsuserfiles/50200500/nust/1947%20nust.PDF

• ***Summary:*** Near bottom of title page: "United States Department of Agriculture. Agricultural Research Administration. Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Forage Crops and Diseases, cooperating with State Agricultural Experiment Stations."

Contents: Introduction. Cooperation. Location of Uniform Tests. Methods. Uniform test, Group 0. Preliminary

UNITED STATES DEPARTMENT OF AGRICULTURE

W. J. Morse

Honor Awards Ceremony

November 12, 1947 · · · *2:30 p.m.*

SYLVAN THEATER, WASHINGTON, D. C.

test, Group 0. Uniform test, Group I (Origin & development of H5. Origin & development of A6K-937. A3K884 strain test). Preliminary test, Group I. Uniform test, Group II. Uniform test, Group III (Origin & development of A5-2683). Uniform test, Group IV (Origin & development of C463). Preliminary test, Group C-IV. Preliminary test, Group L-IV. Effect of location on composition. Disease investigations. Weather summary.

"Introduction: "... Nine uniform test groups have been established, the first five of which include strains of proper maturity for the North Central States. The other four groups contain strains adapted to the southern part of the United States, and a summary of performance of these will be found in Part II of this report, which is published separately.

"Uniform Test, Group 0, contains the strains that will bloom and mature under the longer days encountered during summer in the Dakotas, Minnesota, and northern Wisconsin. Group I contains strains generally adapted to South Dakota, the southern parts of Minnesota, Wisconsin, and Michigan, and northern Ohio. Groups II, III, and IV, respectively, include strains adapted to locations. farther south in the North Central States and to other areas of similar latitude. In general, each group is arranged to include strains differing in maturity by not over 10 to 15 days. Maturity of the strains is expressed as so many days earlier or later than some well-known check or reference variety in the group."

"Cooperating Agencies and Personnel from the North Central Region:

"Bureau of Plant Industry, Soils, and Agricultural Engineering: Division of Forage Crops and Diseases: W.J. Morse, J.L. Cartter, F.I. Collins, C.V. Feaster, David Heusinkveld, G.A. Krober, D.F. McAlister, A.H. Probst, L.C. Saboe, C.R. Weber, J.L. Weihing, and L.F. Williams.

"Illinois Agricultural Experiment Station, Agronomy Department: W.L. Burlison and C.M. Woodworth.

"Iowa Agricultural Experiment Station, Farm Crops Department: I.J. Johnson, M.G. Weiss.

"Kansas Agricultural Experiment Station, Agronomy Department: J.W. Zahnley.

"Michigan Agricultural Experiment Station, Agronomy Department: L.V. Nelson.

"Minnesota Agricultural Experiment Station, Agronomy. Department: J.W. Lambert.

"Missouri Agricultural Experiment Station, Field Crops Department: W.C. Etheridge.

"Nebraska Agricultural Experiment Station, Agronomy Department: F.D. Keim.

"North Dakota Agricultural Experiment Station, Agronomy Department: T.E. Stoa.

"Ohio Agricultural Experiment Station, Agronomy Department: J.L. Haynes, L.E. Thatcher.

"Purdue Agricultural Experiment Station, Agronomy Department: G.H. Cutler, H.H. Kramer.

"South Dakota Agricultural Experiment Station, Agronomy Department: M.W. Adams.

"Wisconsin Agricultural Experiment Station, Agronomy Department: J.H. Torrie." Address: Urbana, Illinois.

1091. Caldwell, J.S.; Culpepper, C.W.; Hutchins, M.C.; Ezell, B.D.; Wilcox, M.S. 1948. Dehydrated green vegetable soybeans. *Soybean Digest.* March. p. 20-21, 24-28, 30.

• ***Summary:*** "The authors compared most of the leading vegetable varieties of soys in three forms: canned green, dehydrated green and mature dry beans. Tests were made for flavor and desirability... Approximately 125 varieties of soybeans are classified by Japanese horticulturists as garden vegetables and are grown specifically for use as human food. Thorough tests of these in the United States have shown that some 25 are fairly well adapted to conditions in some or most of the important soybean-producing districts and that they combine satisfactory yields and good to excellent quality as fresh green beans.

"Canning of vegetable soybeans on a commercial scale is assuming some importance. The number of canners reporting soybeans in the list of products packed increased from 7 in 5 states in 1940 to 23 in 12 states in 1944, but was reduced to 16 in 10 states in 1946 (according to the National Canners' Association Canners' Directory), and to 16 in 8 states in 1947. Commercial freezing of soybeans, either alone or in combination with sweet corn as succotash, has very recently been begun by a few operators. The wide adaptation of vegetable soybeans to cultivation, and their acceptability and especially their high nutritive value as fresh vegetables, which exceeds that of any other fresh legume (Chatfield and Adams 1931) seemed to warrant a study of the possibilities of dehydration as a means of preserving them."

Seventeen varieties of "vegetable or 'edible' soybeans were selected for the study by William J. Morse of the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering. All of the varieties were grown together on the Plant Industry Farm at Beltsville, Maryland. The varieties were ready for harvest from 84 days (Sousei) to 111 days (Rokusun 17) after planting. The beans were shelled, blanched in flowing steam for 8 minutes, then dried "in a rapid current of air at 170ºF for the first 4 hours, with reduction to 150º for the remaining 4-5 hours of the drying period. Material was removed from the drier with a moisture content of 5 to 5.5 percent." The two varieties judged best overall were Willomi (strain A) and Etum (authentic strain).

Comparison of dehydrated with canned green soybeans was difficult since the canned and dried products of the same variety were so dissimilar. "The dried product retained much of the characteristic flavor of the fresh beans; in the canned, this was lost and replaced by an altered 'canned' flavor which was much less appealing to all the judges.

Part of the planting of each variety was allowed to mature, then the beans were harvested, dried, and the mature

dry soybeans pressure cooked. "Mature dry beans, as a class had a characteristic, mild, nut-like flavor and the rather strong 'beany' taste of some varieties, fresh or dehydrated, was never present. The mature nut-like flavor was somewhat more attractive and pleasing, in the opinion of the judges, than the flavor of the dehydrated green beans, and they considered that most consumers tasting both products for the first time would prefer the mature beans. On the contrary, those who are familiar with the fresh vegetable would prefer the dehydrated product rather than the mature dry bean.

"No comparison between dehydrated and frozen beans were possible in the present study." Address: Div. of Fruit & Vegetable Crops and Diseases, Bureau of Plant Industry, USDA.

1092. Morse, W.J. 1948. Fourth work planning conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois, March 1-3, 1948. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 148. May 21. 29 + 9 p.

• ***Summary:*** "The Fourth Work Planning Conference of the North Central States technical collaborators of the U.S. Regional Soybean Laboratory was held in Urbana, Illinois, on March 1-3, 1948, to review the accomplishments of the cooperative research conducted during the past season and to plan future investigations. Four new soybean strains were considered for release, and a permanent soybean crop committee was appointed by the conference to draw up recommendations for handling the increase and release of new strains.

"Monday, March 1–J.L. Cartter, Chairman

"The planning conference was called to order at 1215 p.m. in the Faculty Lounge, Illini Union Building, at the University of Illinois. The following were in attendance:

"Aamodt, O.S., Head Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland

"Bray, R.H., Agronomist, Illinois Agricultural Experiment Station, Urbana, Illinois

"Burlison, W.L., Agronomist, Illinois Agricultural Experiment Station, Urbana, Illinois

"Carroll, W.E., Associate Director, Illinois Agr. Expt. Station, Urbana, Illinois

"Cartter, J.L., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Chamberlain, D.W., Pathologist, Forage Crops & Diseases, U.S.D.A., Urbana, Illinois

"Collins, F.I., Chemist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Cutler; G.H.; Agronomist, Purdue Agr. Experiment Station, Lafayette, Indiana

"DeTurk, E.E., Agronomist, Illinois Agricultural Experiment Station, Urbana, Illinois

"Feaster, C.V., Agronomist, U.S. Regional Soybean Laboratory, Columbia, Missouri

"Frank, F.A., Agronomist, Purdue Agricultural Experiment Station, Lafayette, Indiana

"Fuelleman, R.F., Agronomist, Illinois Agr. Experiment Station, Urbana; Illinois

"Hackleman, J.C., Agronomist, Illinois Agr. Experiment Station, Urbana; Illinois

"Hartwig, E.E., Agronomist, U.S. Regional Soybean Laboratory, Raleigh, North Carolina

"Henson, P.R., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi

"Heusinkveld, D., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois

Holman, L.E., Agricultural Engineer, U.S.D.A., Urbana, Illinois

"Hoover, M.M., Director, Plant Introduction Station, Ames, Iowa

"Johnson, I.J., Agronomist, Iowa Agricultural Experiment Station, Ames, Iowa

"Keim, F.D., Agronomist, Nebraska Agricultural Experiment Station, Lincoln; Nebraska

"Koehler, B., Pathologist, Illinois Agricultural Experiment Station, Urbana, Illinois

"Kramer; H.H., Agronomist, Purdue Agr. Experiment Station, Lafayette, Ind.

"Krober, O.A., Chemist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Lang, A.L., Agronomist, Illinois Agricultural Experiment Station; Urbana, Illinois

"McAlister, D.F., Physiologist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Marston, H.W., Research Coordinator, A.R.A., U.S.D.A., Washington, D.C.

"Milner, R.T., Chemist, Northern Regional Research Laboratory, Peoria, Illinois Morse, W.J., Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland

"Pitner; J.B.; Agronomist; Rockefeller Research Institution, Mexico City, Mexico

"Probst, A.H., Agronomist, U.S. Regional Soybean Laboratory, Lafayette, Indiana

"Saboe, L.C., Agronomist, U.S. Regional Soybean Laboratory, Columbus, Ohio

"Stoa, T.E., Agronomist, North Dakota Agr. Experiment Station, Fargo, North Dakota

"Torrie, J.H., Agronomist, Wisconsin Agricultural Experiment Station, Madison, Wisconsin

"Van Doren, C.A., Agronomist, Soil Conservation Service, U.S.D.A., Urbana, Illinois

"Volk, N.J., Associate Director, Purdue Agr. Experiment Station, Lafayette, Indiana

"Weber; C.R.; Agronomist; U.S. Regional Soybean Laboratory, Ames, Iowa

"Weiss, M.G., Agronomist, Iowa Agricultural Experiment Station; Ames, Iowa

"Williams, L.F., Agronomist, U.S. Regional Soybean

Laboratory, Urbana, Illinois

"Woodworth, C.M., Agronomist, Illinois Agr. Experiment Station, Urbana, Illinois

"Zahnley, J.W., Agronomist, Kansas Agr. Experiment Station, Manhattan, Kansas

"The first speaker of the afternoon was Dr. W.E. Carroll, Associate Director of the Illinois Agricultural Experiment Station, who welcomed the collaborators on behalf of the Experiment Station. Dr. Carroll was asked by the Chairman of the North Central Directors' Conference to attend the Soybean Laboratory meetings and to bring a report of accomplishments to the next Directors' meeting. Dr. Carroll in his talk emphasized the importance of both informal and formal cooperation among agricultural workers. He stressed the increase in the cooperative approach to many problems within the North Central States, especially since the Production and Marketing Administration has been organized. The Directors have had much informal cooperation under way before this time, particularly in the field of livestock marketing and studies on land tenure.

"Reports of Research

"The first afternoon of the conference was devoted to the presentation of reports on soybean research at each station by collaborators.

"Illinois report by W.L. Burlison–The Illinois Agricultural Experiment Station has many soybean research projects, among them one on price studies and one on the cost of growing and combine harvesting the crop. The Animal Science Department has projects on protein supplements for growing and fattening pigs, the nutritive value of protein feeds and animal products, changes in nutritive value of feeds due to storage, effect of soybean meal in poultry rations, and methionine supplementation in swine rations. The Home Economics Department has projects on soybeans as human food and on the value of the protein of soybeans in the dietaries of adult human subjects. The Agricultural Engineering Department is studying methods of harvesting, storing, and artificially drying soybeans. The Entomology Department is studying the biology and control of grape colaspis on soybeans and the control of insects affecting soybeans in storage.

"The Agronomy Department has a number of projects on soybeans, one being on genetics. In the season of 1947, studies on soybean hybrids, originally made by Gordon E. Geeseman in 1945, were continued. Ten varieties were crossed in all possible ways, making 45 different crosses in all. The varieties were Chief, Dunfield, Illini, Mukden, Earlyana, Richland, T117, Hawkeye, Lincoln, and Patoka. F1 plants were grown and compared with the parents in 1946. Analysis of the data has not been completed. Summary tables have been made for number of branches per plant, yield of seed per plant, and weight of 100 seeds. In number of branches per plant, the hybrids were very nearly the same as the parents, but in yield of seed, considerable..."

Page 12: In 1946 and 1947 a little more than 900,000 acres in Ohio were devoted to soybean production for seed. A large percentage of this acreage is in the northwestern one-fourth of the state.

"South Dakota report by W.W. Adams–During the last season, the Group 0, Group I, and Group II Uniform nurseries were grown, spanning the state's soybean growing area from extreme north to south. Several standard varieties were also included with these uniform tests.

"At the main station, a rate of seed experiment and a row width trial were established but were not harvested because of the extensive hail damage occurring the last of June.

"The work in 1947 indicated the superiority of the varieties Capital and Hawkeye for certain areas of the state and reaffirmed the position of Ottawa Mandarin as a good variety for the east-central section. Interest has been directed toward a few other entries in the variety tests having possible value for one or more areas of eastern South Dakota.

"In 1948 a variety test for hay will be conducted in addition to the uniform nurseries and other agronomic trials for seed.

"Wisconsin report by J.H. Torrie–The soybean research program of the Department of Agronomy, University of Wisconsin, is conducted in cooperation with the U.S. Regional Soybean Laboratory, Urbana, Illinois. The program is primarily concerned with the breeding of new varieties adapted for Wisconsin conditions and the evaluation of new strains developed in Wisconsin and by other stations. The program for the southern and central portions of Wisconsin is centered at Madison, whereas that for the northern portion is under the supervision of Messrs. A.M. Strommen and C. Rydberg at the Branch Experiment Station, Spooner, Wisconsin.

"At Madison experiments are under way to determine the effect of different dates of planting and methods of planting (broadcast and different row widths) on the yield and other agronomic characters of several soybean varieties. Studies are also under way to determine any change that may occur in yield and other characters of successive generations of several bulked soybean crosses. The inheritance of downy mildew reaction is under investigation.

"Soybean genetic work at the Laboratory headquarters by L.F. Williams–Several experiments in breeding are under way at Urbana. In one experiment the backcross method of breeding is being compared with the straight cross. In one test the cross Lincoln x Richland and the backcross Lincoln x Lincoln x Richland are being compared, and in another the cross Lincoln x Ogden and the backcross Lincoln x Lincoln x Ogden.

"An attempt to combine the high iodine number of the wild soybean with the desirable agronomic characteristics of the commercial type has failed. The cross Patoka x Wild has been crossed and backcrossed to Lincoln, selecting only for erect habit and freedom from shattering. An analysis of 270

lines from this material indicates no lines much higher than Lincoln in iodine number and many lines similar to Lincoln in oil content. Many resemble Lincoln in appearance and yield. However, some of these lines do have a higher protein content than the common commercial varieties" (Continued). Address: Secretary of Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1093. Morse, W.J. 1948. Fourth work planning conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois, March 1-3, 1948 (Continued–Document part II). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 148. May 21. 29 + 9 p.

• ***Summary:*** (Continued): Page 13: "Breeding work has been initiated to transfer the resistance to pustule of the C.N.S. variety to the Lincoln variety. The C.N.S. variety is low in oil, very susceptible to bacterial blight and lodging, and very late for this latitude. Selections in the BC1S2 generation, grown in 1947, had resistance to pustule, together with satisfactory lodging and maturity. Their oil content and yield performance will be tested later.

"A study of the effects of natural selection on a mixed population has been under way for five years. A mixture of seven varieties has been grown at each of six locations, the seed from each location being returned to the same location each year. Preliminary results indicate that Scioto has almost disappeared from the mixture at most locations, while Patoka and Dunfield have increased at certain locations and decreased at others.

"An experiment has just been concluded studying the effects of gaps in the row on the yield of the affected row and the adjacent row. This experiment has been conducted for three years, using the Lincoln and Hawkeye varieties in 36- and 24-inch row widths, with gaps of 12, 18, 24, 30, and 40 inches in a rod row. There were no significant effects of gaps on the adjacent rows in any combination of varieties and row spacings. There were no significant differences at the 36-inch spacing between the check and the rows with 12-, 18-, 24-, and 30-inch gaps. Rows having 40-inch gaps averaged about 1.5 bushels per acre less than the check. In the 24-inch spacings, On the other hand, a gap of 24 inches lowered the yield 2.1 bushels; a 30-inch gap, 3.2 bushels; and a 40-inch gap, 3.8 bushels.

"Physiological work at the Laboratory headquarters by D.F. McAlister–In the physiological program at the U.S. Regional Soybean Laboratory, studies are under way on mineral nutrition, effect of temperature on development and chemical composition, greenhouse technique, and pollen physiology.

"The mineral nutrition problem is being considered from the standpoint of the efficiency of soybean varieties in the use and/or absorption of potassium and phosphorus. Preliminary cultures under controlled conditions have indicated that soybean varieties differ in their capacity to make vegetative growth when these two elements are held at a very low concentration. To furnish basic information for use in the mineral nutrition work, a study was made of the mobility of food reserves in Lincoln and Earlyana cotyledons and the influence of these reserves on the development of the plant. At emergence, one-third of the phosphorus, two-thirds of the potassium, nearly all of the available magnesium, one-third of the protein, one-half of the fats and oils, and nearly all of the total sugars had been transferred from the cotyledons to the seedlings. Removal of the cotyledons at emergence or two days later resulted in a decreased plant site throughout the field growing season with both varieties. Subsequent dates of cotyledon removal (up to 38 days after planting) gave at most only a temporary setback to the plants. No significant differences in seed yield were apparent between any of the treatments.

"Satisfactory control of red spiders on soybeans grown under greenhouse conditions has been obtained by using as a spray 70 percent hexaethyltetraphosphate (trade name "Blot") at a dilution of 1 part of the insecticide to 1200 parts of distilled water. A miscible concentrate of DDT (trade name "Cert-O-Kill") used as a spray in a concentration of 1 part of the insecticide to 400 parts of distilled water has proved effective in the control of white fly on soybeans. A soil composed of 1 part of field soil, 1 part pit sand, and 1 part granulated peat moss (by volume) [page 14] plus 100 cc. of a 4-8-4, powdered, commercial fertilizer to each 5 gallons of this mixture has produced satisfactory growth of soybeans in the greenhouse. Number 10 cans with drain holes punched in the bottom and filled with the above mixture have been large enough to grow single soybean plants to maturity. Fluorescent lamps, mounted vertically, have proved to be suitable as a source of supplementary light for soybeans. The chief advantages of these lamps are the uniform illumination of the whole plant and the relatively small amount of heat given off.

"Tests have been conducted on storage and germination in vitro of Lincoln, Ogden, and Patoka pollen. Germination values of as high as 75 percent have been obtained using a medium composed of 2 percent agar and 20 percent sucrose. Pollen of Ogden was germinated on this medium after storage for 22 days at 0ºC. and about 50 percent relative humidity.

"Analytical-Chemical work at the Laboratory headquarters by F.I. Collins and O.A. Krober–A means of readily separating high and low oil lines in a bulk population from a soybean cross would open up a new field in the breeding for improvement in oil content. The density of soybean oil is 0.90 to 0.93 grams per cc. and the density of soybean seed is 1.14 to 1.28. Recent work by the Laboratory on the density and chemical composition of single seed has indicated that seed separation on the basis of specific gravity may offer promise. In general, seeds with the lower

densities have the higher percentage of oil. A method has been developed for separating a sample into high and low oil portions by specific gravity without damage to viability. The method has shown promise on the basis of one year's trial and will be tested more extensively during the coming season.

"Cooperative research on the effect of storage on the chemical composition of soybean seed has been conducted over a period of three seasons. The conclusion from this study is that oil and protein content of soybean seed does not change appreciably during the first year under ordinary commercial storage.

"Other problems receiving attention are: (1) Effect of moisture content of soybeans and rate of predrying on chemical analyses of soybeans. (2) Varietal and environmental conditions that may cause differences in the amount of gums and mucilagenous material that is extracted from soybean meal by Skelly F. [hydrocarbon solvent].

"The Laboratory has started research on developing suitable methods for the determination of essential amino acids in soybean protein. This preliminary work is on the hydrolysis or breaking down of the protein into its amino acids, an essential step in amino acid analysis. A study is also being made of the digestion process in the protein determination with a view to increasing speed of reaction and preventing loss by volitilization.

"In addition, cooperative work is being carried on with the plant physiology section in greenhouse studies of plant metabolism, and between 5000 and 5500 samples have been analyzed in connection with the plant breeding work" (Continued). Address: Secretary of Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1094. Morse, W.J. 1948. Fourth work planning conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois, March 1-3, 1948 (Continued–Document part III). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 148. May 21. 29 + 9 p.

• ***Summary:*** (Continued): Page 15: "Soybean Disease Research by D.W. Chamberlain–The ever-changing aspect of the disease picture in economic plants has interested and plagued pathologists for many years. New diseases have appeared without previous warning, minor ones have attained major importance, and major diseases of long standing have varied in relative prevalence and intensity from year to year. Although the soybean is a comparative newcomer in the field of important crop plants, a review of the last decade gives ample evidence that the disease situation of this species parallels that of other crops.

"For example, bud blight (virus) and brown stem rot (*Cephalosporium* sp.), two of our most serious soybean diseases in the Midwest, were unknown ten years ago. Both attained widespread distribution in the Midwest within two years after they were first reported in the field. In 1943 Septoria brown spot was found in only trace amounts in Illinois; in 1947 it was one of our two most common leaf spots. The two bacterial leaf spots illustrate the variation in prevalence of long-established diseases. In 1943 and 1944 bacterial pustule (*Xanthomonas phaseoli* var. *sojensis*) was the most common disease of soybean in Illinois and throughout the Midwest, while bacterial blight (*Pseudomonas glycinea*) was of minor importance; in 1947 pustule was rare and bacterial blight was the most prevalent disease. A few years ago wildfire was distributed throughout the northern and southern soybean-producing regions. In 1947 it was confined almost entirely to the southern states. The cool, wet spring weather of the past few seasons in the Midwest may explain the advance of bacterial blight, but there is no satisfactory explanation for the recession of bacterial pustule and wildfire.

"Two diseases that appeared in unusual amounts in Illinois in 1947 were Rhizoctonia root and basal stem rot and Alternaria leaf spot. The former occurred early in the season when cool, wet weather prevailed, killing young plants in scattered spots one to several feet in diameter. Stands in certain fields were reduced an estimated 2 to 3 percent, but in most cases the loss was negligible. Alternaria leaf spot appeared in July and increased steadily through August. This is not considered a serious disease as it usually appears in seasons of considerable drought. Alternaria does not seem to be an aggressive parasite on vigorously growing soybeans.

"Since breeding for disease resistance is usually the most practical and effective method of controlling disease losses, a search for resistant material was begun in 1947. All available soybean introductions and varieties were grown at Urbana, Illinois, and inoculated with the bacterial blight organism (*Pseudomonas glycinea*). About 50 introductions showed marked resistance, and from this group three of the best were selected and retested in the greenhouse. They have shown a high type of resistance that makes them a promising source of germ plasm for the plant breeders. Two additional nurseries, including about 1200 introductions and varieties, were grown in a test for resistance to bud blight and brown stem rot. Since there is no known method of creating epiphytotics of these two diseases artificially, the nurseries were located at Weldon, Illinois, on a field that has consistently produced uniform brown stem rot infection, and at Oblong, Illinois, where severe bud blight has developed naturally for several years. About 200 introductions at Oblong showed no trace of bud blight. However, bud blight infection in 1947 was not uniformly heavy and those introductions must be retested repeatedly until true resistance can be differentiated from escapes. At Weldon all of the material was..."

Page 25: "Wednesday morning, March 3

"Report of the committees on uniform nursery tests and preliminary tests for 1948 by L.F. Williams–The uniform

nursery tests and preliminary tests for the 1948 season were outlined as follows:

"Strain–Origin

"Group 0

"1. Capital–Selection from Strain 171 x A.K. (Harrow)

"2. Flambeau–Sel. from Manchu

"3. Goldsoy–Sel. from O.A.C. 211

"4. Kabott–Sel. from Intr. from Ninguta, Manchuria

"5. Mandarin (Ottawa)–Sel. from Mandarin

"6. Montreal Manchu–Sel. from Manchu

"7. 0-255–Sel. from Strain 171 x A.R. (Harrow)

"8. W4-610–Sel. from Richland x Kabott

"9. W4-631–Sel. from Richland x Kabott

"10. W55-4142–Sel. from Kabott x Goldsoy

"11. W5S-4143–Sel. from Mukden x Pagoda

"12. W6S-339–Sel. from Cayuga x Kabott

"Preliminary Group 0 [from here on we will omit the Origin]

"1. Capital

"2. Flambeau

"3. Mandarin (Ottawa)

"4. M8

"5. M9

"6. M11

"7. M305-2

"8. 0-10

"9. W5-2070

"10. W5-2260

"11. W6S-326

"12. MS-338

"13. A6S-341

"14. W6S-441

"15. W6S-457

"Group I

"1. Earlyana

"2. Habaro

"3. Mandarin (Ottawa)

"4. Wisconsin Manchu 3

"5. A3K-884

"6. A6K-937

"7. H5S

"8. H2804

"9. H6403

"10. M1

"11. M4

"12. W5-2175

"13. W5-2307

"14. W5-3638

"Preliminary Group I

"1. Mandarin (Ottawa)

"2. Mandarin Rogue

"3. A6K-937

"4. A6K-649

"5. A6K-0649

"6. A6K-1428

"7. A6K-1521

"8. A6K-1810

"9. Cornell 1069-4-1-1-4-2

"10. Cornell 1136-5-3-1

"11. Cornell 1175

"12. Cornell 1196

"13. L6-8091

"14. L6-8144

"15. L6-8148

"16. L6-8174

"17. L6-8179

"18. L6-8275

"19. M6

"20. M7

"21. M10

"22. W4-3190

"23. W4-4018

"24. W5-3346

"25. W5-3372

"26. W5-3633

"Group II

"1. Bavender Special

"2. Earlyana

"3. Hawkeye

"4. Korean

"5. Lincoln

"6. Richland

"7. A5-2683

"8. A6K-937

"9. C789

"10. C790

"11. C791

"12. H6150

"13. L4-8066

"14. L4-8090

"15. L6-8144

"16. L6-8182

"17. L6-8474

"18. L6-8622

"There were so few entries in Preliminary Test, Group II, that this test was dropped.

"Group III

"1. Carlin

"2. Chief

"3. Dunfield

"4. Illini

"5. Lincoln

"6. A3-176

"7. A5-2683

"8. L6-1152

"Preliminary Group III

"1. Chief

"2. Lincoln

"3. A5-2683
"4. A6-440
"5. A6-549
"6. C785
"7. C786
"8. C787
"9. C788
"10. L6-1503
"11. L6-1656
"12. LG-1744
"13. L6-1776
"14. L6-2132
"15. L6-5605
"Group IV
"1. Chief
"2. Gibson
"3. Patoka
"4. C463
"5. C490
"6. C499
"7. C500
"8. C501
"9. C502
"10. C508
"11. C612
"12. L3-2010
"13. L3-3427" Address: Secretary of Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1095. Morse, W.J. 1948. Fourth work planning conference of the North Central States Collaborators of the U.S. Regional Soybean Laboratory, Urbana, Illinois, March 1-3, 1948 (Continued–Document part IV). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 148. May 21. 29 + 9 p.
• ***Summary:*** (Continued): Page 28: "Preliminary Group IV
"1. Chief
"2. Gibson
"3. C463
"4. C508
"5. S100
"6. CX6742-11
"7. CX6742-16
"8. CX6742-20
"9. CX6742-22
"10. CX6742-34
"11. CX6842-17
"12. CX7342-27
"13. CX7342-39
"14. CX7342-42
"15. CX7342-53
"16. D56-8
"17. D523-30
"18. D523-55
"19. D5S6-4
"20. L4-6238
"21. L4-6259
"22. L4-6290
"23. L6-5002
"24. L6-5658
"25. L6-5679
"26. L6-5680
"27. L6-5683
"28. S4-24I
"29. S4-307
"3O. S4-374
"31. SS-41
"32. 35-234

"Fundamental genetic studies of value to the breeding program–C.M. Woodworth, Chairman–The conference discussed what fundamental genetic research might be undertaken that would be of value to the next phase in the breeding program.

"The first topic discussed was breeding for increased oil content. In studying segregation for oil content in the F2, a minimum of 200 and better 500 selections should be analyzed. This would entail a tremendous number of analyses. Starting with a cross between a high x a high, a high x a low, and a low x a low oil strain, using two crosses for each, would require around 3000 determinations. The possibility of a quick method for oil determination was discussed, but it was pointed out that with the personnel available there is no method of sufficient promise at present to permit the handling of so many determinations. A preliminary picture of the use of specific gravity in separating segregating populations into high and low oil fractions was discussed by Mr. Collins, but it was pointed out that the method had not been sufficiently tested to predict its value. It is known that a number of environmental factors affect the specific gravity of the seed, and the influence of each of these factors must be carefully studied before the method can be reliably utilized in breeding work. Additional information on the subject will be gained during the coming season.

"Another question discussed was the magnitude of environmental effects. Spaced plants have been found to have less variation due to environment than plants that are crowded in the row, pointing to the desirability of making selections from spaced plantings. The desirability of further experimental work on the effect of environment in a selection nursery was pointed out.

"Breeding for disease resistance looks encouraging. Germ plasm resistant to bacterial pustule has been found, and crosses have been made to transfer this resistance in desirable high yielding types. Resistance in most cases is rather clear-cut, and a measure of success has been achieved in selecting pustule resistant lines. C.N.S., a southern variety,

is quite resistant, and in crosses with Ralsoy it has given segregation in the F3 in a ratio of 1 resistant–2 moderately resistant–1 susceptible. Ogden is moderately resistant, and in a cross Ogden x C.N.S. very few susceptible plants were found. In no crosses involving two susceptible lines has there been resistance, and in one case a very susceptible line was found. It looks like resistance to bacterial pustule could be added very easily by means of a backcross.

"Among 1400 introductions studied in 1947, about 50 were found to be fairly resistant to bacterial blight. Further testing in the greenhouse proved three of these lines to be highly resistant to the disease, and crosses are being made to transfer this to improved agronomic types.

"All of the introductions and varieties available at the Laboratory have been tested for resistance to brown stem rot and bud blight, but in no case have any resistant lines been uncovered. In the case of these two diseases we may have to be satisfied with comparative or partial resistance.

"Soybean strains resistant to downy mildew have been found and preliminary studies indicate a 3:1 segregation with resistance dominant, but with a modifying factor affecting the ratios. Using the moist chambers, it is easy to get infection in the first true leaf stage.

"The meeting adjourned at 12:30 p.m., March 3.

"W.J. Morse

"Secretary of Conference."

Continues with a 9-page separately-paged list at the end titled "Soybean varietal names used to date," compiled by W.J. Morse. Address: Secretary of Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1096. Morse, W.J. comp. 1948. Soybean varietal names used to date.

• ***Summary:*** This is a 9-page separately-paged list:

"Variety Name–Source [Unfortunately will omit the Source for all but a few]

"Acadian–Louisiana Experiment Station 40-293

"Acme–P.I. 14954

"Adams–A5-2683 (A3-176)

"Agate–P. I. 81037

"A.K.–Manchuria 1912

"A.K. (Harrow)–Dominion Experiment Station, Canada

"Akasoya–Japanese variety (Indiana)

"Aksarben

"Allison Black

"American Oil King–Same as Midwest

"Amherst

"Anwei–La Choy Company (Ohio)

"Aoda

"Arikara

"Arisoy

"Arkan

"Arksoy

"Arksoy 2913

"Arlington

"Armredo

"Auburn

"Austin

"Austrian Green

"Avoyelles

"Baird

"Bakaziro

"Banner

"Bansei

"Barchet

"Bavender Special

"Bell

"Best Green

"Best White

"Biloxi

"Biltan

"Black

"Black Beauty

"Black Champion

"Black Eyebrow

"Blackhawk

"Black Sable

"Boone

"Bopp

"Brindle

"Brooks

"Brown

"Brown Otootan

"Brownie

"Buckeye Cross (BX)–Same as Mt. Carmel

"Buckshot

"Burnette

"Buster Brown–Same as Trenton

"Butterball

"Capital

"Cayuga

"Chame

"Chang

"Charlee

"Chernie

"Cherokee

"Chestnut

"Chief

"Chinaton Echo

"Chiquita

"Chuku

"Chusei

"Cibao

"Clay–Same as Midwest

"Claybank–Same as Midwest

"Clemson–P.I. 71659

"Cloud–P.I. 16790

"Cluster Bean–Same as Midwest

"C.N.S.–J.E. Wannamaker (South Carolina)
"Coker's Black Beauty–Same as Oloxi
"Coker's 31-15–Same as Pee Dee
"Columbia
"Columbian
"Creole
"Delnoshat–Delta Station selection 6679
"Delredo–Mississippi selection
"Delsoy–P.I. 85355
"Delsta–Delta Station #6677
"DeSoto–Reported by Ohio grower
"Dixie
"Dortchsoy #2–Dortch Company (Arkansas)
"Dortchsoy #6
"Dortchsoy #7
"Doxie–Georgia Experiment Station
"Duggar–P.I. 17268C
"Dunfield–P.I. 36846
"Dunland
"Dwarf Brown
"Dwarf Early Yellow
"Dwarf Green
"Earlyana
"Early–Same as Ito San
"Early Black–Same as Buckshot
"Early Brown
"Early Green–Same as Medium Green
"Early Indiana Laredo
"Early Japan
"Early Korean
"Early Laredo–Same as Norredo
"Early Mammoth Black–Same as Buckshot
"Early Mandarin–Same as Mandarin
"Early Virginia Brown–Same as Virginia
"Early White–Same as Ito San
"Early White Eyebrow–Source unknown
"Early Wilson–Same as Wilson
"Early Wilson Black–Same as Wilson
"Early Wisconsin Black–Same as Wisconsin Black
"Early Woods Yellow–[Blank]
"Early Yellow–Same as Ito San
"Easycook–P.I. 34702
"Ebony–P.I. 17254
"Eda–P.I. 17257
"Eda Mame–Ito San and Eda
"Edgecombe–R.P. Cooke, Williamsburg, Virginia
"Edna–P.I. 17252C
"Edsoy–Changed to Delsoy
"Edward–P.I. 14953
"Elton–P.I. 20406
"Emperor–P.I. 97155
"Essex–Same as Peking
"Etampes–Same as Ito San
"Etum–P.I. 86100
"Extra Early Black–Same as Buckshot
"Fairchild–P.I. 19184
"Farnham
"Feed All–A.M. Johnson (North Carolina)
"Feeser's Prolific–Same as Midwest
"Flambeau–Wisconsin selection 839-14
"Flat Black–Same as Flat King
"Flat King–P.I. 17252
"Flava–P.I. 16789A
"Foster's Prolific
"Fungi
"Funk Delicious
"Funman
"Gala
"Galaway
"Gatan
"Gem
"George Washington
"Georgian
"German Coffee Berry
"Giant Brown
"Giant Green
"Giant Yellow
"Gibson
"Goku
"Golden
"Goldsoy–Ontario Station, Canada
"Gosha–Same as Manhattan
"Goshen Prolific–Farmer selection (North Carolina).
"Granger
"Green
"Green and Black
"Greenfield
Green Samarow
"Guelph
"Habaro
"Haberlandt
"Hahto
"Hakote
"Hamilton
"Hankow
"Hansen
"Harbinsoy
"Harman
"Hawkeye
"Hay Boy
"Hayseed
"Herman
"Hidatsa
"Higan
"Hiro
"Hokkaido
"Hollybrook
"Hollybrook Early

"Hongkong
"Hoosier
"Hope
"Hudson Manchu
"Hurrelbrink
"Ignotum
"Illington
"Illini
"Illinois 13-19
"Illinois Champion
"Ilsoy
"Imperial
"Indiana Hollybrook
"Indiana Meadow
"Italian
"Ita Mame
"Ito San–P.I. 17268
"Jackson
"Japanese #15
"Japan Pea–Same as Ito San
"Jefferson
"Jet
"Jogun
"Johnsoy
"Kabott
"Kagon
"Kanro
"Kanum
"Kentucky A
"Kia
"Kingston
"Kingwa
"Kirin
"Kungchuling
"Kura
"Laredo
"Large Black
"Large Brown
"Large Yellow
"Late
"Late Ita Mame
"Late Yellow
"Lexington
"Lincoln
"Little Wonder
"Looney #2
"Lowrie
"Loxitan
"Ludeke
"LZ
"Macoupin
"Magnolia
"Mamloxi
"Mammoth
"Mammoth Black
"Mammoth Brown
"Mammoth Yellow
"Mamotan
"Mamredo
"Manchu
"Manchu #3
"Manchu #606
"Manchukota
"Manchuria
"Manchuria 13-177
"Mandarin
"Mandarin #507
"Mandarin (Ottawa)
"Mandell
"Mandriff
"Manhattan
"Manitoba Brown
"Mansfield
"Mansoy
"Marlow
"Matthews
"McClave
"Medium Black
"Medium Early Black
"Medium Early Brown
"Medium Early Yellow–Same as Ito San
"Medium Green–Same as Guelph
"Medium Yellow–Same as Midwest
"Mendota–Wisconsin Expt. Station selection
"Meridian
"Merko
"Meyer
"Miami
"Michigan Green
"Midland
"Midunk
"Midwest
"Midwest Free
"Mikado
"Mingo
"Minnsoya
"Minong
"Minsoy
"Missoy
"Misstucky
"Monetta
"Mongol
"Monroe
"Montreal Manchu–T.B. Macauley (Canada)
"Morgan
"Morse–P.I. 19186
"Mount Carmel
"Mukden

"Mukden #4
"Nanda
"Nanking
"Nanksoy
"Nansemond
"Nansemond Early
"Natsu
"Nela
"Nemo
"New Bush Bean
"New London
"Nielsen
"Nigra
"Norredo–Unknown
"Norsoy (Pridesoy)
"Northern Hollybrook
"Nuttall–P.I. 17253
"O.A.C. 211–Canada Experiment Station
"Ogden
"Ogemaw
"Ohio 9035–Same as Hamilton
"Ohio Champion–Same as Midwest
"Ohio Medium Green–Same as Guelph
"Okute
"Old Dominion
"Oloxi
"Ontario
"Osaya
"Otootan–Formosa
"Otoxi–South Africa
"Ottawa Mandarin–See Mandarin (Ottawa)
"Ozark
"Pagoda
"Palmetto
"Patoka–P.I. 70218-2-19-3
"Pee Dee–Coker's 31-15
Peking
"Pekwa–Combined with Kingwa
"Pelican -
"Pennsoy
"Perley's Mongol
"Pine Dell Perfection
"Pingsu
"Pinpu
"Pluto
"Pocahontas
"Premier
"Preston
"Pridesoy
"Prolific
"Purredo
"Quillian
"Ralsoy
"Rattlesnake
"Red Otootan
"Red Sable
"Red Tanner
"Reiching
"Riceland
"Richfield
"Richland
"Rila
"Roanoke
"Rokusun
"Roosevelt
"Rose Non Pop
"Round Black
"Royal
"S100
"Sable
"Sac
"Sainte Anne
"Samarow
"Sangra
"Saskatoon
"Sato
"Scioto
"Sedo–P.I. 23229
"Seminole–P.I. 93058
"Seneca–F.C. 03654A
"Shanghai–Same as Tarheel Black
"Sherwood–P.I. 17862
"Shinto–P.I. 21079
"Shiro–P.I. 81036
"Siegenthaler–Same as Morse
"Sioux–P.I. 81021
"Sooty–P.I. 167908
"Sousei–P.I. 80476
"Southern–Same as Mammoth Yellow
"Southern Green–P.I. 62839
"Southern Medium Green–Same as Tokyo
"Southern Prolific–P.I. 37250
"Soy Good–Same as Etum
"Soysota–P.I. 28019
"Stuart–P.I. 22644
"Summerland–Canada Station selection
"Super Quick–Same as Sousei
"Suru–P.I. 89128
"Swan–P.I. 22379
"Taha–P.I. 21999
"Tanloxi–Delta Station selection 483
"Tanner–Farmer selection (Alabama)
"Tarheel–Same as Tarheel Black
"Tarheel Black–P.I. 14952
"Tarheel Brown–Same as Mammoth Brown
"Tashing–P.I. 20854
"Tastee–P.I. 86019
"Tennessee Non Pop–Tennessee Expt. Station selection

"Tenses–P.I. 104881
"Texoil–Farmer selection (Texas)
"Tinzan–Australia selection
"Toku–P.I. 86129
"Tokyo–P.I. 17264
"Trenton–P.I. 24610
"Trinitaria–Salvador selection
"U.S.-2–P.I. 70218-2
"U.S.-5–P.I. 54563-5
"Viking–Illinois Experiment Station selection
"Vilnensis–Poland variety
"Vireo–P.I. 22874
"Virginia–P.I. 19186D
"Virginia Brown–Same as Virginia
"Volstate–Tennessee Expt. Station selection
"Wabash–C463
"Waseda–P.I. 80461-1
"Wee–P.I. 30600
"White–Same as Haberlandt
"White Biloxi–Delta Experiment Station selection
"White Eyebrow–- P.I. 30745
"Willomi–P.I. 81044-1
"Wilson
"Wilson Black
"Wilson Early Black
"Wilson-Five
"Wing's Royal–Same as Peking
"Wisconsin
"Wisconsin Black
"Wisconsin Early Black
"Wisconsin Early Green
"Wisconsin Manchu #3
"Wisconsin Manchu #606
"Wisconsin Mandarin #507
"Wolverine
"Wonder
"Woods Yellow
"Wyokatenn
"Yellow–Same as Mammoth Yellow
"Yellow Biloxi
"Yellow Marvel
"Yelnando–Coker's 433
"Yelredo–Coker's 319
"Yokotenn–P.I. 19981
"Yoshioko–Same as Yosho
"Yosho–P.I. 17262
"Division of Forage Crops & Diseases
"Bureau of Plant Industry, Soils, & Agr. Engineering
"U.S. Department of Agriculture
"May 26, 1948" Address: Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, & Agric. Engineering, U.S. Department of Agriculture.

1097. King Features Syndicate. 1948. What started the oleo-butter battle? Why, the lowly soybean, of course! (News release). 1435 E. 12th St., Cleveland 14, OH. 1 p. May 29.
• ***Summary:*** Photos show: (1) W.J. Morse. The caption reads: "His soybeans did it, but he doesn't take sides." (2) Soybean oil extractors in the Regional Soybean Laboratory, Urbana, Illinois. They are being operated by Floyd Collins. Note: This article was published in at least one unknown U.S. newspaper in 1948. Address: Cleveland, Ohio.

1098. Morse, W.J. comp. 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.
• ***Summary:*** This is a 9-page two-column table. Column 1 is "Variety name." Column 2 is "Source." P.I. refers to the Plant Introduction number. Acadian–Louisiana Experiment Station 40-293. Acme–P.I. 14954. Adams–A5-2683 (A3-176). Agate–P.I. 81037. A.K.–Manchuria 1912. A.K. (Harrow)–Dominion Exp. Station, Canada. Akasoya–Japanese variety (Indiana). Aksarben–P.I. 36576. Allison Black–D.T. Allison, Tennessee. American Oil King–Same as Midwest. Amherst–P.I. 17275. Anwei–La Choy Co. (Ohio). Aoda–P.I. 81043. Arikara–O. Will Co. (North Dakota). Arisoy–P.I. 86736. Arkan–P.I. 87050. Arksoy–P.I. 37335. Arksoy 2913–Arkansas Exp. Station (Marianna). Arlington–P.I. 22899. Armredo–Arizona Station selection. Auburn–P.I. 21079A. Austin–P.I. 17263. Austrian Green–Same as Tokyo. Avoyelles–Avoyelles Parish, Louisiana, selection. Baird–P.I. 22333. Bakaziro–Same as Amherst. Banner–Same as Midwest. Bansei–P.I. 81031. Barchet–P.I. 23232. Bavender Special–Bavender selection (Iowa). Bell–Same as Midwest. Best Green–Same as Hope. Best White–Same as Amherst. Biloxi–P.I. 23211. Biltan–Otootan selection (South Africa). Black–Same as Buckshot. Black Beauty–Same as Ebony. Black Champion–Same as Peking. Black Eyebrow–P.I. 30744. Blackhawk–A6K-937 (A3K-884). Black Sable–Same as Peking. Boone–P.I. 54563-3. Bopp–Same as Chernie. Brindle–P.I. 20407. Brooks–P.I. 16789. Brown–Same as Mammoth Brown. Brown Otootan–Same as Tanner. Brownie–P.I. 17256.

Buckeye Cross (BX)–Same as Mt. Carmel. Buckshot–P.I. 17251. Burnette–Farmville, North Carolina, selection. Buster Brown–Same as Trenton. Butterball–P.I. 17273. Capital–Central Exp. Farm (Canada). Cayuga–P.I. 65393. Chame–P.I. 80473. Chang–P.I. 54610-2. Charlee–P.I. 71663. Chernie–P.I. 18227. Cherokee–P.I. 93057. Chestnut–P.I. 20405B. Chief–Illinois Exp. selection. Chinaton Echo–Harrow, Canada. Chiquita–P.I. 27707. Chuku–La Choy Co. Chusei–P.I. 80472. Cibao–Salvador variety. Clay–Same as Midwest. Claybank–Same as Midwest. Clemson–P.I. 71659. Cloud–P.I. 16790. Cluster Bean–Same as Midwest. C.N.S.–J.E. Wannamaker (South Carolina; Note 1. This is the earliest document seen {Dec. 2004} concerning John

E. Wannamaker). Coker's Black Beauty–Same as Oloxi. Coker's 31-15–Same as Pee Dee. Columbia–P.I. 22897. Columbian–Same as 22897. Creole–P.I. 71614. Delnoshat–Delta Station selection 6679. Delredo–Mississippi selection. Delsoy–P.I. 85355. Delsta–Delta Station #6677. DeSoto–Reported by Ohio grower. Dixie–P.I. 37330. Dortchsoy #2–Dortch Co., Arkansas. Dortchsoy #6–Dortch Co., Arkansas. Dortchsoy #7–Dortch Co., Arkansas. Doxie–Georgia Exp. Station. Duggar–P.I. 17268C. Dunfield–P.I. 36846. Dunland–Ohio report (Dunfield?). Dwarf Brown–Same as Ogemaw. Dwarf Early Yellow–Same as Ito San. Dwarf Green–Same as Guelph. Earlyana–Indiana Exp. Station C-28. Early–Same as Ito San. Early Black–Same as Buckshot. Early Brown–P.I. 25130 & 25161. Early Green–Same as Medium Green. Early Indiana Laredo–Same as Norredo. Early Japan–Same as Butterball. Early Korean–No source given.

Early Laredo–Same as Norredo. Early Mammoth Black–Same as Buckshot. Early Mandarin–Same as Mandarin. Early Virginia Brown–Same as Virginia. Early White–Same as Ito San. Early White Eyebrow–Source unknown. Early Wilson–Same as Wilson. Early Wilson Black–Same as Wilson. Early Wisconsin Black–Same as Wisconsin Black. Early Woods Yellow–No source given. Early Yellow–Same as Ito San. Easycook–P.I. 34702. Ebony–P.I. 17254. Eda–P.I. 17257. Eda Mame–Ito San and Eda. Edgecombe–R.P. Cocke, Williamsburg, Virginia. Edna–P.I. 17252C. Edsoy–Changed to Delsoy. Edward–P.I. 14953. Elton–P.I. 20406. Emperor–P.I. 97155. Essex–Same as Peking. Etampes–Same as Ito San. Etum–P.I. 86100. Extra Early Black–Same as Buckshot. Fairchild–P.I. 19184. Farnham–P.I. 22312. Feed All–A.M. Johnson (North Carolina). Feeser's Prolific–Same as Midwest. Flambeau–Wisconsin selection 839-14. Flat Black–Same as Flat King. Flat King–P.I. 17252. Flava–P.I. 16789A. Foster's Prolific–Same as Midwest. Fungi–P.I. 81029. Funk Delicious–Funk Brothers (Illinois). Funman–Funk Brothers (Illinois). Gala–Georgia Exp. Station. Galaway–Same as Midwest. Gatan–Georgia Exp. Station. Gem–P.B. Hutchins (Missouri). George Washington–Virginia selection. Georgian–P.I. 71583. German Coffee Berry–Same as Ito San. Giant Brown–Same as Mammoth Brown. Giant Green–Illinois Exp. Station. Giant Yellow–P.I. 22415. Gibson–Indiana Exp. Station. Goku–P.I. 80480. Golden–Canada Exp. Station, Harrow. Goldsoy–Ontario Station, Canada. Gosha–Same as Manhattan. Goshen Prolific–Farmer selection (North Carolina).

Granger–Ohio selection 31-4. Green–Same as Guelph. Green and Black–P.I. 84784. Greenfield–Probably Illini. Green Samarow–Same as Samarow. Guelph–P.I. 17261. Habaro–P.I. 20405. Haberlandt–P.I. 17271. Hahto–P.I. 40118. Hakote–P.I. 81039. Hamilton–Ohio-9035. Hankow–P.I. 6559. Hansen–P.I. 20409. Harbinsoy–P.I. 54606-3. Harman–Canada Exp. Station. Hawkeye–Iowa A45-251. Hay Boy–Farmer selection (North Carolina). Hayseed–P.I. 71525. Herman–North Carolina selection. Hidatsa–P.I. 81038. Higan–P.I. 80475. Hiro–P.I. 86038. Hokkaido–P.I. 85666. Hollybrook–Wood Seed Co. (Virginia). Hollybrook Early–Same as Midwest. Hongkong–P.I. 22406. Hoosier–P.I. 30746. Hope–P.I. 17267. Hudson Manchu–T.B. Macauley [sic, Macaulay] (Canada). Hurrelbrink–Farmer selection (Illinois). Ignotum–E.E. Evans (Michigan). Illington–Source unknown. Illini–Illinois Exp. selection. Illinois 13-19–Same as Ilsoy. Illinois Champion–Same as Midwest. Ilsoy–Same as Merko. Imperial–P.I. 81780. Indiana Hollybrook–Same as Midwest. Indiana Meadow–Ohio Report. Italian–Canada Exp. Station. Ita Mame–Same as Tokyo. Ito San–P.I. 17268. Jackson–P.I. 82581. Japanese #15–Same as Kingston. Japan Pea–Same as Ito San. Jefferson–P.I. 82202. Jet–P.I. 17861. Jogun–P.I. 87615. Johnsoy–A.E. Johnson (North Carolina). Kabott–Canada Exp. Station. Kagon–Source unknown. Kanro–P.I. 84928. Kanum–P.I. 84668-1.

Kentucky A–Kentucky Exp. Station selection. Kia–Illinois Exp. Station selection. Kingston–P.I. 17255. Kingwa–West Virginia Exp. Station selection. Kirin–La Choy Co. Kungchuling–Manchuria selection. Kura–P.I. 81042. Laredo–P.I. 40658. Large Black–Same as Buckshot. Large Brown–Same as Mammoth Brown. Large Yellow–Same as Mammoth Yellow. Late–Same as Mammoth Yellow. Late Ita Mame–Same as Tokyo. Late Yellow–Same as Mammoth Yellow. Lexington–P.I. 17862E. Lincoln–Illinois Exp. Station selection. Little Wonder–Farmer selection (Missouri). Looney #2–Farmer selection (Tennessee). Lowrie–P.I. 22898A. Loxitan–Delta Exp. Station selection. Ludeke–Farmer selection (North Carolina). LZ–Louisiana Exp. Station selection.

Note 2. This is the earliest document seen (Oct. 2013) that mentions the soybean varieties Brown Otootan, Early Mammoth Black, or Hidatsa.

Note 3. This is the earliest document seen (July 2013) which states that Black Champion is the same as Peking, or that Best Green is the same as Hope, or that Brown Otootan is the same as Tanner, or that Early Mammoth Black is the same as Buckshot, or that Hollybrook Early is the same as Midwest. Continued. Address: USDA, Bureau of Plant Industry, Soils & Agricultural Engineering, Div. of Forage Crops & Diseases [Beltsville, Maryland].

1099. 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 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 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.

1100. Morse, W.J. comp. 1948. Soybean varietal names used to date (Continued–Document part 2). 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.

• ***Summary:*** Continued from page 5: This is a 9-page two-column table. Column 1 is "Variety name." Column 2 is "Source." P.I. refers to the Plant Introduction number. Macoupin–Farmer selection (Illinois). Magnolia–P.I. 85537. Mamloxi–Delta Exp. Station selection. Mammoth–Same as Mammoth Yellow. Mammoth Black–Same as Tarheel Black. Mammoth Brown–Source unknown. Mammoth Yellow–Source unknown. Mamotan–Delta Exp. Station selection. Mamredo–Delta Exp. Station selection. Manchu–P.I. 30593. Manchu #3–Wisconsin Exp. Station selection. Manchu #606–Wisconsin Exp. Station selection. Manchukota–South Dakota Exp. Station selection. Manchuria–Same as Pinpu. Manchuria 13-177–No source given. Mandarin–P.I. 36653. Mandarin #507–Wisconsin Exp. Station selection. Mandarin (Ottawa)–Canada Station selection. Mandell–Indiana Exp. Station selection. Mandriff–Ohio Report (Mandarin?). Manhattan–P.I. 17277. Manitoba Brown–Canada Station selection. Mansfield–Ohio Report. Mansoy–Manchu selection. Marlow–Ohio Report. Matthews–Farmer selection (Georgia). McClave–Same as Midwest. Medium Black–Same as Buckshot. Medium Early Black–Same as Buckshot. Medium Early Brown–Same as Early Brown. Medium Early Green–Same as Guelph.

Medium Early Yellow–Same as Ito San. Medium Green–Same as Guelph. Medium Yellow–Same as Midwest. Mendota–Wisconsin Exp. Station selection. Meridian–Ohio Report. Merko–P.I. 20412. Meyer–P.I. 17852. Miami–Ohio Report. Michigan Green–Same as Guelph. Midland–Ohio Report. Midunk–Funk Brothers (Illinois). Midwest–P.I. 17269. Midwest Free–Same as Midwest. Mikado–Farmer selection (Indiana). Mingo–Ohio Exp. Station selection. Minnsoya–Same as Minsoy. Minong–Probably Minsoy. Minsoy–P.I. 27890. Missoy–P.I. 71664. Misstucky–Farmer selection (Kentucky). Monetta–P.I. 71608. Mongol–Same as Midwest. Monroe–H5 (Ohio). Montreal Manchu–T.B. Macauley [sic, Macaulay] (Canada). Morgan–P.I. 22633. Morse–P.I. 19186. Mount Carmel–P.I. 70218-2. Mukden–P.I. 50523Q. Mukden #4–Wisconsin Exp. Station selection. Nanda–P.I. 95727. Nanking–P.I. 71597. Nanksoy–P.I. 104881. Nansemond–Farmer selection (Virginia).

Nansemond Early–Farmer selection (Virginia). Natsu–P.I. 19984. Nela–Louisiana Exp. Station selection. Nemo–P.I. 19985. New Bush Bean–Same as Midwest. New London–Same as Midwest. Nielsen–P.I. 22644B. Nigra–P.I. 22407. Norredo–Source unknown. Norsoy (Pridesoy)–North Dakota. Northern Hollybrook–Same as Midwest. Nuttall–P.I. 17253. O.A.C. 211–Canada Exp. Station. Ogden–Tennessee Exp. Station selection. Ogemaw–P.I. 17258. Ohio 9035–Same as Hamilton. Ohio Champion–Same as Midwest. Ohio Medium Green–Same as Guelph. Okute–P.I. 19986. Old Dominion–P.I. 44512.

Oloxi–Coker's Black Beauty. Ontario–P.I. 65344. Osaya–P.I. 80465. Otootan–Formosa [later Taiwan]. Otoxi–South Africa. Ottawa Mandarin–See Mandarin (Ottawa). Ozark–P.I. 37272. Pagoda–Canada Exp. Station. Palmetto–P.I. 71587. Patoka–P.I. 70218-2-19-3. Pee Dee–Coker's 31-15. Peking–P.I. 17852B. Pekwa–Combined with Kingwa. Pelican–Louisiana Exp. Station selection. Pennsoy–Pennsylvania Exp. Station selection. Perley's Mongol–Same as Midwest. Pine Dell Perfection–Farmer selection (Virginia). Pingsu–P.I. 18259. Pinpu–P.I. 28050. Pluto–P.I. 72219. Pocahontas–Farmer selection (Virginia). Premier–Same as Midwest. Preston–Virginia Exp. Station selection. Pridesoy–Twin City Seed Co. selection. Prolific–Same as Midwest. Purredo–Same as Norredo. Quillian–Farmer selection (Oklahoma). Ralsoy–Ralston-Purina selection. Rattlesnake–Kentucky Exp. Station selection. Red Otootan–Same as Tanner. Red Sable–Same as Peking. Red Tanner–Same as Tanner. Reiching–Ohio Report. Riceland–P.I. 20797. Richfield–Ohio Report (Richland?). Richland–P.I. 70502-2. Rila–Marsh Foundation, Ohio. Roanoke–North Carolina Exp. selection. Rokusun–P.I. 80481. Roosevelt–Same as Midwest. Rose Non Pop–Farmer selection (North Carolina). Round Black–Same as Buckshot. Royal–Same as Wilson-Five. S100–Missouri Exp. Station selection. Sable–Same as Peking. Sac–P.I. 80462. Sainte Anne–Canada Station selection. Samarow–P.I. 17260. Sangra [Sanga]–P.I. 70210-1. Saskatoon–Farmer selection (Canada). Sato–P.I. 81041. Scioto–Ohio Exp. Station selection.

Sedo–P.I. 23229. Seminole–P.I. 93058. Seneca–F.C. 03654A. Shanghai–Same as Tarheel Black. Sherwood–P.I. 17862. Shingto–P.I. 21079. Shiro–P.I. 81036. Siegenthaler–Same as Morse. Sioux–P.I. 81021. Sooty–P.I. 16790B. Sousei–P.I. 80476. Southern–Same as Mammoth Yellow. Southern Green–P.I. 62839. Southern Medium Green–Same as Tokyo. Southern Prolific–P.I. 37250. Soy Good–Same as Etum. Soysota–P.I. 28019. Stuart–P.I. 22644. Summerland–Canada Station selection [from British Columbia]. Super Quick–Same as Sousei. Suru–P.I. 89128. Swan–P.I. 22379. Taha–P.I. 21999. Tanloxi–Delta Station selection 483. Tanner–Farmer selection (Alabama). Tarheel–Same as Tarheel Black. Tarheel Black–P.I. 14952. Tarheel Brown–Same as Mammoth Brown. Tashing–P.I. 20854. Tastee–P.I. 86019. Tennessee Non Pop–Tennessee Exp. Station selection. Tensas–P.I. 104881. Texoil–Farmer selection (Texas). Tinzan–Australia selection. Toku–P.I. 86129. Tokyo–P.I. 17264. Trenton–P.I. 24610. Trinitaria–Salvador selection. U.S.-2–P.I. 70218-2. U.S.-5–P.I. 54563-5. Viking–Illinois Exp. Station selection. Vilnensis–Poland variety. Vireo–P.I. 22874. Virginia–P.I. 19186D. Virginia Brown–Same as Virginia. Volstate–Tennessee Exp. Station selection. Wabash–C463. Waseda–P.I. 80461-1. Wea–P.I. 30600. White–Same as Haberlandt. White Biloxi–Delta Exp. Station selection. White Eyebrow–P.I. 30745. Willomi–P.I. 81044-1.

Wilson–P.I. 19183. Wilson Black–Same as Wilson. Wilson Early Black–Same as Wilson. Wilson-Five–P.I. 19183-5. Wing's Royal–Same as Peking. Wisconsin–Ohio Report. Wisconsin Black–P.I. 25468. Wisconsin Early Black–Same as Wisconsin Black. Wisconsin Early Green–Same as Guelph. Wisconsin Manchu #3–Wisconsin Exp. Station selection. Wisconsin Manchu #606–Wisconsin Exp. Station selection. Wisconsin Mandarin #507–Wisconsin Exp. Station selection. Wolverine–P.I. 80490-1. Wonder–Same as Midwest. Woods Yellow–T.W. Woods Co. selection. Wyokatenn–Same as Yokotenn. Yellow–Same as Mammoth Yellow. Yellow Biloxi–North Carolina Exp. Station selection. Yellow Marvel–Farmer selection (Wisconsin). Yelnando–Coker's 433. Yelredo–Coker's 319. Yokotenn–P.I. 19981. Yoshioko–Same as Yosho. Yosho–P.I. 17262.

Note 1. This is the earliest document seen (June 2009) that mentions the soybean varieties Round Black or Yelnando. Both Yelnando (1948) and Yelnanda (1961) appear to have been developed by the Coker Seed Co. of Hartsville, South Carolina.

Note 2. This is the earliest document seen (July 2013) which states that Round Black is the same as Buckshot, or that Wilson Black is the same as Wilson. Address: USDA, Bureau of Plant Industry, Soils & Agricultural Engineering, Div. of Forage Crops & Diseases [Beltsville, Maryland].

1101. June 2–Charles F. Brannan (D), Colorado, becomes U.S. Secretary of Agriculture under President Harry S. Truman (1945-1953) (Important event). 1948.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

1102. Richter, Jay. 1948. What started the oleo-butter battle? Why the lowly soybean, of course! *Journal News* (*White Plains, New York*). June 7. p. 3.
• ***Summary:*** A large photo shows: "Soybean Lab–These soybean oil extractors in the Regional Soybean laboratory, Urbana, Illinois, aid in the finding of superior varieties and strains for industrial use. Floyd Collins, staff member, operates them."

William Morse, the soft-spoken scientist, almost single-handed, introduced and 'sold' the soybean to America.

Morse's big break came in 1929. The reputation of the soybean had grown and the Agriculture department sent

him to the Orient to seek more varieties. "It was a cherished dream realized at last."

A large portrait photo shows William Morse. Address: Central Press Correspondent.

1103. Morse, W.J. 1948. El fríjol-soya: Lo que fue ayer y lo que es hoy [The soybean: What it was yesterday and what it is today]. *Agricultura Tropical* (*Colombia*) 4(7):11-16. July 15. [1 ref. Spa]
• ***Summary:*** This article is a Spanish-language translation by *Agricultura Tropical* of: Morse, W.J. 1948. "Soybeans yesterday and today." *Foreign Agriculture* 12(5):91-95. May. Address: Principal Agronomist, Div. of Forage Crops and Diseases, BPI [Bureau of Plant Industry, USDA], SAE [Soils and Agricultural Engineering], ARA [Agricultural Research Administration], Beltsville, Maryland.

1104. *Soybean Digest.* 1948. 28th annual convention: American Soybean Association. Sept. p. 20-22.
• ***Summary:*** Almost 1,000 people from 28 states and 9 other countries attended the 3-day sessions of the 28th annual convention of the American Soybean Association which closed at Memphis [Tennessee] September 15. The meetings, which included the field trip into the Delta section of Arkansas, were undoubtedly among the best attended and most successful in the entire history of the Association.

"The efforts of several groups beside the Association committees and staff contributed greatly to the success of this meeting held in one of the world's great cotton centers. These included the Memphis Merchants Exchange, the Clarkedale Experiment Station [in Arkansas], and Lee Wilson & Co.

"Members of the convention committee of the Memphis Merchants Exchange had literally put in months of effort in preparing a rousing welcome for the convention attendants; and their efforts paid off. Wives of Exchange members were in charge of ladies hospitality. The Exchange was host at a cocktail party which preceded the annual banquet.

"The staff of the Clarkedale station had been busy in preparing the test plots for the field trip; which included all named commercial varieties in the U.S. for inspection of convention visitors, and the preparation of the plots for demonstrations of flame weeding, artificial defoliation and mechanical cotton picking.

"The Lee Wilson & Co. people under the able generalship of Manager J.H. Crain had likewise gone allout to make the visit to the world's largest cotton plantation and one of the world's largest agricultural enterprises a memorable occasion. A large number in addition to those registered at the convention attended the tour of the plantation, which was in charge of Glen (Bud) Green, Wilson public relations man. About 800 were fed at the barbeque lunch put on by Wilson's at Bassett Park.

"The Memphis Merchants Exchange and Lee Wilson & Co. each published a well printed and liberally illustrated book in honor of the occasion.

"Ersel Walley, Walley Agricultural Service, Fort Wayne, Indiana, was reelected president of the Association. Geo. M. Strayer, Strayer Seed Farms, Hudson, Iowa, was reelected secretary-treasurer. John W. Evans, Montevideo, Minnesota, was elected vice president, succeeding W.G. Weigle, Marsh Foundation Farm, Van Wert, Ohio. Newly elected directors were Leroy Pike, Pontiac, Illinois, succeeding Walter W. McLaughlin, McLaughlin Agricultural Service, Decatur, Illinois; and O.H. Acorn, Little River Farms, Wardell, Missouri, succeeding Harry A. Plattner, Malta Bend, Missouri.

"Strayer, Weigle and G.G. McIlroy, Farm Management, Inc., Irwin, Ohio, were reelected directors.

"Holdover directors include: Walley, Evans; J.B. Edmondson, Danville, Indiana; Howard L. Roach, Plainfield, Iowa; Jacob Hartz, Sr., Stuttgart, Arkansas; John P. Dries, Saukville, Wisconsin; F.S. Garwood, Stonington, Illinois; and R.H. Peck, River Canard, Ontario.

"The Association went on record favoring immediate announcement by the government of allocation of a 'reasonable amount' of whole soybeans for shipment abroad to bolster the price of 1948-crop beans before the bulk of the crop begins to move.

"The Association pointed out that the 1948 crop is estimated to be the largest in history, and the adopted resolution stated that exportation of soybeans would stabilize the market and encourage growers to maintain an acreage large enough to meet future U.S. and foreign demand."

A photo at the bottom of page 20 has this caption: "The new ASA beard of directors–the men who will serve you during 1948-49. Standing left to right: R.H. Peck, John W. Evans, John Dries, Howard Roach, G.G. McIlroy, W.G. Weigle and Frank S. Garwood. Seated: J.R. Edmondson, O.H. Acorn, President Ersel Walley, Secretary-treasurer Geo. M. Strayer, and Jacob Hartz, Sr. Leroy Pike is not in the picture."

Page 21: "At the Convention: On this page you see just a few of the people who attended the 28th convention at Hotel Peabody.

"Top left, examining a soybean plant, Geo. U. Shelby, Charleston, Missouri, grower; W.E. Tidwell, Columbus, Mississippi, seed dealer and handler; John Gray, Louisiana State University agronomist; and John A. Hendrix, Northeast Louisiana Experiment Station, St. Joseph, Louisiana.

"Top right, visiting in a booth, N.H. Pace, dealer and exporter of soybeans, Cleveland, Mississippi; ASA President Ersel Walley, Walley Agricultural Service, Fort Wayne, Indiana; A.A. Williams, Happy Mills, and J.M. Trenholm, Standard Commission Co., Memphis. Williams and Trenholm were members of the convention committee of the Memphis Merchants Exchange.

"In picture second from top, three Tallulah, Louisiana,

growers compare two varieties of soybeans. They are: Walter M. Scott, Sr., Walter M. Scott, Jr. and W.S. Patrick. The senior Scott was a program speaker.

"Second from bottom, four Illinois elevator men compare notes: Frank Garwood, president Stonington Cooperative Grain Co., and Irwin W. Larrick, manager; Elmer T. Frobish, manager of the Morrisonville Farmers Co-op Co.; and C.G. Simcox, manager Assumption Cooperative Grain Co.

"Bottom left, S.S. De of India and Massachusetts Institute of Technology and Florence Rose, executive secretary for Meals for Millions, find they have much in common in their concern for better diets for the world's hungry.

"Bottom right, three Canadians confer in corridor: Ivan Roberts, Guelph, Ontario; R.H. Peck, River Canard [Ontario] grower and member of ASA board; and J.V. Ross, Victory Mills, Ltd., Toronto.

"All pictures read from left to right. Photos by Soybean Digest.

"The Association asked strong producer backing in soybean-growing areas for its promotional program announced this summer. The program is being financed by grower contributions of one-fifth cent per bushel collected by elevators on 1948-crop soybeans at the time of harvest.

"The Association also went on record on the butter-margarine issue by demanding repeal of 'all regulatory taxes and controls-local, state or federal-which discriminate against the use of edible products made from domestic oils.'

"The usual informal smoker [smoking cigarettes and cigars] was held the evening preceding opening of the convention, and was presided over by Secretary-treasurer Geo. M. Strayer. Two films, *Progress in Products,* the margarine film produced jointly by the American Soybean Association and the National Cotton Council, and the

"Allis-Chalmers film, *The Soybean Story,* were shown.

"Five hundred and fifty-five people bought tickets to the annual banquet and took part in the group singing led by Joe Seabold, McMillen Feed Co., Napoleon, Ohio; saw the presentation of lifetime memberships to the men elected this year; and heard Clayton Rand's humorous talk, 'Jack and the Beanstalk.' Robert Snowden, Horseshoe Plantation, Hughes, Arkansas, was toastmaster. A feature of the banquet was 'Stake-lets,' a soy product of Madison Foods.

"Over 100 women attended the convention–a new record. They were guests at a noon luncheon tendered by the Interstate Bag Co., a Wilson & Co., enterprise at Wilson, Arkansas. All ladies attending the banquet were presented with corsages by Memphis Merchants Exchange.

"Exhibit booths of firms serving the industry received many visitors during the convention. They offered a good cross-section of services offered to the industry and were a center of much interest.

"The following men were members of convention committees: Nominations committee: Howard L. Roach, Plainfield, Iowa, chairman; Jacob Hartz, Sr., Stuttgart, Arkansas; David G. Wing, Mechanicsburg, Ohio; Dr. W.L. Burlison, Urbana, Illinois; John Dries, Saukville, Wisconsin.

"Awards committee: W.G. Weigle, Van Wert, Ohio, chairman; J.B. Edmondson, Clayton, Indiana; J.W. Calland, Decatur, Indiana; J.C. Hackleman, Urbana, Illinois; W.J. Morse, Beltsville, Maryland.

"Resolutions committee: J.B. Edmondson, Danville, Indiana, chairman; K.E. Beeson, Lafayette, Indiana; W.G. Weigle, Van Wert, Ohio; George Hale, Burdette, Arkansas; John Evans, Montevideo, Minnesota; John Sand, Marcus, Iowa; Paul Hughes, Hudson, Iowa."

Two photos on page 22 have these captions: (1) "Barges in tow on the Mississippi. These lines now bring millions of bushels of grain and soybeans to the port of Memphis for distribution throughout the South."

(2) "Contributing greatly to the good fellowship so evident at the 28th convention was Joe Seabold, McMillen Feed Mills, Inc., Napoleon, Ohio, our song leader again this year. Seabold led off all sessions."

1105. Fairchild, David. 1948. Early experiences with the soybean. *Soybean Digest.* Nov. p. 14-15. [2 ref]

• ***Summary:*** "It was not until 1897 that I first saw soybeans growing... I found my friend Merton B. Waite had been trying to grow soybeans on his farm outside Washington [DC, in Maryland; see Fairchild, Oct. 1948], but with little success. They had been sent in by some American consul or missionary, I believe. At about the same time Dr. George T. Moore [who by 1903 was Physiologist in Charge of the Lab. of Plant Physiology, Bureau of Plant Industry, USDA, working on soybean root bacteria] in working on the root nodules of leguminous plants had discovered that the nodules contained bacteria. Waite and I talked over the matter of the failure of his soybeans and wondered if they might require special bacteria, so I wrote out to Japan and imported several pounds of soil from a soybean field.

"We made a little experiment, planting alternate rows of soybeans with and without the addition of this Tokyo soil. The effect of the imported soil was immediately apparent as the plants grown in it made a far better growth and had their roots covered with bacterial nodules, whereas the control were practically without any.

"Photographs had yet to come into any general use as records of agricultural experiments, but Waite had taken up photography as a hobby and made excellent photographs with his stand camera. So at harvest time he pulled up an equal number of soybean plants from the soil-treated rows and from the controls, and the only photographic record in existence of this little experiment (the first of its kind, I suppose, in the world) is this negative taken by Waite in the autumn of 1897.

"Although these experiments did not at the time lead

to more extensive trials, they indicate the awakening of our interest in soybeans.

"In that fall of 1897 it was my privilege to organize the office of plant introduction in the Department of Agriculture. We began introducing a great number of different kinds of plants, among them, as I see from our inventories printed at the time, occasional small collections of soybeans from China and Japan. They were obtained mostly through correspondence with missionaries and consuls stationed there.

"At that time the Department had no testing ground near Washington where we could grow miscellaneous vegetables, including these soybean collections. It was not until several years had passed that facilities were provided on the so-called 'Potomac Flats' [in Washington, DC] and James H. Beattie, an enthusiastic young horticulturist, took over the planting of our introduced seeds.

"The soybeans did well and Beattie soon had on his hands a quantity of seeds. But we didn't know just what to do with these strange beans. When cooked in the way other beans were prepared they had a strange flavor that nobody seemed to like...

"It was not, I think, until the office of forage crop investigations was organized and C.V. Piper took charge that the soybean as a forage crop attracted attention and Beattie's experiments came to be looked upon as important. We planted larger patches of soybeans on a tract of land near Bethesda, MD...

"And then we ran into the difficulty of harvesting the soybeans. P.H. Dorsett of the office, one of the most ingenious and most indefatigable workers I have ever known, and his friend Rankin, who was running the little experimental farm, put their heads together and adapted a bean picker then in use–in California I think–and discovered that it was perfectly possible to harvest soybeans mechanically...

"I went out exploring again and my travels with Mr. Lathrop this time took me into the soybean fields of Japan. The tremendous importance of the crop as I saw it there made a great impression on me. Also the almost universal use of soy sauce, which Americans were just beginning to appreciate, fixed my interest...

"Dr. Yamei Kin, an extraordinary Chinese woman whose acquaintance I had made on the boat returning from Japan [in Aug. 1902], made a visit to Washington and captivated us all by her enthusiasm over soybeans. She introduced us to 'tofu,' a delicate cheese which has not even yet attracted the attention it deserves from the American public.

"In 1903 A.J. Pieters came to me one day and told me of an amazing young Hollander who had been a gardener of the great geneticist, Hugo de Vries. He was then on his way back from a trip on foot to Mexico, and I wired him to come to Washington. For 13 years, as agricultural explorer of our office, Frank N. Meyer tramped from village to village over much of China. He gathered soybeans whenever he saw them, for he felt it was important to secure all the local varieties he could for our plant breeders before they should have disappeared as the result of the spread of standard varieties he thought was bound to come.

"The importance of getting as many as possible of these local varieties and these, or selections from them, form, I believe, the basis of the very extensive soybean breeding that has been done by the various plant breeders of America."

Note: According to Vivian Wiser of the USDA and to the Washington D.C. Historical Society (13 Feb. 1991; phone 301-785-2068, Mrs. Offut), in 1897 Merton Waite lived in downtown Washington, D.C. in a built-up area. There is no record of his owning a farm outside Washington D.C., but he may have owned the farm as a sort of summer home or he may possibly have worked with the group at the USDA farm at Somerset, Montgomery County, Maryland. He was a plant pathologist and physiologist, in charge of diseases of orchard fruit trees, especially pears and peaches. There is a collection of David Fairchild's materials at Coconut Grove. His personal residence, The Kampong near Coconut Grove, is still (as of 1998) well preserved and open to the public. Address: "The Kampong," Coconut Grove, Florida.

1106. *Madison Health Messenger* (*Madison, Tennessee*). 1948. King Cotton welcomes King Soybean: American soybean convention highlights. Fall. p. 1-2, 5-6.
• ***Summary:*** The American Soybean Association held its 28th annual convention on 13-15 Sept. 1948 in Memphis, Tennessee (on the banks of the Mississippi River in southwestern Tennessee) at the historic and famous Peabody Hotel. Nearly 1,000 people attended, representing 28 states and 9 foreign countries. Madison College is in Tennessee, so representatives attended.

Memphis became the largest spot cotton market in the world, the largest cotton seed products market in the USA, and (at one time) the largest mixed feed center. In 1884 the Memphis Merchants Exchange was organized.

"Early in the twentieth century, experiments were made in this market in the use of blackstrap molasses, then a worthless by-product, mixing it with alfalfa hay and grain. It proved to be an excellent animal feed and was placed on the market as commercial mixed feed. Memphis can probably claim the honor of originating the mixed feed business that was the forerunner of the scientifically prepared stock feeds that now comprises one of our nation's largest industries." The feed industry created an enormous demand for protein which was largely derived from cottonseed meal. That source, however, proved inadequate, and so 'Necessity being the mother of invention' the soybean was introduced into American agriculture and began to be produced in considerable quantities about 1920.

"Having about the same protein content as cottonseed meal it has practically doubled the supply of protein

available for mixed animals feeds. Geographically Memphis is the center of the production of high protein vegetable meals. The crops of cottonseed and peanuts of the Mississippi Valley in the South, blend here with The soybean crops of the North Mississippi Valley states. Memphis, therefore, is the natural location for the world's only protein futures market. The price of cottonseed meal and soybean meal established by this open market is recognized throughout this country, as well as abroad, as the basis price for trading in both commodities.

"Barge lines on the Mississippi River now handle a vast tonnage of merchandise and bring millions of bushels of grain and soybeans to Memphis for distribution throughout the South and for export via barge to the Port of New Orleans [Louisiana]. So important is the Port of Memphis that millions of dollars are being spent to improve and enlarge its facilities for handling an ever increasing tonnage while 'Old Man River He Just Keeps Rolling Along.'

"Convention highlights: The Soybean Conventioners were welcomed royally by Mayor Pleasants, President Williams of the Memphis Commercial Exchange, and the friendly staff of Peabody Hotel. Ladies of the Memphis Commercial Exchange entertained the ladies attending the convention and it seemed from the gardenia corsages given to all the ladies (100 attending) by the Memphis Commercial Exchange, the luncheons, parties, tours. and the annual banquet, planned for the guests, that King Cotton himself and all Memphis bent their efforts to make Kong Soybean their honored guest. The conventioners were profoundly impressed with the beautiful city of Memphis and its never-to-be-forgotten genuine warm hospitality. With every exhibit space in the large hall taken with interesting displays of soybean products, machinery, supplies, and technical services offered, it was obvious that the industry was well organized and integrated to meet the heavy demand put upon its young shoulders.

"Efficient President Walley and aggressive Secretary Strayer of the American Soybean Association gave every evidence of providing the unusual leadership required for the development of a national organization to serve the soybean industry in the United States.

"President Walley reported fresh from his summer stay in Europe where he studied conditions relating to the interest and needs of the people with respect to the potential possibilities of supplying soybeans to aid in the recovery program. He said in part, 'From The best available information, France could use oilseeds equivalent to at least 10 or 15 million bushels of soybeans per year at the present time... soybeans have become more popular and more appreciated by the French.' In Italy it is about the same story. 'I was particularly impressed with the fine work being done by CRALOG (Christian Relief Organizations Authorized to Operate in Germany), cooperating with German food manufacturers in preparing soybean products in the most palatable form.' Large quantities of soy flour are being flown to Berlin over the blockade. Belgium processors were pleased with the quality of America soybean varieties. 'In England I found many friends of soybeans and much progress has been made in the use of soy products in food.' 'One of the principal paint companies of England is very enthusiastic about the use of soybean oil in paint and is doing everything it can to encourage the growing of soybeans in South Africa in order to augment its needed supplies.'

"'... let us take the cost of protein for human consumption in Germany. At the time I was there 40 grams of protein purchased at the store in the form of full fat soy flakes cost only one-third to one-sixth as much as 40 grams of protein secured through any animal product and that cost was figured on the basis of soybeans being worth between $8 and $10 a bushel in Germany.' Here is a large fertile opportunity market that can mean much to the American soybean grower.

"'Gentlemen, in my opinion, this "cold war" is hotter than you think. Today national security is our most important business."

"'As producers of a potent weapon in that war [soybeans] let us carry on, keeping this in mind: a continued and assured production of soybeans in the United States can have much to do with the preservation of individual liberty here and abroad–a treasure more important than any immediate consideration of price or profit.'

"Two films, *Progress in Products,* the margarine film produced jointly by the American Soybean Association and the National Cotton Council, and the Allis-Chalmers film, *The Soybean Story,* were shown and, as you might surmise, Madison Foods comprised a part of the section of the story on the screen showing foods produced from soybeans.

Soybean milk experiment: Dr. Sasanka S. De of the Indian Institute of Science, Bangalore, India, and now a research fellow in the Department of Food Technology, Massachusetts Institute of Technology (MIT), reported on his experimental work with soybean milk. He found "that it was possible to prepare a fortified soya milk that would have a high supplementary value in the Indian diet comparable to that of cow's milk and without increasing the cost greatly... In the human experiments, nearly 6,500 infants, children and youth were used as subjects in Welfare Centers, Orphanages, and Schools."

"Visit to the world's largest cotton plantation: The last day of the conference was set aside for a field day in the rich Arkansas delta at the Arkansas Agricultural Experiment Station, Clarkedale, Arkansas, and at Wilson, Arkansas, to see the world's largest cotton plantation. In this rich northeastern section of Arkansas the flooding mighty 'Old Man River' deposited layer upon layer of black loam silt until it reached the incredible thickness of 1,200 feet (the average topsoil depth around the world is seven inches).

"At the Clarkedale experiment station the staff

prepared test plots for this field day showing all the named commercial varieties of soybeans in the U.S. Flame weeding was also demonstrated...”

Over 500 guests attended the Soybean Banquet in the Ball Room of the Peabody Hotel. Madison Stakelets and Zoy-Koff were served. “Dr. Morse, father of the soybean, Chief Agronomist of the Department of Agriculture said, ‘I always enjoy Madison Soybean Foods, especially Zoy-Koff for it takes the place of coffee which I do not use.’ Dr. De of India, previously mentioned, said ‘I liked your Stake-Lets very much and ate them with intense interest. Both the flavor and texture are so much like meat.’”

1107. *Soybean Digest.* 1948. 20 or more years in the soy industry–Oldtimers. Nov. p. 20-21.
• ***Summary:*** This list of soybean pioneers was compiled out of the old soybean letter files of W.J. Morse at Beltsville, Maryland. The names of the old-timers are listed in alphabetical order, with a symbol indicating if the person is retired or deceased, the concern/organization with which he was affiliated (grower, company, university, etc.), and the city and state.

A tally by state of these men, in descending order of predominance, shows the following: Illinois 30, Indiana 23, Ohio 15, Minnesota 10, Iowa 8, Michigan 8, Washington DC 7, New Jersey 7, Virginia 7, Connecticut 6, Louisiana 6, Missouri 6, Tennessee 5, Wisconsin 5, Georgia 4, Kansas 4, Maryland 4, North Carolina 4, Colorado 3, Florida 3, Kentucky 3, Alabama 2, Delaware 2, Maine 2, Nebraska 2, New York 2, Pennsylvania 2, Rhode Island 2, South Carolina 2, West Virginia 2, Arkansas 1, Idaho 1, Mississippi 1, New Hampshire 1, North Dakota 1, Oklahoma 1, Oregon 1, South Dakota 1, Utah 1, Vermont 1, Washington 1.

States with no old-timers/pioneers listed include Arizona, California, Hawaii, Maine, Montana, Nevada, Texas, Vermont, and Wyoming.

Oldtimers from states that started growing soybeans after 1900, or that rarely grew soybeans, include (listed alphabetically by last name): H.W. Albertz, Wisconsin Branch Exp. Station, Hancock; G.M. Briggs, E.J. Delwiche, B.D. Leith, and R.A. Moore, Wisconsin Exp. Station, Madison; H.K. Hayes and W.M. Hays, Minnesota Exp. Station, St. Paul; A.W. Hulbert, Idaho Exp. Station, Moscow, Idaho; F.D. Keim and T.A. Kisselbach, Nebraska Exp. Station, Lincoln; Alvin Kezer, Colorado Exp. Station, Ft. Collins; T.C. McIlvaine, West Virginia Exp. Station, Morgantown; F.V. Owen, USDA, Logan, Utah; H.A. Schoth, USDA, Corvallis, Oregon; T.E. Stoa, North Dakota Exp. Station, Fargo, North Dakota.

Note: It would be very interesting to know when F.V. Owen first grew soybeans in Utah.

1108. W.J. Morse and USDA co-workers in the 1948 (Photographs). 1948.
• ***Summary:*** (1) 1948 Aug.–Dr. Lew Allison (left, in a white shirt and necktie) and W.J. Morse (right, in a coat) at the Soybean Experimental Plots in Beltsville, Maryland.

(2) 1948 Aug.–Dr. Lew Allison (left), William Stuart (center) and W.J. Morse (right, in a hat) in Beltsville.

(3) 1948 Aug.–W.J. Morse (in a hat and smoking a cigarette) in Beltsville. (4) Conference of Collaborators at the Soybean Regional Laboratory in Urbana, Illinois. Perhaps 1948. Full page.

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).

1109. Morse, W.J. 1949. Fourth work planning conference of the Southern States Collaborators of the U.S. Regional Soybean Laboratory, Birmingham, Alabama, March 2-4, 1949. *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 152. March 4. 25 + 9 p.
• ***Summary:*** “The Fourth. Work Planning Conference of the Southern States technical collaborators of the U.S. Regional Soybean Laboratory was held in Birmingham, Alabama, on March 2-4, 1949, to review the accomplishments of the cooperative soybean research conducted during the past season and to plan future investigations. Birmingham was chosen for the meeting this year on a trial basis, as it appeared to be centrally located for all collaborators.

“Wednesday, March 2–Edgar E. Hartwig, Chairman

“The conference was called to order at 9:00 a.m. in a conference room of the Hotel Bankhead. The following were in attendance:

“Adair, C.R., Agronomist, U.S.D.A., Rice Branch Station, Stuttgart, Arkansas

“Allison, J.L., Sr. Pathologist, Forage Crops and Diseases, U.S.D.A., Beltsville, Maryland

“Canode, G.L. Agronomist, Oklahoma Experiment Station, Stillwater, Oklahoma

“Carr, R.B., Agronomist, U.S. Regional Soybean Laboratory, Stoneville, Mississippi

“Cartter, J.L., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois

“Collins, F.I., Chemist, U.S. Regional Soybean Laboratory, Urbana, Illinois

“Cowan, J.C., Head, Oil & Protein Div., Northern Regional Research Laboratory, Peoria, Illinois

“Craigmiles, J.P., Agronomist, Georgia Experiment Station, Experiment, Georgia

“Feaster, C.V., Agronomist, U.S. Regional Soybean Laboratory, Columbia, Missouri

“Gore, U.R. Agronomist, Georgia Experiment Station, Experiment, Georgia

“Gray, J.P. Agronomist, Louisiana Experiment Station, Baton Rouge, Louisiana

“Hartwig, E.E., Agronomist, Delta Experiment Station, Stoneville, Mississippi

"Johnson, H.W., Agronomist, North Carolina Experiment Station, Raleigh, North Carolina

"Johnson, H.W., Pathologist, Forage Crops & Diseases, U.S.D.A. Stoneville, Mississippi

"McAlister, D.F., Physiologist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Miley, D.G., Superintendent, Delta Branch, Mississippi Experiment Station, Stoneville

"Morse, W.J., Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland

"Myers, W.M. Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland

"Nelson, W.L., Agronomist, North Carolina Experiment Station, Raleigh, North Carolina

"O'Kelly, J.F., Agronomist, Mississippi Experiment Station, State College, Mississippi

"Paden, W.R., Agronomist, South Carolina Experiment Station, Clemson, South Carolina

"Pitner, J.B., Agronomist, Rockefeller Research Institution, Mexico City, Mexico

"Potts, R.C., Agronomist, Texas Experiment Station, College Station, Texas

"Simmons, C.F., Agronomist, Alabama Experiment Station, Auburn, Alabama

"Skold, L.N., Agronomist, Tennessee Experiment Station, Knoxville, Tennessee

"Smith, R.L., Agronomist, North Florida Experiment Station, Quincy, Florida

"Smith, T.J., Agronomist, Virginia Experiment Station, Blacksburg, Virginia

"Williams, L.F., Agronomist, U.S. Regional Soybean Laboratory, Urbana, Illinois

"Reports of Research Dr. Edgar E. Hartwig opened the conference with an outline of the subjects to be covered during the meeting. The morning was to be devoted to brief reports by the collaborators on high-lights of the work in their state and factors of importance in determining the types of research that should be outlined for the coming season.

"Arkansas report by C.R. Adair–The estimated acreage of soybeans harvested for seed in Arkansas in 1948 was 264,000 acres, which was 19,000 acres less than in 1947 but 106,000 acres more than the 1937-46 average. The average yield per acre in 1948 was 19.5 bushels which was 7.5 bushels more than 1947 and 5.5 bushels more than the 1937-46 average. The total production in 1948 was 5,148,000 bushels compared with 3,396,000 bushels in 1947 and an average of 2,296,000 bushels for the 1937-46 period.

"Conditions at planting time were unfavorable because of excessive rainfall. However, conditions improved as the season advanced. There was ample summer rainfall in most sections of the state for development of a good crop. Yields were reduced by a lack of rainfall on light sandy soils in the southwestern part of the state.

"The principal areas of soybean production in Arkansas are the Mississippi Delta in the eastern part of the state, Grand Prairie and in the Arkansas, lower White, Red and St. Francis river valleys.

"In the northeastern part of the state Ogden is the principal variety although there seems to be an increasing interest in earlier varieties such as S100. Later varieties such as Roanoke and Volstate have not produced as well as Ogden and the growers do not like the later varieties because of danger of rain before harvest.

"In the southeastern part of the state Ogden is the leading variety although Volstate and Roanoke are grown on a limited acreage. There is some interest in S100 to be grown and followed by fall sown oats.

"In the Grand Prairie area Ogden, Arksoy, Tanner and Volstate are the leading varieties. S100 is grown on a limited acreage in rotation with fall sown oats. The later (Group VII) varieties are more popular in this section because S100 and to some extent Ogden conflict with rice harvest.

"Groups V, VI and VII are made up of varieties most widely adapted in Arkansas. Varieties in Group IV can be grown in the northern part of the state but those varieties produce less than Group V varieties on the average. The varieties in Group VIII can be grown in the southern part of the state but those varieties produced less than the better varieties in Groups VI and VII. It is planned to devote most time testing Groups V, VI and VII. Any breeding work that is done will be to develop strains within the maturity range of those three groups. Groups IV and VIII will probably be grown at one place in the state so there will he some information on new strains in those groups.

"Pod and stem blight and wildfire caused damage in local areas. Bacterial pustule was quite serious probably because of the frequent showers during the summer. Varieties resistant to these diseases would be very beneficial.

Page 12: "November rainfall was above normal in most sections of the State and seriously hampered harvesting of soybeans. Fields were so wet that the harvest in December was also delayed resulting in poor quality beans for many farmers. An estimated 20% of the crop remained unharvested on January 1.

"The Experiment Station has received more requests than in previous years and farmers have shown more interest in a high yielding early bean in middle and eastern Virginia. This allows early hogging down where desired and also permits beans to be harvested for grain in time for seeding winter cover crops. The best early bean to date is S100 although it is not early enough in some sections.

"The S100 bean is ten days to two weeks earlier than Ogden in Eastern Virginia. One of its best characteristics is the excellent quality of the beans. The beans do not mold or deteriorate to any degree oven though they may be left in the field six weeks or two months after maturity.

"Several of the newer strains which have been tested in the past 2-3 years look very promising.

"Report of Soybean Work in Mexico Being Conducted by John B. Pitner–Dr. Pitner, working on soybean breeding and production problems for the Rockefeller Institute at Mexico City, reports that they are enthusiastic about the prospects of developing the crop. One of the reasons for their interest is that Mexico imports much vegetable oil, mainly cotton seed, and would like to develop local oil production that would give badly needed protein for the people of Mexico. One of the problems in this area is that they have a rainy season and a dry season with the rains coming in late June and ending in October. The soybean appears to fit in well with wheat in a rotation and applications of nitrogen are important in securing good yields. A vide range of soybean selections have been studied under conditions at the high altitudes near Mexico City and also at one of their experiment stations at 1500 feet elevation. Selections in Group V, VI, and VII maturity look best under these conditions and strain S-100 has given good results. Plantings at 5000 feet elevation have given the best yields so far. Introducing a new crop is always a problem, but they are hoping to build up an acreage and expect yields of around 25 bushels per acre without too much difficulty. Increase plots of 3-100 and Ogden are now being grown to get a start toward commercial production.

"Wednesday afternoon, March 2–W.R. Paden, Chairman

"Fertilizer Treatment and Placement Responses by W.L. Nelson–Soybeans are heavy feeders on the soil, soybeans and peanuts removing about the same amount of mineral nutrients. They remove about 60 pounds per acre K2O [potassium oxide] with tobacco and cotton removing 35 pounds. Soybeans remove about 33 pounds per acre P2O5 [phosphoric anhydride] with tobacco removing only 5 pounds. In North Carolina soybeans give a marked response to dolomitic limestone and soil at pH 4.5 may need 3½ tons limestone per acre. Some Manganese deficiency is now showing up, the symptoms being green veins with the interveinal area yellow. Much of this manganese deficiency is due to over enthusiastic liming" (Continued). Address: Secretary to the Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1110. Morse, W.J. 1949. Fourth work planning conference of the Southern States Collaborators of the U.S. Regional Soybean Laboratory, Birmingham, Alabama, March 2-4, 1949 (Continued–Document part II). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 152. March 4. 25 + 9 p.

• ***Summary:*** (Continued): Page 15: "b. Committee to consider desirability of outlining general rules for guidance of the soybean conference group in the increase and release of new soybean varieties.

"J.P. Gray, W.M. Myers

"D.G. Miley, J.F. O'Kelly

"W.J. Morse, W.R. Paden

"J.L. Cartter, Chairman

"c. Committee to consider needed research on fertilizer applications and the effect of competition on the accuracy of yield testing in soybean nurseries.

"C.R. Adair, J.D. Pitner

"E.E. Hartwig, L.N. Skold

"W.L. Nelson

"W.R. Paden, Chairman

"Thursday morning, March 3–C.R. Adair Chairman

"The Breeding Program of the Regional Laboratory in the Southern States–Past, Present, and Future–Round Table Discussion–Several ideas were brought out in the round table discussion on breeding. There was general agreement that more fundamental genetic work was necessary. Dr. Miley of the Delta Branch Station, Mississippi Experiment Station stated that he supported wholeheartedly the idea of more fundamental studios by the U.S.D.A. staff with more of the practical breeding work if necessary being carried on by state men in order that the fundamental research could progress rapidly.

"Date of flowering or length of period from flowering to maturity may have an important bearing on oil content. Among crosses from low oil parents the high [oil] progeny may be due to date of blooming–an environmental rather than genetic effect.

"A desire was expressed for segregating material from a wider range of crosses for local selection work. More F2 seed can be obtained by spaced F1 plants. If any selection has been exercised in the F2 generation, this fact is important to know when studying the F3 and such notes should accompany the distribution of any of this material, In the F2, selection can be made for some characters such as maturity and disease resistance. Dr. Myers expressed the opinion that if we know more about inheritance of quantitative characters and what factors could be selected for in the F2 and what could not be, we would be in a position to make more rapid progress. It was his opinion that we would make more progress in the next 10 years by concentrating on fundamental studies coordinated in a balanced program with practical breeding than we would through practical breeding alone in a similar length of time.

"Soybean Disease Investigations in the Southern States by Howard W. Johnson–The attention of those present was called to pages 102 to 107 of the "Results of the Cooperative Uniform Soybean Tests, 1948. Part II. Southern States" where the results of the soybean disease research in the South has been summarized. Particular attention was called to page 103 where are listed the varieties and strains in the uniform groups that appear to be resistant to the bacterial foliage diseases. In addition to the disease readings made on the uniform nurseries by the cooperating pathologists, strains appearing to possess resistance are planted in a special disease nursery at Stoneville, Mississippi, and an attempt is made to obtain a uniform infestation of the bacterial foliage

diseases by inoculating spreader [sic] rows of the highly susceptible Ralsoy variety.

"The work of Graham on the bacterial foliage diseases, of Lehman on purple seed stain, of Weimer on southern blight and of Holdeman on anthracnose was reviewed. Tables of data were presented showing that treating soybean seed with chemical disinfectants in the fall of harvest or in the spring before planting resulted in better stands at Stoneville, Mississippi, but failed to give increased yields with the relatively high seeding rates used.

"Slides were shown illustrating the injury caused in soybean nurseries by the velvet bean caterpillar, the bean leaf beetle and the green clover worm. Practical control of these pests can be obtained by timely applications of D.D.T. dust. The copper dusting experiments in North Carolina and at Stoneville were reviewed and the possibility of using a D.D.T.-copper dust mixture for control of insect pests and bacterial foliage diseases was suggested.

"Preliminary results of tests set up at Stoneville, Mississippi in cooperation with the Southern Regional Research Laboratory to determine whether a mixture of propylene glycol dipropionate and 4,6-bis-chloromethyl xylene applied to soybean seed in the fall would prevent loss of viability during storage were presented.

"While no significant differences were evident in the data for the first four months of storage, attention was called to the fact that the test had been set up with S-100 seed, having an original moisture content of 10.4 percent. Could the test have been set up earlier while the moisture content was above 14 percent, it is felt that benefits from treatment might have been demonstrated.

"Thursday afternoon, March 3–J.P. O'Kelly, Chairman

"The Place of the New Varieties Released in the North Central States by L.F. Williams–Several new varieties have been named in the Northern States in recent months and the origin and place of these may be of some interest to this group. The Wabash variety is derived from a cross between Dunfield and Mansoy. This variety is similar to Chief in maturity and is an improvement over Chief in yielding ability, resistance to lodging and in oil content of the seed. It has been a much more dependable yielder in Group IV than Chief and Gibson. It is being released by Indiana, Illinois, Missouri and Kansas and is recommended for the Southern portion of Indiana and Illinois, and the Central portion of Missouri.

"The Hawkeye variety is descended from a cross between Mukden and Richland. This variety is of Richland maturity and is similar to Richland in appearance, but yields much better, is somewhat taller, and has a higher oil content. It has been released by Ohio, Indiana, Illinois, Wisconsin, Iowa, Minnesota, Nebraska and South Dakota. This variety should replace Richland in commercial production.

"The Monroe variety is from a cross between Mukden and Mandarin and has been released particularly as an early variety to precede winter wheat in Northern Ohio. It is between the two parents in maturity" (Continued). Address: Secretary to the Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1111. Morse, W.J. 1949. Fourth work planning conference of the Southern States Collaborators of the U.S. Regional Soybean Laboratory, Birmingham, Alabama, March 2-4, 1949 (Continued–Document part III). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 152. March 4. 25 + 9 p.

• ***Summary:*** (Continued): Page 20: "Based partly on procedures previously found helpful in other sections the committee recommended the following six points that might be useful to the soybean plant breeders.

"1. Regional testing. All soybean selections contemplated for release should be widely tested in the region through the facilities of the uniform soybean tests.

"2. Seed increase. New varieties intended for release should be simultaneously increased by the interested experiment stations in the area where the new variety would be adapted.

"3. Naming varieties. General names should be selected and announced after seed is available for distribution.

"4. Preventing escapes. Effort should be made to prevent the escape of small quantities of seed of new soybean varieties before the time of the official experiment station release.

"5. Preparation and release of information. The sponsoring agencies should prepare general information regarding a new variety and distribute it to other states so that they could modify and add to it to meet their local conditions. Only general information should be given to national farm magazines.

"6. The soybean crop conference should have general supervision over the release of a new variety.

"The committee suggested that the recommendations developed by the directors of the North Central States be given careful consideration by each collaborator in order that he could come to the next soybean conference prepared to discuss rules that should be set up in the Southern States.

"It was moved by Dr. Gray of Louisiana that the report of the North Central Directors regarding "Recommendations of the Seed Practices Committee of the North Central Region" be incorporated in the minutes of this conference so that they could be studied in detail between now and the next meeting of the Southern Soybean Conference group. This motion was carried unanimously and the secretary directed to incorporate these recommendations, if approval could be secured from Dr. N.J. Volk, Administrative Adviser of the Regional Technical Committee on Seed Practices of the North Central Directors. These recommendations are as follows:

"RECOMMENDATION NO. 1: REGIONAL TESTING

"THE COMMITTEE RECOMMENDS THAT THE DIRECTORS ASK THE FARM CROPS RESEARCH WORKERS TO INITIATE OR CONTINUE COOPERATIVE REGIONAL TRIALS OF ALL IMPORTANT FARM CROPS, WHERE FEASIBLE, SO THAT NEW AND PROMISING STRAINS MAY RECEIVE ADEQUATE REGIONAL TESTING DURING THE TWO OR THREE YEARS PRIOR TO THE POSSIBLE DISTRIBUTION OF THE NEW STRAIN OR VARIETY TO SEED PRODUCERS."

Page 21: "There have been instances in the past, and there are several right now, of new varieties ready to be released that may have regional adaptation but which neighboring states have not had an opportunity to test thoroughly. Breeders should be given the opportunity by the Directors to meet periodically to discuss test results, to select strains for regional tests, and to inform each other of new strains approaching release.

"RECOMMENDATION NO. 2: SIMULTANEOUS MULTIPLICATION

"THE COMMITTEE RECOMMENDS THAT AT THE TIME IT IS DETERMINED THAT A STRAIN WILL BE NAMED AND RELEASED THE FOSTERING AGENCY OR AGENCIES SHALL SUPPLY THE INTERESTED STATES WITH A REASONLBLE AMOUNT OF SEED FOR SIMULTANEOUS MULTIPLICATION.

"There are a number of good examples of shortages of seed in one state or another and of existing policies that prevented an interested state from securing seed. Approval of the above recommendation would tend to eliminate such situations.

"RECOMMENDATION NO. 3: NAMING VARIETIES

"THE COMMITTEE RECOMMENDS THAT ALL NEW VARIETIES HAVING REGIONAL ADAPTATION BE GIVEN NAMES OF A GENERAL NATURE WHENEVER POSSIBLE. THE NAMES SHOULD NOT BE ANNOUNCED UNTIL AFTER SEED HAS BEEN PRODUCED FOR GENERAL DISTRIBUTION.

"Possible names should be discussed by the breeders from the states concerned but final choice should be the privilege of the originating agency or agencies. Good examples of satisfactory general names are: Vicland [sic], Lincoln and Midland.

"RECOMMENDATION NO. 4: PREVENTION OF ESCAPES

"THE COMMITTEE RECOMMENDS THAT THE DIRECTORS INSIST THAT PRECAUTIONS BE TAKEN BY RESEARCH AND EXTENSION WORKERS TO PREVENT ESCAPES.

"Escapes occur in a number of ways, such as: (1) Seed given to friends by state and federal employees: (2) Farmers harvest test strips planted on their farms for demonstration or testing purposes: (3) Seed deliberately taken by individuals having no right to the seed. Multiplication of seed via the escape route makes orderly distribution of seed very difficult.

"RECOMMENDATION NO. 5: PREPARATION AND RELEASE OF INFORMATION

"THE COMMITTEE RECOMMENDS THAT PERTINENT INFORMATION AS TO THE BASIC FACTS OF ORIGIN AND CHARACTERISTICS, AND DATA JUSTIFYING THE INCREASE AND RELEASE OF A NEW VARIETY SHALL BE PREPARED BY THE FOSTERING AGENCY OR AGENCIES. PARTICIPATING STATES SHALL USE THIS MATERIAL SUPPORTED OR MODIFIED BY THEM INFORMATION IN STATE PUBLICITY. PUBLICITY INTENDED FOR NATIONAL OR REGIONAL PERIODICALS SHOULD INCLUDE INFORMATION ON THE REGIONAL ADAPTATION OF THE VARIETY. A UNIFORM DATE FOR THE RELEASE OF INITIAL PUBLICITY SHALL BE AGREED UPON BY THE INTERESTED STATES.

"The fostering agency or agencies are best qualified to prepare the initial publicity. They have the background information and facts from which to describe the development and the characteristics of the variety. Advanced publicity has often complicated the distribution problem. In some cases, the publicity has been put out too soon, and in others, it was not complete. Recommendation No. 5, if followed, should insure agreement ahead of time on the nature and time of release of publicity.

Page 22: "RECOMMENDATION NO. 6: RECOGNITION OF EXISTING CROP CONFERENCES AND ORGANIZATION OF NEW ONES

"THE COMMITTEE RECOMMENDS: (a) THAT SPECIFIC CROP CONFERENCES FUNCTIONING CURRENTLY OR TO BE ORGANIZED ALSO HANDLE THE SEED DISTRIBUTION PROBLEMS FOR THEIR RESPECTIVE CROPS IN ACCORDANCE WITH RECOMMENDATIONS SET FORTH IN THIS REPORT. WHEN MULTIPLICATION AND DISTRIBUTION OF A NEW VARIETY ARE TO BE CONSIDERED, REPRESENTATIVES OF THE SEED PRACTICES COMMITTEE FROM THE STATES INTERESTED IN THE VARIETY SHALL AUTOMATICALLY BECOME MEMBERS OF THE CROP CONFERENCE: (b) THAT NEW CROP CONFERENCES BE CREATED WHENEVER THE NEED DEMANDS IT TO HANDLE CROPS NOT ALREADY COVERED BY A CONFERENCE: (c) THAT THE UNITED STATES DEPARTMENT OF AGRICULTURE BE INVITED TO SEND REPRESENTATIVES TO EACH MEETING: (d) THAT THE SEED PRACTICES COMMITTEE OF THE NORTH CENTRAL REGION BE CALLED TOGETHER ONLY WHEN MATTERS OF POLICY OR SOME PROBLEM AFFECTING THE WHOLE REGION HAS ARISEN THAT REQUIRE THE ACTION OF THE ENTIRE COMMITTEE.

"A number of conferences are currently functioning such as the soybean conference, alfalfa conference, barley

institute, flax institute, wheat conferences and others. Some of these conferences have been making recommendations with respect to seed multiplication and distribution and should continue to do so in accordance with the recommendations set forth in this report. It is suggested that closed meetings be held when desirable to discuss problems pertaining to the recommendations presented herein.

"RECOMMENDATION NO. 7: MASS MULTIPLICATION AND SEED DISTRIBUTION PLANS

"THE COMMITTEE RECOMMENDS THAT IN ADDITICN TO CARRYING OUT RECOMMENDATIONS 1, 2, 3, 4, and 5, THESE CROP CONFERENCES SHALL DEVELOP REGIONAL PLANS FOR THE MASS MULTIPLICATION AND DISTRIBUTION OF NEW CROP VARIETIES.

"RECOMMENDATION NO. 8: APPROVAL FOR MEETINGS AND REPORT OF PROCEEDINGS

"IT IS RECOMMENDED THAT ALL CROP CONFERENCES CLEAR ALL MEETINGS THROUGH, AND REPORT PROCEEDINGS TO THE ADMINISTRATIVE ADVISER OF THE SEED PRACTICES COMMITTEE.

"Such a procedure would make these meetings official with respect to the North Central Directors' Association.

"APPROVED by the North Central Directors April 13, 1948.

"c. Committee to consider needed research on fertilizer applications and the effect of competition on the accuracy of yield testing in soybean nurseries–W.R. Paden

"The committee did not recommend any uniform large scale fertilizer test but drew up the following general suggestions which the collaborators could adapt to their local needs:

"Fertilization

"The policy recommended by the committee is that each cooperator obtain a soil sample from his proposed nursery area prior to planting and have a test made at his state soil testing laboratory. This test will serve as an aid for any soil..." (Continued). Address: Secretary to the Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1112. Morse, W.J. 1949. Fourth work planning conference of the Southern States Collaborators of the U.S. Regional Soybean Laboratory, Birmingham, Alabama, March 2-4, 1949 (Continued–Document part IV). *RSLM* (*U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois*) No. 152. March 4. 25 + 9 p.

• ***Summary:*** (Continued): Page 24: "List of Names Used for Soybean Varieties

"The conference directed the secretary to append to this report a complete list of all names that have been used for soybean varieties in the United States.

"This list, which is attached, was prepared by Mr. Morse as a guide to avoid duplication in naming of new varieties.

Note: This list is identical to the 9-page attachment to RSLM No. 148 (March 1948).

"Friday morning, March 4–John Gray, Chairman

"Work of the Northern Regional Research Laboratory by John R. Cowan, Northern Regional Research Laboratory, Peoria, Illinois. Dr. Cowan reported to the group that Dr. Milner is now Director of the Northern Regional Research Laboratory, having been promoted from Head of the Analytical and Physical Chemical Division. The position as Head of the Analytical Division will be filled by Dr. Fritz Scente. A new division has been added to the Laboratory during the past year, a Motor Fuels Evaluation Division. The principle accomplishment of the Motor Fuels Division has been the development of a fuel injector operating off the manifold pressure of a gasoline engine to inject an alcohol and water mixture automatically as the manifold pressure increases. By this device trucks and automobiles with relatively high compression engines will be able to use 3-grade low octane gasolines while running under average light loads and will ordinarily use the alcohol-water mixture to increase octane rating of the fuel mixture as the power demand increases either for acceleration or for hill climbing. The principle has considerable promise and is being actively tested under practical road conditions.

"The Laboratory has five RMA projects under way in addition to the regular fund projects: utilization of grain, flavor stability of soybean oil, development of anti-biotics, utilization of soybean flour and utilization of lecithin.

"Spectrophotometric methods are being developed for determining the percentage of the different fatty acids in soybean oil. Studies are also being made of the refining losses in soybean oil and the best methods for determining refining losses. The Laboratory has established an organoleptic test panel for measuring soybean oil reversions as a part of flavor stability studies. This method so far has been the most promising and the only reliable method of studying flavor revision. The method has been refined to the point where small differences can be measured fairly reliably.

"Soybean oil is a major food oil in this country at the present time, though it may not remain so unless the problem of flavor reversion can be solved. The Laboratory and others working on the problem are beginning to see definite progress though much remains to be done. Among the causes of flavor reversion are trace amounts of metals. Iron is the most important and 0.3 parts per million will have a measurable influence on stability. One part per million in often present in samples of soybean oil. Citric acid measurably improves the stability of samples. There are also a number of other agents including carboxylic acid and some of the phosphates, which, when added to oil, will make the iron no longer available as a pro-oxidant. These compounds are added in trace amounts of water at the start of the refining

process.

"It has been suggested that phosphatides may be the cause of flavor reversion. Every fraction of phosphatide material that has been removed from soybean oil and later re-added has improved flavor stability, thus it is no longer thought of as a cause of reversion.

"The Laboratory has been working on corn protein and has developed excellent zein fibers. Dr. Cowan exhibited a hat made of 15 percent zein and 85 percent rabbit fur that had excellent durability as a hat material, One advantage of this zein fiber is that it can be dyed in an acid bath the same as wool. The fiber has good wet strength, which also is an advantage over some other vegetable fibers.

"The Engineering Division of the Laboratory has improved the liquid-liquid extraction process to the point where a fraction can be produced that is a superior paint oil, and another fraction produced that is a satisfactory vegetable oil equal to untreated oil for food use.

"Alcoholic extraction has been developed to where 95 percent alcohol can be used economically without distillation in a low pressure extractor and a better oil for food use can be obtained than from hexane extraction. Those oils are more free of gums. A lighter meal can also be obtained from the alcohol extraction. The process is in pilot plant scale and appears promising from the standpoint of economical operation.

"Another product of the Laboratory has shown considerable promise. This has been named Gelsoy and is obtained from water extraction of meal that has been previously extracted with alcohol to remove a gel inhibitor. The Gelsoy can be used industrially in crown seals and has a vegetable glue. As an edible product it can be used in stable ice cream and as icings and candy.

"Another development of the Laboratory has been the modification of soybean oil to a product with a configuration similar to that of tung oil. The process involves addition and splitting off of chlorine and one of the early difficulties was that of chlorine removal. Now the process has been refined to the point where all but one percent of the chlorine can be removed, making the oil very suitable for industrial use.

"The Paint Section of the Laboratory, using 100 percent soybean oil in the vehicle, has been able to develop a very suitable 8-hour drying paint that stands up well and has no after-tack. Chemists have learned that the addition of 4 percent CaO [calcium oxide / lime], will materially speed drying, improve durability, prevent dirt collection and prevent after-tack. The drying time of this paint is around 8 hours compared to 4 hours for linseed oil.

"A discussion of iodine number in relation to soybean breeding followed Dr. Cowan's talk and in response to a question, he stated that flavor reversion, if caused by linolenic acid, would be a proportional effect and on this assumption he felt that the lower the iodine number the more stable an oil should be. Dr. Cowan stated that the rate of oxidation of oleic, linoleic, and linolenic acids were in the ratio of 1 to 12 to 24. Thus a small shift in linolenic acid might be important in oil stability.

"The Conference adjourned after expressing gratitude to the Bankhead Hotel and to others who had made the arrangements for the meeting.

"W.J. Morse, Secretary to the Conference. Birmingham, Alabama, March 4, 1949." Address: Secretary to the Conference, Agronomist, Forage Crops & Diseases, U.S.D.A., Beltsville, Maryland.

1113. Bill, Frank W. 1949. Usual soybean acreage sought in USDA goal, price support: Less chance for surplus beans than corn–Funk. *Pantagraph* (*Bloomington, Illinois*). April 26. p. 15.

• ***Summary:*** Soybeans planted this spring are guaranteed a 90% parity price as of Sept. 1, and present indications are that the price support level will be close to $2.12 a bushel for No. 2 beans.

This news and USDA's prediction of surplus production of corn, should justify a good acreage of soybeans planted this spring, says Eugene Funk, president of Funk Bros. Seed Co., which has operated a soybean mill in Bloomington [Illinois] since 1924.

The first guaranteed price for soybeans was in 1927 and 1928 when Funk Bros., the American Milling Co., and the Grange League Federation joined in a contract [called "The Peoria Plan"] that promised growers $1.27 to $1.35 per bushel of soybeans depending on the grade. This was also the first guaranteed price for any major crop in the USA. "Attending a soybean miller's conference at Urbana recently, Mr. Funk recalled old times."

A photo shows Dr. W.L. Burlison, I.C. Bradley, and W.J. Morse. These soybean promoters have devoted a total of 116 years of service to the industry.

Contents: Introduction. May have surplus corn. Recalls old times. A new industry. What next?

1114. Banks, G.H. 1949. Soybeans for industry in the South. *Chemurgic Digest.* May. p. 24-25.

• ***Summary:*** "Most of us know the first U.S. crushing of soybeans took place in a cottonseed oil mill in North Carolina during the vegetable oil shortage of World War I. But not many know the struggles of the early crushers to find a market for the oil, and still fewer know the impasse that occurred in disposing of the soybean meal. Nobody knew anything for sure about it; maybe it would poison livestock; 'safety first' prevailed and it was used as fertilizer. And it's still a mighty good fertilizer; highly prized by the growers of certain types of tobacco. But the scientist, the industrialist, and the chemurgist found literally hundreds of uses for soybean meal, which make the product far too valuable to have a practical and economic place in the preparation of mixed fertilizers.

"The saga of the soybean in American industry is well-known to this group. Shifting from a forage crop in North Carolina and nearby parts of the South, the soybean became first a minor, later a major crop in the great midwest. It would seem that the cotton-seed oil mills, with several months idle time each year, would have been the logical processing plants; but first at Chicago Heights, then the Staley development at Decatur, and later all over the Midwest soybean processing became common. Many factors were involved, including (1) the Southern farmer's tendency to use too much hand-labor in production; (2) the cottonseed crusher's devotion to the status quo; (3) the work of such pioneers as Morse and Burlison making available soybean varieties adapted to the shorter growing season of Illinois and neighboring states.

"During the late twenties and early thirties Illinois took and still holds the lead in production. A little later Iowa passed Indiana and into second place. Still more recently Minnesota has been giving Missouri a real battle for fifth place, while North Carolina, an early leader, has now assumed eighth place. But in the mid-thirties, under the stimulus of cotton acreage control, the cotton-growing part of the Mississippi Valley took a new look at soybeans. With cotton production reduced, oil-mills became interested in beans for crushing. No actual statistics are available, but among the mills which started crushing beans about 1935 were Osceola Cotton Oil Company, of Osceola, Arkansas, Rose City Oil Mill of Little Rock; and the Tunica Cotton Oil Company, Tunica, Mississippi.

"With a ready market for beans, farmers increased their acreage, more hydraulic mills turned to beans for a supplemental crush, and occasional expeller plants appeared. Eventually the solvent process entered the picture and we see such complete chemurgic developments as that in the Osceola-Wilson area, with solvent extraction for beans and cotton-seed; a vegetable oil refinery, and two margarine factories (the latter under construction). From Cairo to the Gulf of Mexico beans are being processed by one or more of the three accepted systems.

"Including the cotton-growing Southeast tip of Missouri, this delta country produces approximately 21.000,000 bushels of soybeans. Arkansas is now the 7th ranking state in bean production; Mississippi is 10th; Kentucky, 11th; Tennessee 13th. And while Louisiana goes in more for the hay-type of bean, that state's production in 1948 was the not inconsiderable amount of 490,000 bushels of harvested beans. In this same area was produced in 1948 about four and one-half million bales of cotton, with its concomitant crop of cotton seed resolving itself eventually into cotton-seed oil and cotton-seed meal. Taken together the two crops' production of vegetable oil and protein concentrates is highly significant. Cotton may be King but the soybean has reached at least the status of 'Prime Minister.'

"Soybeans are well-established; farmers have suitable combines and tractors; the bean handlers have made larger strides in making the marketing convenient and consistent; and both the farmer and the handler have a lot of 'know-how' when it comes to growing and marketing the crop. We need more funds for fighting the soybean's battle in Congress but that's a story you will hear more about in the near future. It calls for a little more of that co-operative spirit that is so characteristic of this fine country, and has accomplished so much for the Cotton Council. This group doesn't need any talk about the uses of soybean oil, soybean meal, cotton seed oil or cotton seed meal. Vegetable oils, especially edible vegetable oils, have assumed national and even international importance in recent years, and our two crops produce an abundance of highest quality vegetable oil. (About 110,000,000 gallons annually). Our entire national livestock program is based on the balancing of carbohydrates with protein concentrates. the latter of which we produce about 1,400,000 short tons.

"Growing a lot of good cotton is not entirely unique; other sections of the South do this. Growing this large volume of beans is not distinctive; sections of Illinois and Iowa have concentrated pretty much on soybeans. The thing which sets our country apart from the rest of the world is that our farmers alone grow both these crops. When Texas or Georgia cotton farmers rotate, they use several different crops, but seldom is there seen a cotton-soybean rotation. The soybean farmer of Illinois rotates but the alternate crop, be what it may, is not a producer of (1) vegetable oil, and (2) protein concentrate.

Our distinctiveness lies, therefore, in that all our acres come close to producing vegetable oil and protein concentrates every year. It is growing both these crops that make us so economically important to the nation and to the world. Our farmers, and our acres, are not content to grow cotton-seed or soybeans; theirs is a double duty, to produce cotton-seed and soybeans. No other section does this on a comparable scale.

"The operation with which I am connected grew about ten thousand acres of soybeans in 1948 and an equal acreage in cotton. Ours is largely a two-year rotation; the bean land of 1948 will be in cotton in 1949 and vice versa. We and our neighbors do a very good job of producing, but are the first to recognize our debt to the science of chemurgy for developing new uses for our crops."

A small portrait photo shows George Heartsill Banks. Address: Director of Agricultural Research, O.H. Acom Farms, Inc.

1115. Lawrence, George H.M. 1949. New and adopted names: Discussions in botanical names of cultivated plants. *Gentes Herbarum* (*Ithaca, New York*) 8(1):3-76. May. See p. 45-49. [8 ref]

• ***Summary:*** In a section titled "Nomenclature of the Soybean," the author presents detailed analyses to support

the contention that the legitimate name of the soybean is *Glycine max* (L.) Merrill. Thus, he agrees with the conclusion of Ricker and Morse (1948) as to the name of the soybean, but for different reasons. "Confusion may have been injected into the understanding of the nomenclature of the plant Linnaeus named *Dolichos Soja* by Piper's paper of 1914 [*J. Am. Soc. Agron.* 6:75-84], for in it Prain [the late Sir David Prain, once eminent Regius Keeper of the Edinburgh Botanical Garden in Scotland] is quoted to have stated *'Dolichos Soja* though written about by Linnaeus in 1753 was not seen by him until he grew specimens of it in Hort. Upsal. [Uppsala], which specimens he recorded the existence of, for the first time, in 1767.' In his original diagnosis Linnaeus cited as a supplementary reference 'Fl. zeyl. 534.' This refers to the *Flora Zeylanica* published by Linnaeus in 1747, a work made possible through his receipt of five tomes from a Danish pharmacist, August Gunther. The first three of these volumes contained pressed dried plant specimens from the Orient, the fourth an admixture of specimens from South Africa and the Orient, while the fifth comprised original drawings of many of these same plants. Linnaeus perceived quickly that all were the collections and drawings of a Paul Hermann, prepared during his travels in 1670-77 in the areas concerned. The flora written by Linnaeus and based on these collections is sometimes referred to as Hermann's Flora Zeylanica. In it (page 222) Linnaeus described a Dolichos (no. 534) based on one of the plants collected by Hermann. The description is identical with that published five years later by Linnaeus as *Dolichos Soya* in Species Plantarum. According to Savage's Catalogue of the Linnaean Herbarium (1945) a specimen labelled *Dolichos Soja* in Linnaeus' hand is in his herbarium. There seems no doubt that Linnaeus knew the plant and had seen a specimen of it prior to 1753. Evidence for Prain's statement to the contrary is not available, whereas reliable data refuting it is in the record.

"In 1767 Linnaeus published two works; his Mantissa Plantarum, which in effect was a supplement to the Species Plantarum, Edition 2 (1764), and a Systema Naturae, Edition 2. In the Mantissa (page 101) he published as new the name *Phaseolus Mungo.* In his Systema (ii. 482) he accounted for *Phaseolus Max* and *P. Mungo* (citing the Mantissa reference under the latter). Furthermore he continued to recognize *Dolichos Soja* as a valid and distinct entity (page 483). No Linnaean specimen is now known to exist for *P. Mungo,* but we know it to be the Urd bean of India. For reasons not clear to me, and despite the evidence cited above, Prain is quoted by Piper to have asked rhetorically, 'why, in 1753, did Linnaeus use *Max* in preference to *Mungo* and why in 1767 did he drop *Max* and use *Mungo* instead?' I find no evidence that Linnaeus ever 'dropped' the epithet *Max* or treated the name as a synonym of *Phaseolus Mungo* or that he considered the two to be conspecific. This has little pertinence to the nomenclature of the Soybean and is presented here only in an attempt to clarify the record and to show that Linnaeus did not abandon the name *Phaseolus Max* for the Soybean as is alleged.

"Linnaeus' specimens comprising the types of *Phaseolus Max* and *Dolichos Soja* are of cultivated plants (Hermann's collection of the latter is credited by Linnaeus, 1747, to be 'Habitat in zeylona culta'). As Piper pointed out, Moench in 1794 was the first to differentiate the wild indigenous prototype of the Soybean from the cultivated counterpart; he named the indigen *Soja hispida,* a name later (1873) transferred by Maximowicz as *Glycine hispida.* However, prior to Maximowicz's action, Siebold and Zuccarini described this same wild form as *Glycine Soja,* indicating that it was not based on the type of *Dolichos Soja* of Linnaeus. In creating their *Glycine Soja,* Siebold and Zuccarini also considered *Soja hispida* to be distinct generically as well as specifically, and treated *Dolichos Soja,* L., as a synonym of it."

Note: George Hill Matthewson Lawrence was an American botanist from Cornell Univ. Address: Bailey Hortorium, Cornell Univ.

1116. Morse, W.J. 1949. Across the borders: Soybeans yesterday and today. *Indian Farming* 10(5):218-21. May. [1 ref]

• ***Summary:*** This article is reproduced from *Foreign Agriculture,* May 1948 12(5):91-95, where it was titled "Soybeans Yesterday and Today." Address: USDA.

1117. Funk, Gene, Jr. 1949. The first [soybean] processors (Letter to the editor). *Soybean Digest.* June. p. 42.

• ***Summary:*** Written to set the historical record straight, this letter begins by noting that Gus Staley was *not* the first man to promote and process the soybean in the United States (see *Soybean Digest,* March 1949, p. 62).

"The early processing of soybeans in 1911 by Herman Meyer, a small crusher in Seattle, and later in 1915 by the Elizabeth City Oil and Fertilizer Co. at Elizabeth City, North Carolina, and again the Havens Oil Co. at Washington, N.C. in 1916, all should be recognized as the first in the field to really crush soybeans and press the oil out, in a small way."

After that came I.C. Bradley, who is the oldest continuous processor of soybeans in the United States. In 1924 Funk Brothers Seed Co. purchased Bradley's equipment and "brought it here to Bloomington, along with I.C. Bradley, wherein we continued to put forth effort to get beans grown for processing purposes. These early years were trying ones for at no time could we secure enough beans to process throughout the entire year" and feed manufacturers did not want to use soybean oil meal in their formulas unless they were able to secure it the year round.

The A.E. Staley Co. started in 1922 and they too had some of the same problems which Funk encountered.

"One of the most outstanding men in the soybean history and one who could truly be called the Father of the USA

Soybean, is none other than Bill Morse of the USDA. He was one of the first to see the possibilities of soybeans as a crop and has taught and preached the value of them ever since he graduated from college [in 1907].

"Another gentleman whom we also should recognize as a father of the soybean crop is Prof. W.L. Burlison at the University of Illinois..."

And "we cannot leave out Ed Dies as one who has been a true general in guiding the processors through their many problems... during the National Soybean Processors Association growing period."

Eugene Funk Sr. "spent a lot of his time in trying to promote and guide the soybean crop throughout its early stages. We [Funk Brothers] have records of selling soybean seed as early as 1903. This of course was for planting beans in corn only on a small scale. We promoted the use of inoculation of soybeans using dirt from soybean fields..." Address: Funk Bros. Seed Co., Bloomington, Illinois.

1118. Morse, W.J.; Cartter, J.L.; Williams, L.F. 1949. Soybeans: Culture and varieties. *Farmers' Bulletin* (*USDA*) No. 1520 (Revised ed.). 38 p. Aug. Revision of 1927 and 1939 editions.

• ***Summary:*** Contents: History. Description. Distribution and production. Climatic adaptations. Varieties. Description of varieties. Improved varieties. Soil preferences. Soil erosion. Preparation of 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 and corn, cowpeas, Sudan grass, millet, sorghum. Insect enemies of soybeans: Grasshoppers, velvetbean caterpillar, leafhoppers, blister beetles, bean beetles, Japanese beetles, other beetle enemies, army worms and other caterpillars, chinch bugs. Diseases of the soybeans. Other enemies of soy beans (rabbits, pigeons, deer, woodchucks).

The section on "History," states (p. 2): "Since 1890 most of our agricultural experiment stations have experimented with soybeans, and many bulletins treating of various phases of the crop have been published. In 1898, the United States Department of Agriculture began the introduction of a large number of soybeans from Asiatic countries. Since that time the acreage of soybeans has increased nearly three-hundred-fold–from less than 50,000 acres in 1907 to 12,427,000 acres in 1946. Increase of acreage and production has been closely correlated with the introduction of varieties and their improvement through selection. Remarkable progress has been made in the last few years in developing food and industrial uses."

The section on "Varieties" (p. 5-7) states: "Soybean varieties have been classified as early or late, depending on when they ripen under the latitude and climatic conditions at the location where they are grown. Another means of expressing maturity that is coming into general use among plant breeders is a classification according to the relative maturity groups. The varieties being grown in the United States have been divided into nine maturity groups (0 through VIII), group 0 and I being adapted to the northern part of the country. The succeeding groups are adapted further south, group VIII being grown in the Gulf-coast region. A map of the United States (fig. 3) shows the areas "where varieties in each of the soybean maturity classification groups are adapted as a full-season crop.

A full-page chart (p. 7) shows the varieties in each of the 9 maturity groups. Within most groups, the varieties are divided into commercial, forage, and vegetable, and the vegetable group is further divided into "green bean" and "mature bean." Group 0: Commercial–Capital, Flambeau, Goldsoy, Kabott, Minsoy, Montreal Manchu, Norsoy, Pagoda, Pridesoy. Green vegetable–Agate, Sac, Sioux. Group I: Commercial–Blackhawk, Cayuga, Habaro, Manchu 3, Manchu 606, Manchukota, Mandarin, Mandarin (Ottawa), Mandarin 507, Monroe, Ontario, Wisconsin Black. Forage–Cayuga, Wisconsin Black. Green vegetable–Green Giant, Hidatsa.

Group II: Commercial–Bavender Special, Earlyana, Granger, Harman, Hawkeye, Mandell, Mingo, Mukden, Richland, Seneca. Vegetable: Green bean–Bansei, Etum, Hakote, Jogun, Kanro, Kanum, Mendota, Sato, Sousei. Vegetable: Mature bean–Bansei, Etum, Jogun, Kanro, Kanum, Mendota, Sousei. Group III: Commercial–Adams, Chief, Dunfield, Illini, Lincoln, Manchu, Pennsoy, Scioto, Viking. Vegetable: Green bean–Chusei, Hokkaido, Kura, Tastee, Willomi, Wolverine. Vegetable: Mature bean–Chusei, Hokkaido, Willomi, Wolverine.

Group IV: Commercial–Boone, Gibson, Hongkong, Macoupin, Mansoy, Midwest, Morse, Mount Carmel, Patoka, Wabash. Forage–Ebony, Kingwa, Norredo, Peking, Virginia, Wilson. Vegetable: Green bean–Aoda, Chame, Emperor, Funk Delicious, Imperial. Vegetable: Mature bean–Emperor, Funk Delicious, Imperial.

Group V: Commercial–Haberlandt, Herman, Hollybrook, S100. Vegetable: Green bean–Easycook, Hahto, Higan. Vegetable: Mature bean–Easycook, Higan.

Group VI: Commercial–Arkan, Arksoy, Arksoy 2913, Armredo, Delsoy, Dortchsoy 2, Magnolia, Mamredo, Ogden, Ralsoy, Rose Non Pop. Forage–Laredo. Vegetable: Green bean–Rokusun, Delsoy. Vegetable: Mature bean–Rokusun, Delsoy.

Group VII: Commercial–Charlee, Clemson, C.N.S. (Clemson Nonshattering), Georgian, Hayseed, Mammoth Brown, Mammoth Yellow, Missoy, Monetta, Palmetto, Roanoke, Tennessee Non Pop, Tokyo, Volstate, Woods Yellow, Yelredo.

Group VIII: Commercial–Acadian, Arisoy, Creole, Delsta, LZ, Mamloxi, Mamotan, Nanking, Pelican, Seminole, Yelnando. Forage–Avoyelles, Biloxi, Creole, Gatan, Otootan. Forage–Avoyelles, Biloxi, Creole, Gatan.

Otootan. Vegetable: Green bean–Cherokee, Nanda, Seminole. Vegetable: Mature bean–Nanda, Seminole.

Description of varieties: Each of the varieties listed above is described here in detail in alphabetical order. The following synonyms are also included: Black Beauty (Same as Ebony). Brown Otootan (Same as Tanner). Early Green (Same as Medium Green). Early Indiana Laredo (Same as Norredo). Early Laredo (Same as Norredo). Early Mandarin (Same as Mandarin). Early Virginia Brown (Same as Virginia). Early Wilson (Same as Wilson). Early Wilson Black (Same as Wilson). Early Wisconsin Black (Same as Wisconsin). Early Woods Yellow (Same as Arksoy). Early Yellow (Same as Ito San). Edsoy (Renamed Delsoy). Giant Brown (Same as Mammoth Brown). Green (Same as Medium Green). Guelph (Same as Medium Green). Hollybrook Early (Same as Midwest). Illinois VC-VT (Same as Ilsoy). Indiana Hollybrook (Same as Midwest). Japan Pea (Same as Ito San). Large Brown (Same as Mammoth Brown). Large Yellow (Same as Mammoth Yellow). Late (Same as Mammoth Yellow). Late Yellow (Same as Mammoth Yellow). McClave (Same as Midwest). Mammoth (Same as Mammoth Yellow). Manchuria (Same as Pinpu). Medium Early Green (Same as Medium Green). Medium Early Yellow (Same as Ito San). Medium Yellow (Same as Midwest). Mongol (Same as Midwest). Northern Hollybrook (Same as Midwest). Ohio 9035 (Same as Hamilton). Purredo (Same as Norredo). Red Otootan (Same as Tanner). Red Tanner (Same as Tanner). Roosevelt (Same as Midwest). Sable (Same as Peking). Shanghai (Same as Tarheel Black). Southern (Same as Mammoth Yellow). Southern Medium Green (Same as Tokyo). Tarheel (Same as Tarheel Black). Tarheel Brown (Same as Mammoth Brown). Vanderburg Black (Same as Norredo). Virginia Brown (Same as Virginia). Virginia Early Brown (Same as Virginia). Wilson Black (Same as Wilson). Wilson Early Black (Same as Wilson). Wisconsin Early Black (Same as Wisconsin Black). Yellow (Same as Mammoth Yellow).

Footnote (p. 8): The following varieties of soybeans do not appear in the present publication as they are no longer handled by growers and seedsmen and have been superseded by improved varieties: A.K., Aksarben, Arlington, Austin, Black Eyebrow, Chernie, Chestnut, Chiquita, Columbia, Delnoshat, Dixie, Early Brown, Elton, Fuji, George Washington, Goku, Goshen Prolific, Hamilton, Harbinsoy, Hiro, Hoosier, Hurrelbrink, Ilsoy, Ito San, Jet, Lexington, Medium Green, Merko, Mikado, Ogemaw, Old Dominion, Oloxi, Osaya, Ozark, Pee Dee, Pine Dell Perfection, Pinpu, Shiro, Sooty, Southern Green, Southern Prolific, Soysota, Suru, Tarheel Black, Toku, Waseda, Wea, White Biloxi, Wilson-Five, and Yokoten.

Note: The term "maturity group" was first used in 1936 by L.E. Kirk, but with a somewhat different meaning than it now has. This is the 2nd earliest document seen (June 2009) that uses the term "maturity group" in the sense that has come to be widely used since 1946, and the earliest document seen (June 2009) that discusses the concept in detail. Address: 1. Principal Agronomist; 2. Senior Agronomist; 3. Assoc. Agronomist. All: Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration [USDA].

1119. *Unknown newspaper*. 1949. Mutt and Jeff (Cartoon). Oct. 30.
• ***Summary:*** This 4-part cartoon begins: (1) Jeff (short with a top hat): "Mutt! I hear you got a new car!" Mutt: "Yep! It's a new kind of a car! A plastic job!"

(2) Shows the car with a license plate bearing Chinese characters. "Did it cost much? Naw! It's cheap! You see the entire car is made from soybeans!"

(3) "Made from soybeans? Yep! It's something new! The chassis is soybeans. The body is soybeans. Even the tires are made from soybeans!"

(4) Jeff: "Ain't cha gonna drive it?" Mutt: "Drive it? Put some ketchup on it and I'll eat it!" Address: USA.

1120. Weiss, Martin G. 1949. Soybeans. *Advances in Agronomy* 1:77-157. [242 ref]
• ***Summary:*** A comprehensive review of the literature on soybean breeding and management. The first such treatment since Piper and Morse's classic book, *The Soybean* (1923). Contents: 1. Introduction. 2. Production and distribution: In the world, in the United States. 3. Disposition and utilization. 4. Physiology of the soybean plant: Floral initiation (varietal differences, duration of dark and photoperiods, light intensity and photosynthesis, age and position of induced tissue, temperature effects), nutrition (nitrogen, phosphorus, major cations, micronutrients), root temperatures. 5. Effect of climate and location: Location and season effects, simulated hail damage. 6. Effect of cultural practices: Rotations, fertilizers and soil management (response, placement), seed inoculation, seed germinability (viability, disinfectants and protectants, hormones), time of planting, method and rate of planting, weed control, harvesting. 7. Genetics and cytology. 8. Variety improvement. 9. Effect on soils. 10. Disease and insect pests. 11. Regional approach to soybean research (U.S. Regional Soybean Laboratory). Address: Iowa State College, Ames, Iowa.

1121. Retirement party for W.J. Morse, USDA, Beltsville, Maryland (Photograph). 1949. Nov. 22.
• ***Summary:*** Morse is standing in the front row, third from the left.

This digital photo, with caption and date, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1122. 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. Wed.

• ***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 her 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.

1123. *Washington Post.* 1949. Morse, U.S. soybean ace, retires today. Nov. 30. p. 10B.

• ***Summary:*** Contents: Introduction. More than a century. Research in Asia. To move to Yonkers.

"William J. Morse, virtual father of the soybean in the United States, is scheduled to retire today..." What is he going to do? He plans to grow soybeans for his dinner table, and to write a book about food–soybean food. "Morse is dead serious about writing that book on soybean foods. So serious, he said, that it is one reason he's retiring at 65. He could stay on another five years under federal retirement regulations."

Yesterday Morse estimated that about 85% of U.S. soybean oil is used to make margarines and shortenings.

"He and his wife plan to move soon to a suburban residence near Yonkers, New York" [just north of Manhattan]. He will need such a house for living, planting and writing.

Besides the book on soybean foods, he plans to write a book on Oriental plants, incorporating a lot of information he collected in the Orient. A portrait photo shows William J. Morse.

1124. *Watertown Daily Times* (*New York*). 1949. Article about William Morse and soybeans. Nov. 30. *

1125. Johnson, E.F. "Soybean". 1949. History and accomplishments of the American Soybean Association. *Soybean Digest.* Nov. p. 28, 30-31.

• ***Summary:*** This article is from a talk before Ohio soybean producers. "The American Soybean Association was organized in the fall of 1920 at a meeting of some 600 soybean enthusiasts at Taylor Fouts Farms at Camden, Indiana. The 1921 meeting was held on Riegel–The Meharry Farms at Tolono, Illinois.

"In this same year a sectional meeting was held in Williams County, Ohio, on my farm. This was the first soybean meeting for demonstration of farm practices for growing soybeans ever held in Ohio. Many of you may recall this meeting. That was back in the days when the Ito San was still a base variety, and Manchu, Black Eyebrow, Medium Green, Peking, Elton and A.K. were major varieties.

"For many years the Association existed mainly through

the untiring efforts of W.J. Morse of the USDA." Now rightfully recognized as the 'daddy' of soybean production and promotion in America, he was ably assisted by many other university agronomists. "In this honor roll must appear such names as W.L. Burlison and J.C. Hackleman of Illinois, Keller Beeson of Purdue [Indiana], Hanger and Parks of Ohio State, Hughes and Dyas of Iowa, and Briggs of Wisconsin.

"The early problems of the Association were mainly varieties, adaptation of existing machinery to growing the crop, and harvesting and threshing. Most of the harvested crop moved for seed, partly for emergency hay crops, partly for silage, and partly to new growers interested in the crop.

"For 18 years, the officers of the Association were agronomists from various universities in the Cornbelt. The presidency was usually extended to the ranking soybean professor in the state where the next annual meeting would beheld. A review of the papers presented at many of these meetings gives one a clear insight into what were then the problems of the soybean grower.

"Every year one or more papers were presented on the use of soybean oil. Could it be used in paint? Would it work in food products? How did soybean oil meal compare with other proteins as a feed for hogs, cattle, sheep and chickens? Frequent papers appeared questioning the possible expansion of the soybean crop. Even I in 194O wondered if the anticipated crop of 110 million bushels of soybeans could be successfully marketed.

"It is conceded today that the activities of your Association had much to do with the adaptation of the large combine to soybeans. All of us today realize that without the adaptation of the combine, the soybean industry as we know it could not have existed...

"The 1940 annual meeting of the Association held at Dearborn, Michigan, as guests of Henry Ford, was perhaps the most significant of all meetings of the Association to that date. As I read the published report printed after the meeting, I find in rather small print two significant statements. 'Two definite suggestions were made to by developed by the board of directors, namely that the Association make plans to employ an executive secretary, and that a soybean periodical be published as an official organ of the Association.' That, my friends, marks the official birth of Geo. Strayer, and the *Soybean Digest,* as far as the American Soybean Association is concerned.

"The policy of having a university agronomist serve as chief officer of the Association had been abandoned the previous year. Much of the reorganization and solid foundation built was due to the able leadership of Glen McIlroy who served as president for 3 consecutive years during this period. Since 1940 the American Soybean Association has driven ahead day after day for those things that were best not only for the soybean grower, but for the soybean user and the nation as well. The only reason it has not done more is due to lack of enough membership of active interested growers, and lack of finances to meet an ever increasing demand on its activities.

"The past relationship of the growers' association to the soybean processors has always been one of mutual interest and concern over vital problems of each group. For years the Association has taken the leadership in working out a more orderly marketing of soybeans. Like any new crop, growers expanded their acreage, with no thought of a similar expansion of storage facilities. During World War II, 90 percent of the soybeans moved direct to processors at harvest time. Your Association recognized the tremendous burden such marketing gave the processors.

"The largest field of your Association activities has been in the legislative field. The officers have been alert to every congressional move that would reduce the market for soybeans or the resulting products, and in turn would have its effect on prices paid to growers.

"The first gigantic problem that faced the Association was the threatened repeal of the reciprocal trade agreement over the stubborn determination of Secretary of State Hull. A fats and oils council was formed largely through the efforts of the soybean and cotton associations. McIlroy and Wing spent about 2 weeks in Washington [DC] as official representatives of the Soybean Association. For the first time in farming history the dairy associations and all the livestock associations joined in a protest against lowering duties on foreign fats and oils. Although your Association did not win a complete victory, they were able to save a portion of the things demanded which have meant millions of additional dollars to every producer of oil or fat in the United States.

"During the last 2 years your Association's activities have been correctly directed against the margarine taxes levied by federal and state laws.

"With the exception of the years we were engaged in World War I and II and a short postwar period, foreign fats and oils have been the largest single factor in determining the price of fats and oils in the United States. To better understand the seriousness of this importation, it is necessary to understand that these imports include two types of products. The most important group included those fats and oils that are the products of natural flora of the country from which they originate."

A photo shows E.F. Johnson standing in the office of Delphos Grain and Soya Products Co. Address: Delphos Grain and Soya Products Co., Delphos, Ohio.

1126. *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."

1127. *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.

1128. Dies, Edward Jerome. 1949. Titans of the soil: Great builders of agriculture. Chapel Hill, North Carolina: University of North Carolina Press. ix + 213 p. Illust. Index. 25 cm. [235 ref]

• ***Summary:*** This book is about U.S. farmers and agriculturists only. Contents: Food and freedom. George Washington, farmer of Mount Vernon. Thomas Jefferson, farmer of Monticello. Elkanah Watson, father of state fairs. Eli Whitney, immortal mechanical genius. Henry L. Ellsworth, soldier of the land. Edmund Ruffin, father of soil chemistry [1818, 1843-55; contemporary of Justus Liebig of Germany, 1840]. John Deere, he turned the prairies [with his plow]. Cyrus Hall McCormick, man with the reaper.

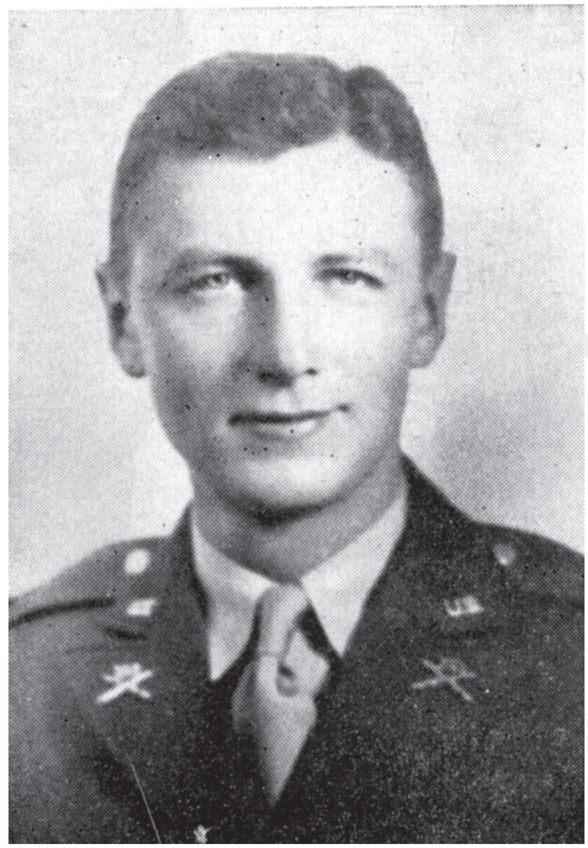
Justin S. Morrill, he 'lighted candles of wisdom.' Samuel W. Johnson, genius of the test tube. Wilbur Olin Atwater, master of nutrition. Seaman A. Knapp, schoolmaster of agriculture. Stephen Moulton Babcock, the jolly scientist. Theobald Smith, conquest of Texas fever. Mark A. Carleton, wheat explorer. Harvey W. Wiley, apostle of pure food. George Harrison Shull, creator of hybrid corn. And these, too, served: Abraham Lincoln, Horace Greeley, Luther Burbank, David Fairchild, Liberty Hyde Bailey, Cyril George Hopkins, the Coker family of South Carolina, Henry Ford (incl. William J. Morse and soybeans), George Washington Carver. Prelude to future. References. Each chapter is accompanied by a full-page illustration or photo of the man described, a brief chronology of vital statistics and major accomplishments, and 5-15 key bibliographic references. Address: USA.

1129. Martin, John H.; Leonard, Warren H. 1949. Soybeans. In: John H. Martin and Warren H. Leonard. 1949. Principles of Field Crop Production. New York, NY: The Macmillan Co. ix + 1176 p. See p. 735-54. Chap. 26. [42 ref]
• ***Summary:*** Contents: Economic importance. History of soybean culture. Adaptation. Botanical description. Varieties. Chemical composition. Rotations. Cultural methods: Seeding, harvesting for seed, harvesting for hay, soybean mixtures. Soybean oil extraction. Quality of soybean oil. Soybean utilization. Diseases: Sclerotial blight (Southern blight), charcoal rot, root knot or nematode disease (a microscopic thread worm, *Heterodera marioni*), bacterial blight, pod and stem blight, bacterial pustule, frog-eye leaf-spot disease, mosaic, other diseases. Insect pests. Rabbits.

The section titled "History of soybean culture" begins: "The soybean is one of the oldest of cultivated crops. Its early history is lost in antiquity. The first record of the plant in China dates back to 2838 B.C. (Morse & Cartter 1937). It was one of the five sacred grains upon which Chinese civilization depended."

Note: This is the earliest English-language document seen (Aug. 2002) which states that the soybean's early history is "lost in antiquity." Address: 1. Senior Agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, USDA; 2. Prof. of Agronomy, Colorado Agricultural and Mechanical College, and Agronomist, Colorado Agric. Exp. Station.

1130. *Soybean Digest.* 1950. Weiss succeeds Morse at Beltsville. Jan. p. 30.
• ***Summary:*** "Dr. Martin G. Weiss, research professor of agronomy [at Iowa Agric. Exp. Station], has resigned, effective Jan. 15 to accept a position with the Division of Forage Crops and Diseases, United States Department of Agriculture, Beltsville, Maryland. He will be leader in charge of soybean investigation for the Bureau of Plant Industry, Soils and Agricultural Engineering, succeeding W.J. Morse



who retired Dec. 1. Under his jurisdiction will be the U.S. Regional Soybean Laboratory at the University of Illinois and soybean work in 12 north central and 12 southern states. In addition he will supervise pathological work in a number of states."

Weiss became a USDA collaborator at the Iowa Agric. Exp. Station in 1936. In 1938 he made a cross of Mukden and Richland soybeans from which the present Hawkeye variety originated. Photos show the author and Robert R. Kalton, who will replace him at Iowa.

1131. Geiger, Robert E. 1950. A 'wonder drug' spurs hunt for plants. *Washington Post.* July 2. p. B3.
• ***Summary:*** Plant hunters a plant to help increase the production of cortisone, the so-called "wonder" drug. Cortisone is now generally produced by a chemical process starting with bile from the livers of oxen. About 40 livers are needed to produce one dose of cortisone.

Plant hunters founded the U.S. soybean industry; the crop is now worth $1 billion a year. One "soybean explorer was the late P.H. Dorsett, who spent about 20 years of his life in far away, usually primitive places, hunting new plants. Between 1924 and 1927 he helped locate 6,000 strains of the soybean plant in the Orient." Later, Dorsett and W.J. Morse, both of the USDA, were sent to Japan, Korea, China and other places to find soybeans. Discusses the book *America's Crop Heritage,* by Nelson Close. In the 1780s Benjamin

Franklin "tried to start a soybean crop in this country, sending Chinese seeds from France. But they did not find a favorable reception." Address: USDA.

1132. Morse, W.J.; Cartter, J.L.; Hartwig, E.E. 1950. Soybean production for hay and beans. *Farmers' Bulletin* (*USDA*) No. 2024. 15 p. Sept. Supersedes Farmers' Bulletin 1605, Soybean hay and seed production.
• ***Summary:*** Contents: Introduction. Soybean hay production: Varieties for hay, methods of planting for hay, time of cutting, method of cutting, curing, artificial drying, storage and baling, yields of hay. Soybean production: Time of harvesting, defoliation, methods of harvesting, weather-damaged beans, yields of soybeans. Storage. Grading and marketing. Address: 1. Formerly Principal Agronomist; 2. Senior Agronomist; 3. Agronomist. All: Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration [USDA].

1133. 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.

1134. 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 (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, 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.

1135. 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.

1136. Morse, W.J. 1950. Chemical composition of soybean seed. 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. 135-56. [73 ref]
• ***Summary:*** Contents: 1. Introduction. 2. Influence of maturity. 3. Influence of variety and environment. 4. Influence of fertility. 5. Lipides [Lipids]. 6. Inorganic constituents. 7. Other constituents: Nitrogenous constituents, nitrogen-free extract, vitamins. 8. General comment. 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.

1137. 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 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.

1138. Morse, W.J. 1950. History of soybean production: 3A. Modern history [in East Asia and Europe] (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. 6-9.

• ***Summary:*** "The origin of soybean culture in Manchuria is not definitely known, but it is supposed to have been brought from central China many centuries ago. At first soybeans were grown only for food but when they became a source of oil, production gradually increased. No mention has been found of soybean oil in ancient Chinese literature, so it is concluded that the crushing of soybeans for oil occurred in comparatively recent times. The production of soybeans, however, was more or less localized until after the Chinese-Japanese War (1894-1895), when Japan began to import the soybean oil cake for fertilizing purposes, resulting in a sudden expansion of demand for this product. Soybean cake became the chief end product of the oil mill industry. The Russo-Japanese War brought about a wider interest in the soybean and its products; shipments were made to Europe about 1908 and the soybean assumed worldwide attention. Acreage and production increased rapidly and the soybean became one of the most staple crops and exports of Manchuria.

"The soybean was first brought to the attention of Europeans in 1712 by Engelbert Kaempfer, a German botanist, who spent two years, 1691-1692, in Japan. Although Kaempfer discussed in detail the various food products prepared from the soybean by the Japanese, little interest was taken in the crop. According to Dale's *Pharmacologiae,* it is evident that European pharmacologists were familiar with the Japanese soybean and its medicinal uses in 1751. Soybean seed sent from China by missionaries was planted as early as 1740 in the Jardin des Plantes, Paris. The plant was experimented with at various times after this date and in 1855 the *Société d'Acclimatation* distributed seed but did not succeed in establishing a permanent culture of the plant. The soybean was grown in 1790 in the Royal Botanical Gardens, Kew, England, but apparently no effort was made toward its culture as a crop. The greatest impetus given soybean cultivation in Europe was the work in 1875 and subsequent years of Friedrich Haberlandt of Vienna, who published the results of his work in much detail. Haberlandt obtained seed of nineteen varieties–Chinese and Japanese–at the Vienna Exposition in 1873. Only four of these varieties matured and in 1877 seed was distributed to various co-operators throughout Europe. Although most of the tests gave fairly promising results, and Haberlandt strongly urged the use of the soybean as a food plant for both man and beast, the soybean failed to obtain any great importance until about 1909. Previous to this time efforts had been made to introduce the soybean and its products–oil and oil meal–from the Far East into European markets in competition with similar products manufactured from other oleaginous seeds, but they were generally unsuccessful, chiefly because of the inferior quality of the meal and oil, and unfavorable shipping conditions for the seed. Although

attempts to grow soybeans in European countries have extended over many years, in general, the climatic conditions are not well suited to the successful culture of the crop. At present, production is largely confined to parts of European U.S.S.R., Austria, Bulgaria, Yugoslavia, Czechoslovakia, and Rumania." 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.

1139. Morse, W.J. 1950. History of soybean production: 3B. Modern history [in the United States] (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. 6-9.

• ***Summary:*** "The first mention of the soybean in the United States is by Mease in 1804, who stated that 'the soybean bears the climate of Pennsylvania very well and should be cultivated.' In 1829, Thomas Nuttall grew a variety in the botanic gardens at Cambridge, Massachusetts. From observations he wrote, 'Its principal recommendation at present is only a luxury, affording the well-known sauce, soy, which at this time is only prepared in China and Japan.' The Perry expedition to Japan in 1854 brought back two varieties of soybeans which were distributed by the United States Commissioner of Patents. Frequent references to the soybean occurred thereafter in agricultural literature under such names as Japan pea, Japan bean, and Japanese fodder plant. [Note: The last two names do not appear in the SoyaScan database as of Nov. 1991.]

"The Mammoth Yellow variety, cultivated extensively in the southern states for many years, is said to have originated from seed sent from China by missionaries in 1873. In 1878, G.H. Cook of New Brunswick, New Jersey, obtained seed of the soybean from the Bavarian station and James Neilson obtained several varieties from Vienna. Crops of these varieties were harvested in 1879. Undoubtedly these varieties were some of those grown and distributed throughout Europe by Haberlandt. In 1890, C.C. Georgeson of the Kansas Agricultural Experiment Station brought in three varieties from Japan and in 1889 W.P. Brooks of the Massachusetts Agricultural Experiment Station brought back several varieties from the same country.

"Previous to the numerous introductions by the United States Department of Agriculture beginning in 1898, there were not more than eight varieties of soybeans grown in the United States and these with quite limited adaptation to soil and climatic conditions. With the introduction and development of new and improved varieties adapted to a greater range of soil and climatic conditions and uses, acreage and production gradually increased. Until about 20 years ago, most of the soybeans in this country were grown in the southern and eastern states. In 1919, the five leading states in soybean acreage were North Carolina, Virginia, Mississippi, Kentucky, and Alabama. By 1924, the relatively more rapid expansion of the crop in the north central region of the country brought Illinois into the leading position, followed by Indiana, Tennessee, North Carolina, and Missouri. Illinois has held the lead in acreage and production ever since, and the north central region has grown in importance as a region of soybean production and processing.

"Soybeans at first, and for several years, were grown primarily as a forage and pasture crop. Previous to 1930 the acreage harvested for seed was less than one-fourth the total acreage grown for all purposes. With the adaption [adoption] of improved methods of culture, improvement of machinery for planting, cultivating, and harvesting, adapted improved varieties for processing for oil, and with the development of markets for soybeans for crushing purposes, a gradual increase in the proportion of acreage harvested for soybeans took place. In 1939, 40% of the total soybean acreage was harvested for seed. The proportion for this purpose increased rapidly during the war years. In 1944, 72% of the total planted acreage was harvested for seed and in 1947, 84.5%. An important factor in the marked increase in acreage of soybeans in 1934 was the severe drought, which ruined large acreages of corn, small grains, and tame hay in the early season of the year–as a result of which soybeans were planted as an emergency crop. The program of the Agricultural Adjustment Administration, United States Department of Agriculture was a stimulus to the expansion in acreage of soybeans in the last half of the 1930's. Corn acreage limitations and allotments restricted the acreage of corn and so increased the acreage of cropland available to other crops. Soybeans for seed, although classified as a soil-depleting crop in the principal producing regions, competed effectively for part of this acreage. The greatest annual increase in acreage of soybeans harvested for seed occurred in 1942, in response to the urgent appeal by the Government early that year for a large increase in soybean production to meet wartime demands for oil and fats. Programs of production goals and guaranteed support prices have contributed to maintaining production at a high level since 1942. The Government program for soybean processors, which greatly reduced their risks, was also of importance.

"Standards for use in grading and marketing soybeans were set up by the United States Department of Agriculture as early as 1925 and in 1936 a future [futures] market for soybeans was established in Chicago. In 1929, a soybean laboratory was established in Ohio by the United States Department of Agriculture to conduct research toward the development of high-oil and high-protein varieties. In 1936, the United States Regional Soybean Industrial Products Laboratory was located at Urbana, Illinois, and in co-operation with the experiment stations of the 12 north central states began agronomic investigations in the development of new improved varieties for industrial purposes and

chemical research on the development of new industrial uses for soybeans. In 1942, the laboratory work devoted to industrial uses was transferred from Urbana to the Northern Regional Research Laboratory at Peoria, Illinois. At this time the agronomic research remaining at Urbana was designated the United States Regional Soybean Laboratory and was expanded to include 12 southern states in addition to the 12 north central states originally served. The Regional Research Laboratory at Peoria conducts research on soybean processing and on processing and utilization of the oil and oil meal for food and industrial purposes.

"Numerous commercial concerns as well as many public research institutions, are conducting research designed to develop more efficient techniques in processing soybeans for food and industrial uses. Much research is also being conducted on methods for improving the quality of oil and flour, and for adapting these products to specific uses." 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.

1140. Morse, W.J. 1950. History of soybean production: 2. Ancient history (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. 4-6.

• ***Summary:*** "The early history of the soybean, like most important food crops, is lost in obscurity. Story tellers of the Far East for centuries have related with untold variations story book tales of the remarkable history of the soybean. One of the oft-repeated tales tells of the saving of a bandit besieged caravan from starvation by the food of the beans of a wild vine-like plant–a plant then unknown but later identified as the wild soybean. From that date the soybean is said to have become the very staff of life of China.

"Ancient Chinese literature reveals that the soybean was extensively cultivated and highly valued as a food for centuries before written records were kept. It is said to be one of the grains planted by Hou Tsi, one of the gods of agriculture. The first written record of the plant is contained in the books *Pên Ts'ao Kong Mu,* describing the plants of China by Emperor Sheng-Nung [Shen-Nung] in 2838 B.C. The soybean is repeatedly mentioned in later records and was considered the most important cultivated legume and also one of the 'Wu Ku' or five sacred grains–rice, soybeans, wheat, barley, and millet–essential to the existence of Chinese civilization. Seed of the soybean was sown yearly with great ceremony by the emperors of China, and poets before the Christian era extolled the virtues of the soybean in its services to humanity.

"Many of the early writings record the advice of agricultural experts on soil preferences, proper time of planting, methods and rates of planting, the best varieties to plant under different conditions and for different uses, time to harvest, methods of storage, and utilization of the many varieties for different purposes. Some of this expert advice goes as far back as 2207 B.C., indicating that the soybean was perhaps one of the oldest crops grown by man.

"The soybean was included in the second class of drugs in many of the old Chinese books and was regarded as having many medicinal virtues. It is learned from a materia medica text written about A.D. 450 that the soybean was not poisonous but was regarded as a specific remedy for the proper functioning of the heart, liver, kidneys, stomach, and bowels. It was also used as a remedy for constipation, as a stimulant for the lungs, for eradication of poison from the system, improving the complexion by cleaning the skin of impurities, and stimulating the growth and appearance of the hair. In the older records the fresh or green beans were said to be used as a remedy for dropsical affections, gastric fever, bladder trouble, improper circulation of the blood, catarrh, or improper flowing of the fluids of the vital organs, heart, liver, kidneys, and stomach."

"The earliest mention of making 'Tou fu,' or soybean curd, is found in the Han Dynasty Taoist work, Huai Nan Tsu, or writings of Liu An (a prince of Huai Nan, who died 122 B.C.). 'Tou fu' was regarded as an excellent delicacy among foods and was considered suitable for offering in sacrifice. The loyal and honest officials were said to enjoy this food as much as they did the fresh-killed lamb.

"The making of 'Shih' (a bean relish or paste [fermented black soybeans]) was mentioned in records 33 B.C. to A.D. 23. Soybean sprouts have been in use for many centuries in both the green and dried forms... A fundamental rule of farming was to count the number of persons in the family and plant five acres of soybeans for each person.

"In reviewing the old records it is most interesting to note that many of the qualities attributed to the soybean as a food and as a remedy for certain human ills by the Chinese have been proved by modern scientific research in America and Europe. Further research by medical and nutritional workers may revel many more valuable qualities of the soybean mentioned in early Chinese literature."

Note 1. This early history of the soybean was written before truly scholarly and critical study of the subject was begun by Hymowitz in 1970. Many of the statements above have subsequently been shown to be without basis in historical fact and incapable of being documented. Unfortunately, because Morse was probably the world's leading authority on the soybean at this time, the above statements were later cited or quoted repeatedly.

Note 2. This is the earliest English-language document seen (Nov. 2011) that uses the word *Shih* (alone) to refer to fermented black soybeans. 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.

1141. 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, 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.

1142. 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 finer and heavier forage than the commercial and vegetable varieties.

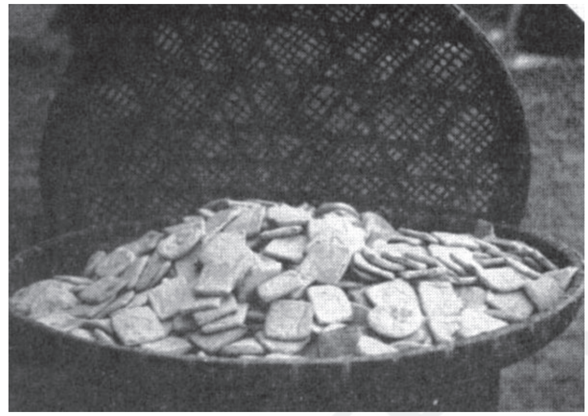
“The term ‘vegetable varieties’ has been applied to varieties introduced from oriental countries where they are used solely as green vegetable or dry, edible soybeans. In extensive tests of the quality of the green and dry beans made by the Bureau of Human Nutrition and Home Economics, Department of 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.

1143. 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 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.

"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: This is the earliest English-language document seen (Aug. 2011) that uses the term "salty soy paste" to refer to miso. 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.

1144. Perry: New U.S. domestic soybean variety. 1951.
• ***Summary:*** Sources: Weiss, M.G. 1953 "Registration of soybean varieties, IV" [Perry, Ogden]. *Agronomy Journal* 45(11):570-71. Nov.

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Perry is Pakota x Offtype selection in P.I. 81041. Maturity group IV. Year named or released: 1951. Address: USA.

1145. Matagrin, Am. 1952. La vérité sur le soya: son réveil et son avenir en France [The truth about soya: its awaking and its future in France]. *Terre d'Oc* (*La*)*: Revue moderne d'agriculture des pays occitans* 34:50-63. Feb.; 34:91-100. March. [24 ref. Fre]
• ***Summary:*** This two-part article appeared in two consecutive issues. Contents: Introduction: The strengths and weaknesses of the soybean, Haberlandt and the International Exposition of Vienna, soymilk, tofu, soy sauce, USDA, Bresse-Jones, Le Clerc / LeClerc, Morse, Hilbert, Horvath, ADM, Muscatine processing Corp., Galesburg Products Co., Glidden Co. (Soya Products Div.). 1. The soybean in agricole and in market gardening: Favorable climates and soils (temperature, light and photoperiodism, humidity, physical soil needs, chemical and pH soil needs, microbiological soil needs, soil amendments [soil conditioners], fertilizers, use as green manure, chemical fertilizers, bacterial fertilizers {*Vaccinograine*}*,* crop rotation). Varieties of soybeans; selection of the seeds, Asian classifications, based primarily on color.

1. Varieties of soybeans for all uses: Domestic and industrial: Early or near-early (*mi-précoces*)*:* yellow varieties, green varieties, brown varieties, black varieties. Late: yellow varieties, green varieties, brown varieties, black varieties.

2. Soybean varieties for forage: Early or near early. Late. European varieties, Russian varieties, French selected varieties, mutations are rather frequent by spontaneous hybridization is quite rare, the selection of seeds.

3. Preparation of the land (*terrain*)*;* planting and seeds; tillage, and protection against diseases and pests.

Footnote 12: Li Yu-ying was the founder of a plant making soyfoods in the suburbs of Paris in 1911, and former president of the Scientific Academy of Peking (*Académie Scientifique de Pékin*)*.* He returned to stay for a while in France around 1940. Li and L. Grandvoinnet (a French agronomist whose tombstone is in our village in the region of Chautagne [in east Central France]) wrote a book about soya in 1912 that is still useful.

Mechanized agriculture (*motoculture*)*,* tractors, date of seeding.

Part 2: Planting. Maturation, harvest, yield, and storage of the soybean seed (*soya-grain*)*.* Appendix: Names of early American soybean varieties according to earliness.

1. Yellow varieties that are early and productive, adopted and preferred in 1948-1951 in Canada and neighboring U.S. states: Blackhawk, Dunfield, Earlyana, Flambeau, Goldsoy, Hawkeye, Kabott, the various Mandarins, Monroe, Richland. These mature in 105 to 125 days. Varieties suited for

northern France are Harrow Manchu, Mansoy, Tokio yellow, etc.

2. Semi-early yellow varieties preferred in the areas of less-cold temperature: Chief, Lincoln, Wabash (less often Adams, Dunfield, Hawkeye, and certain Mandarins). These varieties mature in 125 to 140 days after planting. Several highly regarded green varieties are Nahto [Hahto?], and Giant Green.

3. Yellow varieties that are more or less late, grown in the southern USA: Arksoy, Dortchsoy 31, J.E.W. 45, Ogden, Improved Pelican, Ralsoy, Roanoke, Volstate. These varieties in 140-170 days. The fine variety Imperial, which matures in about the same time in Savoie, can be added as well as Barchet (brown) or O-too-tan (black).

These late varieties are suited to Roussillon, Bas-Languedoc, Provence maritime, northern Africa, and in the tropical regions of the French Union (*l'Union Française* [which lasted 1946-1958]).

At the very end of the article we read: The author of this article regrets that, from now on, he will not be able to reply free of charge (as he has very often done) to the numerous demands for information that he receives concerning soya. Unlike the majority of his compatriots, he has neither a salary nor an appointment, nor is he retired nor pensioned, nor is he a property owner nor a renter. He lives solely on the modest income from his publications and from consultations on applied chemistry. He hopes not to appear greedy by asking future correspondents to add 8 stamps of 15 francs (or an equivalent amount) to their requests for information so that he will be able to answer promptly. While cultivating soybeans for his personal use, he is not a grain merchant and he will not be able to supply even the smallest quantities of well acclimatized varieties, but he will willingly make such shipments against reimbursement of postage costs and compensation for any product or object of fair exchange.

Hervé Berbille writes (5 May 2014): "This article is very rich in teachings. I think especially in this footnote (3) A. Matagrin confirms what I always suspected. Namely, the Vichy government never had a policy displaying a proactive attitude in favor of the soybean. Moreover, the Vichy government never really intended to promote the culture of this plant, even though the dietary restrictions suffered by the French population during the Nazi Occupation urgently required it. All indications are that powerful interests who foiled the development and cultivation of soybeans in the 1920s under the deceased Third Republic still remained very influential in the Vichy government." Address: at Chindrieux (Savoie).

1146. 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 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.

1147. 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.

1148. Morse, W.J. 1952. Soja u proslosti i sadasnjosti [Soy in the past and present]. *Nauka i Priroda* (*Science and Nature, Bulgaria*) 5(7):302-06. Trans. by B. Filipovic. [Ser]*
Address: Yugoslavia.

1149. Jan. 21–Ezra Taft Benson (R), Idaho, becomes U.S. Secretary of Agriculture under President Dwight D. Eisenhower (1953-1961) (Important event). 1953.
• ***Summary:*** Source: Wikipedia, United States Secretaries of Agriculture (March 2012).

1150. Winters, R.Y. 1953. Charles Burgess Williams, 1871-1947. Paper presented at the dedication of Williams Hall Agronomy Building, University of North Carolina, Raleigh, NC. [8] p. Unpublished typescript.
• ***Summary:*** On the top half of the first page is a large portrait of Prof. C.B. Williams. On the bottom half we read: "Charles Burgess Williams (1871-1947), truly North Carolina's pioneer Agronomist, devoted his entire professional life to the service of his fellow citizens. From his graduation as valedictorian of the first class at this institution until his death he served the state as: Assistant Chemist of the Agricultural Experiment Station, Fertilizer

Control Chemist, Assistant State Chemist, Vice-Director and Director of the Agricultural Experiment Station, Dean of Agriculture and Head of the Agronomy Department.

"He served the south: as the organizer, and for twenty-five years, as the chairman of the Tobacco Research Committee, and of The Southeastern Agronomy Research Committee of the Association 'of Southern Agricultural Workers.

"He served the nation: as a leader in Soil Survey, as one of the first Americans to promote the growing of soybeans, as a charter member of the American Society of Agronomy and as its president in 1926.

"He served those who knew him best–his coworkers–as: a loyal, sincere, and understanding friend."

This paper begins: "We have gathered here to honor the memory of a friend who served this State and region faithfully and effectively, and to dedicate this building to the service which characterized his life's work.

"Charles Burgess Williams was truly a native son of North Carolina. His people were among the early settlers of the Albemarle section and were prominent in the public affairs of the region and State. He was born at Shiloh in Camden County, the son of Robert Jones and Susan (Burgess) Williams, on December 23, 1871.

"Our friend was a product of this institution, having graduated with highest honors in 1893, the first class of the college. While a student in the college he came under the influence of J.R. Chamberlain, agriculturist; W.A. Withers and B.W. Kilgore, chemists; Gerald McCarty, botanist; and W.F. Massey, a civil engineer who taught horticulture and botany. These men were pioneers in the development of agricultural instruction and their influence was extended far beyond the confines of their classrooms and field excursions. An early report of the Office of Experiment Stations expressed concern about the heavy load carried by such teachers. Their duties included teaching, lecturing at farmers' institutes and elsewhere, writing books, compiling bulletins and newspaper articles, corresponding with large numbers of persons on a great variety of subjects, attending meetings of associations, helping with agricultural fairs and conducting laboratory and field experiments.

"Upon completion of his undergraduate studies, Mr. Williams accepted work in the college as instructor in chemistry and assistant in the State Experiment Station with opportunity to pursue graduate work. He had earned his master's degree in 1896 and followed this with a year's study of chemistry in Johns Hopkins University. During the period 1897 to 1907 he served first as Chemist and later as Assistant State Chemist in Fertilizer Control. In addition to the analytical work associated with control, Mr. Williams found time to conduct several studies designed to test and improve analytical methods. He was an active member of the Association of Official Agricultural Chemists and the results of his studies are published in its proceedings and in the bulletins of the U.S. Department of Agriculture.

"In 1907 Mr. Williams returned to college work as Director of the State Experiment Station and Chief of the Department of Agronomy (1907-12) and served as Dean of the College of Agriculture from 1917 to 1923. By the beginning of this period most of the original staff of the college and station had gone out to more profitable vocations and had been replaced by men of greater academic specialization..."

We will now select a passage related to his pioneering work with soybeans: "North Carolina was the first State to recognize the soybean as a valuable forage and industrial crop and this was due largely to the efforts of Mr. Williams. He initiated studies of soybeans in the rotation systems, their fertilizer requirements and varieties adapted to different areas of the State. Extensive cooperative studies were made of the new introductions by the U.S. Department of Agriculture. A recent letter from W.J. Morse (retired), formerly in charge of soybean research in the Department, has this to say regarding Mr. Williams' work: 'As to his work with soybeans, no one in North Carolina did more to promote production and industrial utilization than did our friend, long before the Middle West entered the game. I know that he spent considerable time and effort in trying to get the soybean oil industry started in North Carolina along with all of his other duties. He really pushed the Elizabeth City Cottonseed Oil Mill into crushing soybeans for oil and followed it through with other cottonseed mills. I honestly think if it were not for Professor Williams' enthusiasm and work the North Carolina soybean oil industry would have been delayed many years. His publications on various phases of the soybean industry in the early days indicate his tireless efforts to build the industry in the State. I first called on him at Raleigh in the summer of 1910. I can truthfully say that in all of my contacts over the entire United States, I never met a more cooperative cooperator. I found him as enthusiastic and interested in all phases of the soybean the last time I saw him, the fall before his death, as he was the time I met him in 1910.' His publicity on the utilization of soybeans and soybean products attracted the attention of the research laboratory of the Sherwin-Williams Paint Company and at their request cooperative studies were made of the quality of soybean oils for paint manufacture." Address: PhD, Asst. for Production and Utilization, Agricultural Research Administration, USDA, Washington, DC.

1151. *Washington Star Pictorial Magazine.* 1954. Bank of plant treasures. Sept. 26.

• ***Summary:*** Photos show: (1) "Headquarters for plant explorers and site of the bank of plant treasures in the Beltsville Plant Industry Station, located just north of Washington" [DC, in Maryland]. (2) "In Japan, 25 years ago, William J. Morse of Washington was inspecting soybeans. He is known as the father of the American soybean, now the

basis of a multi-billion dollar industry."

1152. Stevenson, John A. 1954. Plants, problems, and personalities: The genesis of the Bureau of Plant Industry. *Agricultural History* 28(4):155-62. Oct. [20 ref]
• ***Summary:*** An excellent history of the origins and first 50 years of USDA's Bureau of Plant Industry, which began operations on 1 July 1901. It was formed by the consolidation of five divisions which had been in operation for various lengths of time: Vegetable Physiology and Pathology, Gardens and Grounds, Pomology, Agrostology, and Botany. The catalyst for the formation of the Bureau was B.T. Galloway, a fine leader, who wrote the first phytopathological text, published in 1890. Key men in the early days were F. Lampson Scribner, Erwin F. Smith, W.T. Swingle, David Fairchild, P.H. Dorsett, Dr. Charles W Dabney.

Arlington Experiment farm was acquired in about 1900 by an assignment of 400 acres of the Lee estate.

Note: This article is based on a talk given at the 50th anniversary seminar of the Bureau of Plant Industry. Address: Plant Industry Station, Beltsville, Maryland.

1153. Cattell, Jaques. ed. 1955. William J. Morse. In: American Men of Science: a Biographical Directory, 9th ed. 1955. Lancaster, PA: The Science Press. 1276 p. See Vol. 2, p. 798.
• ***Summary:*** "26 Interlaken Dr., Tuckahoe, N.Y. Agronomy. Lowville, N.Y., May 10, 1884. married 1911. B.S.A., Cornell, '07. Asst. agrostologist. Bur. Plant. Indust, U.S. Dept. Agr., 07-08, agronomist, 08-26, senior agronomist, 26-29, agricultural explorer, Japan, Korea, Manchuria and China, 29-31, senior agronomist, div. forage crops & diseases, 31-42, principal agronomist 42-49; Retired. Mem. div. milk, meat & legumes, Nat. Research Cmt. U.S. Dept. Agr., superior service award. Fellow Soc. Agron.; hon. Am. Soy-Bean Asn. (president, 1923. 1925, 1932); Bot. Soc. Wash. Soybeans; cowpeas; velvet beans; pigeon peas; oriental legumes." Address: USDA, Washington, DC.

1154. William Morse after retirement from USDA, leaning against his garden gate in Eastchester, New York (Photograph). 1955.

• ***Summary:*** This digital photo, dated mid-1950s, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

After Morse retired from USDA on 30 Nov. 1949, he and his wife moved from their home at 6809 5th St., Washington, DC [sometimes listed as 6809 5th St., Takoma Park, Maryland, because part of Takoma Park is in Maryland and part is in DC] where they had lived since 1917, to Eastchester, New York (about 10 miles northeast of the northern tip of Manhattan). They built a house and his daughter Margaret (and her husband) built another house next door, but with a vacant lot between them. There was a gate in the fence between Morse's property and the vacant lot. Each year Morse planted a vegetable garden there, and always raised vegetable soybeans.

1155. William Morse leaning against his garden gate in Eastchester, New York (Photograph). 1955.
• ***Summary:*** This digital photo, dated mid-1950s, was sent to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut (July 2004).

1156. Kanrich: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1956. Seed color: Yellow, hilum yellow.
• ***Summary:*** Sources: *Soybean Digest.* 1956. "New vegetable varieties." April. p. 6. Kanrich is one of two new "edible soybean varieties." "Agronomist Charles R. Weber, a joint employee of Iowa State College and USDA's Agricultural Research Service, has been primarily responsible for the development of the new varieties." Kanro was the edible-soybean parent of Kanrich.

Weber, C.R. 1966. "Registration of Kim and Kanrich soybeans." *Crop Science* 6(4):391. July/Aug. Kanrich has a yellow seed coat with a yellow hilum, purple flowers and gray pubescence. Yellow cotyledons. Yield: 2,046 lb/acre. Shattering percentage: 0. Seed size: 25.6 gm per 100 seeds.

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Kanrich is (Kanro x Richland) x Kanro. Maturity group II. Address: USA.

1157. Chen, Philip S.; Chen, Helen D. 1956. Soybeans for health, longevity, and economy. South Lancaster, Massachusetts: The Chemical Elements. xii + 241 p. Illust. Index. 21 cm. 2nd ed. Jan., 1962, 242 p. [24 ref]
• ***Summary:*** A comprehensive review of the subject. Contents: Preface, by the author (South Lancaster, Massachusetts, July 1956). Foreword, by Geo. M. Strayer, Vice-President and Secretary-Treasurer, American Soybean Association. Introduction. Part I: Nutritive value of the soybean. 1. Protein (incl. Dr. Wolfgang Tiling of Hamburg, Germany; Dr. Harry Miller). 2. Fat (incl. phosphatides, sterols and hormones). 3. Carbohydrates and caloric value. 4. Minerals. 5. Vitamins. 6. Soybeans and world population. 7. Soybeans and disease (incl. Dr. Wolfgang Tiling of Germany).

Part II: Soy products. 8. Soybean oil: Composition and properties, processing and refining, reversion, uses, phosphatides, margarine, mellorine (vegetable frozen dessert). 9. Soybean oil meal: Heat treatment, Gelsoy, Multi-purpose Food. 10. Soy flour: Uses, soy bread vs. enriched

white bread. 11. Soy milk. 12. Soy cheese (or soybean curd, "aptly described by the Chinese as 'the meat without bones'"–incl. pressed tofu sheets and yuba). 13. Soy sauce: Preparation of kojis, brine fermentation, production yields, microorganisms are available. 14. Soybean sprouts.

Part III: Soybean culture and preservation. 15. Soybean culture: Two types of soybeans (commercial field vs. edible or vegetable varieties), inoculation, fertilizer, cultivation, harvest. 16. Preservation of soybeans: Shelling, canning, freezing, dehydration, harvesting dry mature soybeans.

Part IV: Recipes. 17. Soybeans and soybean pulp: Green or fresh soybeans, dry soybeans, soybean pulp ("prepared by pressing cooked soybeans through a coarse sieve or by grinding them in a food grinder"), recipes (incl. Soyburger, Scalloped green soybeans, and Roasted soybeans–dry roasted or deep-fried (p. 151). Describes how to make wheat gluten at home and praises monosodium glutamate for its ability to improve the flavor of recipes–though its use is called for only in the recipe for Soyburger). 18. Soy flour: Breads, cakes, cookies, pies, soups, other recipes (A recipe for Wafers, p. 180, calls for "½ cup roasted soybeans, finely chopped").

19. Soy grits and soy flakes. 20. Soy milk. 21. Soy cheese. 22. Soybean sprouts.

Appendices: A. Soybean utilization (chart). B. Manufacturers and handlers of soy foods (Source: 1956 *Soybean Blue Book*). C. References.

Chapter 1, "Protein," begins: "The soybean is best known for its high protein content (p. 7). It then discusses the work of Dr. Harry Miller (p. 14-15).

Chapter 15, "Soybean Culture," describes how to grow soybeans in a garden. Pages 126-27 discuss the two types of soybeans: the commercial field type and the edible vegetable type. Five major differences between the two types are discussed (p. 126). The edible varieties are larger in size, do not yield as heavily (though they yield more heavily than snap beans or lima beans), are more prone to shatter as they near maturity in the field, are superior in flavor, texture, and ease of cooking, and some edible varieties are also superior in the manufacture of soybean flour, soybean milk, roasted beans and other products. Table 31 (p. 130) lists eleven varieties of edible soybeans: Very early–Giant Green. Early–Bansei, Fuji. Midseason–Hokkaido, Jogun, Willomi. Late: Illington, Imperial, Funk Delicious, Emperor, Higan. Commercial–Illini.

Chapter 16, "Preservation of Soybeans," describes how to preserve "green soybeans" by canning, freezing, and dehydration.

Photos show: (1) A sack of Lincoln soybeans (facing p. 1). (2) Soybean plants, showing pods and leaves (p. 3 and 4). (3) A beam balance with a small amount of soy flour balancing many animal products. "The protein value of soy flour: 1 lb. of soy flour contains protein values equal to 2 lbs. beef, or 34 eggs, or 6 quarts milk." Source: Health and Character Education Institute (p. 6). A similar photo (p. 24) states: "1 lb of soy flour contains food calories equal to 3½ lbs beef, or 3 quarts milk, or 29 eggs. (4) Two views of a child. Left, suffering from marasmus. Right, after six months on a soy milk diet. Courtesy Dr. Wolfgang Tiling (p. 62). (5) A machine at the Northern Utilization Research Branch of USDA treating soybean oil with alkali (p. 72). (6) The distribution of MPF [Multi-Purpose Food] to starving Indian children (p. 91; Courtesy Meals for Millions Foundation). (7) Quaker City No. F4 grinding mill (p. 102; Courtesy Straub Co., 4059 Ridge Ave., Philadelphia, Pennsylvania). (8) Early soy cheese (tofu) production in the United States (p. 108; perhaps at Madison Foods). (9) The Northern Utilization Research Branch, Agricultural Research Service, USDA–shows outside of the huge building (p. 113). (10). How to grow soy sprouts in a glass jar at home (p. 119). (11) Well nodulated soybean roots (p. 129; Courtesy The Nitragin Co.). (12) Baked soybeans in a crock (p. 144). (13) Soy flour used in numerous baked products (p. 159; Courtesy ADM). (14) Griddle cakes [pancakes] made with soy flour brown quickly (p. 173). (15) Soy peanut butter cookies (incl. peanut butter and soy flour; p. 185). (16) Soy grits in a glass jar (p. 198). (17) Freshly-cooked crisp soybean sprouts in a raw vegetable salad (p. 219).

Note 1. The first printing of this book (1956) was dedicated "To Li Yu Ying and William J. Morse, *The Soybean Champions of the Eastern and Western Hemispheres,"* but by the second printing (April 1957) the dedication had changed "To William J. Morse and Harry W. Miller, *The Soybean and Soy Milk Champions of Our Time."*

The publisher of this third printing was unable to sell all the books printed, so Chen apparently arranged for a company named "Outdoor Pictures" (Box 1326, Escondido, California) to sell them. On the title page, Outdoor Pictures pasted their name and address over that of "The Chemical Elements."

Note 2. According to the *National Union Catalog,* Philip Stanley Chen was born in 1903. The rear cover states that he was born in China and is now a naturalized

U.S. citizen. He is a graduate of Emmanuel Missionary College [in Berrien Springs, Michigan] and Michigan State University. Before writing this, his first book on diet, health, or soybeans, he wrote several books on chemistry: (1) The Chloro Derivatives of *m*-cresol. 1933. Easton, Pennsylvania: Mack Printing Co. 7 p. (Abstract of his PhD thesis, Michigan State College of Agriculture and Applied Science); (2) *The Chemical Elements, Rev. ed.* 1948. South Lancaster, Massachusetts: Chemical Elements (fold chart). (3) 500 Syntan Patent Abstracts, 1911-1950. 1950. South Lancaster, Massachusetts: Chemical Elements. 125 leaves. (4) Syntans and Newer Methods of Tanning. 1950. South Lancaster, Massachusetts: Chemical Elements. 128 p.

In 1962 Chen wrote *A New Look at God,* published by Chemical Elements (288 p.). Address: 1. Prof. of Chemistry, Atlantic Union College, South Lancaster, Massachusetts; 2. National Science Foundation Fellow, Cornell Univ.

1158. Camp, Wendell H.; Boswell, V.R.; Magness, J.R. 1957. The world in your garden. Washington, DC: National Geographic Society. 231 p. See p. 15-16, 168-69. Foreword by Melville Bell Grosvenor. Series: National Geographic Natural Science Library. [15 ref]

• ***Summary:*** In 1897 David Fairchild (the uncle of one of the authors) organized the U.S. Department of Agriculture's Section of Seed and Plant Introduction; he served as "Explorer in Charge" for 27 years. "Staffed by such able and dedicated men as W.T. Swingle, O.F. Cook, P.H. Dorsett, and Frank N. Meyer, who met tragic death on the Yangtze, Dr. Fairchild's section introduced profitable new plant industries and improved existing ones. Dates, olives, avocados, mangoes, grain sorghums, cotton, forage crops, and tung oil are among them. One crop–the soybean–is now worth more than a billion dollars a year.

Part 2, "Our Vegetable Travelers," by Victor R. Boswell (p. 98-169) contains a full-page illustration (p. 168) showing a soybean plant growing in China. Page 169 is a sidebar titled "Vegetable Soybeans Are New in America." It contains a brief history of how the soybean came from China to Europe and then to the USA, mentioning Benjamin Franklin, early soybeans in Philadelphia, Pennsylvania (1804, Mease), the Japan pea of 1853 imported through San Francisco, California, in 1850, and Commodore Perry.

It states that: "Benjamin Franklin sent seeds to this country from France in the late 18th century, and a sea captain who bought soybeans for his ship's stores introduced the plant about 1800."

"It was only about 30 years ago that many Americans began to learn about vegetable varieties of soybean; yet their use as a vegetable is at least 1,500 years old. They are gradually gaining favor in this country, and a few companies are canning the immature seeds. They can also be preserved by dehydrating or quick-freezing.

"Seedsmen in this country now list several varieties suitable for fresh use as a vegetable. Among them are Bansei and Fuji for early harvest; Hokkaido and Jogun for midseason or late harvest; Seminole and Rokusun for culture in the South. The plants of most varieties are relatively large..." Address: 1. Head, Dep. of Botany, Univ. of Connecticut; 2. Head, Vegetable Crops Research, USDA; 3. Head, Fruit and Nut Crops Research, USDA.

1159. William L. Burlison papers, 1888-1968. Record Series No. 8/6/22 (Finding aid for archival collection). 1958. Urbana, Illinois: University of Illinois. 4 p. finding aid to 2 boxes, 2.1 linear feet.

• ***Summary:*** RS 8/6/22. 2.1 cubic feet. Record group: Agriculture. Sub-group: Agronomy. Arranged: By type of material and chronological thereunder. Date received: Sept. 1963. Volume 2.1. Description: Papers of William L. Burlison (lived 1882-1958), professor Agronomy (1915-51) and head of department (1920-51), including correspondence, clippings, photographs, programs, publications and scrapbooks relating to the soybean industry, crop production and research, Agronomy Department, Civilian Defense (1942-45), Oklahoma schools (1905-08), Oklahoma A & M University, Eugene Davenport (1922-40), and agricultural journalism.

"Publications relate to crop production, phosphates, harvesting cereal crops, corn, soil surveys, soybeans, cold resistance of plants and wartime crop production."

Contents of 3-page finding aid: Chronology of Burlison's life (1882-1920, p. 1). Description of the contents of boxes 1 and 2, including photographs, correspondence and programs, publications, clippings, scrapbooks, obituaries (p. 2-3).

"Biographical note: William L. Burlison (1882-1958) was a professor of agronomy at the University of Illinois at Urbana-Champaign (UIUC) from 1915 to 1951 and head of department from 1920 to 1951. He was a researcher of crop production, soybeans, and soil conservation.

"William Leonidas Burlison (1882-1958) was born in Harrison, Arkansas, on September 3, 1882 to William Washington and Amanda Ercila (Pettit) Burlison. After earning a BS at Oklahoma Agricultural & Mechanical College in 1905, Burlison received his Master's degree in 1908 and his PhD in 1915, both in Agronomy at UIUC. Burlison was hired as associate professor in the Agronomy Department at UIUC in 1915. In 1918, he advanced to full professor and served as the Head of the Agronomy Department from 1920 until his retirement in 1951. He married Miss Flossy B. Lewis in 1909 and they had four children.

"His classes and research focused on topics such as crop production, soybeans, soil conservation, cereal crops, corn, soil surveys, and wartime crop production. Burlison published bulletins, circulars, and scientific and popular articles, including one book, Farm Crop Projects (1930).

"Burlison served on professional and government organizations such as the American Society of Agronomy (President, 1927; Fellow, 1936), American Soybean Processors Association (1930), Board of Governors–National Farm Chemurgic Council (Vice President, ca. 1935), Illinois War Board (World War I), Civilian Defense–University of Illinois (Commander, World War II), the American Association for Advancement of Science, and on the board of the campus YMCA. He received several honors and awards, including the Service Plaque from the Illinois Society of Farm Managers and Rural Appraisers (1947) and the Holbert Medal from the Funk Bros. Seed Company (1950).

"After his retirement in 1951, Burlison served as an Honorary Member of the Illinois Crop Improvement Association.

"William Burlison died on December 25, 1958."

Talk with Jacob Jones. 1998. March 18. The Burlison papers are located in two boxes at the University of Illinois Archives, in the university's main library. Jacob has a copy of the finding aid. The collection contains most of his private papers and his published papers. He just returned from several days looking at all these papers. There are quite a few scrapbooks, in which he had saved many clippings related to his own work. In 1951 he retired and had a huge retirement party. It was even written up in the *Chicago Tribune.* When he retired, his colleagues wrote letters to most of the people he had ever worked with and asked them to send in remembrances of their experience together. Some 400 to 500 of these letters are in the collection. The archives show that he was close friends with the Funks–which is not surprising. He was also friends with many of the important people working with soybeans at that time. One interesting letter is from Lacey F. Rickey to Burlison dated 28 Feb. 1930 concerning the Soybean Marketing Association. Surprisingly, there was not a single letter from William Morse to Burlison–not even at Burlison's retirement. Morse died in 1958–seven years after Burlison's retirement.

Note: There is probably information about soybeans in the Mumford papers. Address: Urbana, Illinois.

1160. *Soybean Digest.* 1959. W.L. Burlison is gone. Jan. p. 35.

• ***Summary:*** "Dr. W.L. Burlison, professor of agronomy, emeritus, at the University of Illinois and one of the key figures in the development of the soybean crop and industry in the United States, died peacefully in his sleep at his home at Urbana, Illinois, Dec. 25. He was 76.

"Dr. Burlison was head of the department of agronomy at the University of Illinois from 1920 until his retirement in 1951. He saw the crop develop from a few bushels to half a billion bushels annually. It was in no small part due to Burlison's leadership that Illinois has paced the nation in soybean production for over 30 years and at times has produced over half the crop.

"Said Harold D. Guither, assistant extension editor at the University of Illinois, in the *Soybean Digest* in 1957, 'A vigorous research and extension program covering more than 35 years is one of the major reasons why Illinois today is the top soybean state.' Mr. Guither noted Dr. Burlison's leadership in this work.

"Dr. Burlison was one of the founders of both the American Soybean Association [ASA] and the National Soybean Processors Association. He served both as president and secretary of ASA. He was a longtime counselor to both Associations and helped to promote friendly relationships between the two groups.

"He was an honorary life member of both Associations. He was one of the first two men to be so honored by ASA in 1946, the other being W.J. Morse, who pioneered the soybean work in the U.S. Department of Agriculture.

"When the American Soybean Association celebrated its 25th anniversary with its annual convention at the University of Illinois in 1945, Dr. Burlison was the key man in planning that program and made it a high point in ASA history.

"His vision and foresight resulted in the establishment of the U.S. Soybean Laboratory at Urbana. This later became the U.S. Regional Soybean Laboratory at Urbana, where the soybean breeding work for 12 Midwest states is directed and the Northern Regional Research Laboratory at Peoria, where soybean industrial and foods work is centered.

"Dr. Burlison was born in 1882 in Harrison, Arkansas. He attended country school in Oklahoma. He received his bachelor of science degree at Oklahoma A&M College in 1905, and his Master of Science and Ph.D. at the University of Illinois in 1908 and 1915. He was the author of a book

entitled, *Farm Crop Projects,* and author or co-author of 30 bulletins, 25 circulars and at least 65 scientific and popular articles. He was a member of and active in many agricultural, scientific, civic and religious organizations for many years.

"Dr. Burlison is survived by Mrs. Burlison, who attended many soybean meetings with her husband, two daughters and two sons."

A large portrait photo shows W.L. Burlison.

1161. *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 an 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.

"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.

1162. Strayer, George M. 1959. Marketing opportunities lie before us. *Soybean Digest.* Sept. p. 18-21.

• ***Summary:*** Last year U.S. soybean production topped the 500 million bushel mark for the first time in history. "For the first time in history we will export over 100 million bushels of soybeans as beans during the present crop year ending Sept. 30. That means that 1 bushel out of every 5 produced on the farms of American finds its way to plants in Japan, Germany, England, Israel and the other countries of the world. This year again we will export about one-fifth of our [soybean] oil production... The soybeans have all been sold for dollars, while some portions of the oil have been sold for dollars and the remainder for foreign currencies under Public Law 480.

"The U.S. soybean crop has truly become an international commodity"–thanks in large part to ASA [American Soybean Assoc.] market development programs in Japan, Spain, Italy, Israel, and Germany. The Japanese program is the biggest and most successful; a long description of its activities is given. In India, the Soybean Council exhibited at a trade fair in Madras. Also discusses problems with grading standards (broken soybean particles are now classified as foreign material) and ASA's need for more members (it now has only 7,000).

The entire soybean industry has been saddened by the death of W.J. Morse on July 30. "More than any other man in the United States he was responsible for soybeans as we know them today. He made the plant exploration trips that uncovered the thousands of varieties and strains of soybeans that were brought to the United States for trial purposes, and which supplied the germ plasm for all [sic, many] of today's varieties of soybeans. One of the first two honorary life members chosen by this Association, Bill Morse retired from his work in the U.S. Department of Agriculture just 10 years ago. His contributions to the present billion-dollar soybean industry can never be adequately appraised."

Thanks to the nine men (serving without pay) who have represented ASA on the board of directors of the Soybean Council of America.

"Thanks to Kent Pellet for his continued faithful allegiance to the editorship of the *Soybean Digest,* the *Blue Book* and *Late News,...*" Address: Executive Vice President and Secretary-Treasurer, American Soybean Assoc. [Hudson, Iowa].

1163. *Agronomy Journal.* 1959. William J. Morse [Obituary].

51(12):767. Dec.
• ***Summary:*** "William J. Morse, 75, who had better claim than any other man to the title of founder of the soybean industry in the U.S., died July 30 at his home in Eastchester, New York."

He was one of the founders of the American Soybean Association, three times its president, and the first man to be elected an honorary life member of the Association.

He was born in Lowville, New York, attended Lowville Academy, then graduated with a B.S.A. degree from Cornell University.

"He was a long-time member of the American Society of Agronomy and was active in its affairs. He was elected a Fellow in 1946."

1164. Yelnanda: New U.S. domestic soybean variety. 1961.
• ***Summary:*** This is NOT the same variety as Yelnando (launched in 1948). Sources: Coker's Pedigreed Seed Co. 1961. Coker's soybean catalogue–1961 breeder's registered seed. Hartsville, South Carolina. 16 p. See p. 3, 6.

Ebine, Hideo; Matsushita, Z.; Sasaki, H.; Yanai, S.; Ariyoshi, M.; Machi, M. 1972. *Beikoku-san daizu no miso genryô to shite no tekisei hyôka* [Evaluation of U.S. soybeans as raw materials for making miso]. *Report of Central Miso Institute* No. 7. 66 p. July. Among the U.S. varieties tested in 1961, Comet, Yelnanda and Harosoy were promising.

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Yelnanda is Nanda x Yelredo. Maturity group VIII. Year named or released: 1947. Address: USA.

1165. Chen, Philip S.; Chen, Helen D. 1962. Soybeans for health, longevity, and economy. 2nd ed. South Lancaster, Massachusetts: The Chemical Elements. xii + 242 p. Jan. Illust. Index. 21 cm. 1st ed. 1956. [24 ref]
• ***Summary:*** This book is identical to the original 1956 edition, third printing (the dedication is to William J. Morse and Harry W. Miller), except that: (1) Table 1, titled "Soybean production in the United States" (p. 2) gives statistics to 1960, instead of 1958. (2) Appendix B (p. 224-36) has been updated based on the 1961 *Soybean Blue Book.* (3) The dust jacket has been updated. On the rear dust jacket is a portrait photo of Dr. Philip Chen and a biographical sketch. (4) The paper is slightly thicker.

Note: In 1962 Chen wrote *A New Look at God,* published by Chemical Elements (288 p.). Address: 1. Prof. of Chemistry, Atlantic Union College, South Lancaster, Massachusetts; 2. National Science Foundation Fellow, Cornell Univ.

1166. Carroll, William R.; Muhrer, Merle E. 1962. The scientific contributions of George Washington Carver. Department of Interior, National Park Service. 60 p. See p. 20. Unpublished manuscript. [45* ref]
• ***Summary:*** The National Park Service commissioned this paper in connection with the Carver National Monument that it manages in Diamond Grove (also called Diamond), Missouri. The authors theorize that Carver may have been influenced in his peanut research by his knowledge of existing processes for making products from soybeans. "W.J. Morse, in an article on the soybean industry in the United States in 1917 reported that the Chinese had long used soybeans as a source of oil and food. Among the products they had developed were meal, flour, sauces, soybean milk, buttermilk, cheese, chocolate custards, etc. These products bear such a close resemblance to many of Carver's peanut products that it is quite possible he used these well established processes for his preparations and merely substituted peanuts for soybeans. Of course, scientific insight was necessary to see the possibilities of peanuts in terms of soybeans." Address: Dep. of Agricultural Chemistry, Univ. of Missouri, Columbia, Missouri.

1167. 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, 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.

1168. 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 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." 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.

1169. Lager, Mildred; Jones, Dorothea Van Gundy. 1963. The soybean cookbook: Adventures in zestful eating. New York, NY: Devin-Adair Co. xiv + 240 p. Foreword by Ruth Stout. Index. 22 cm.

• ***Summary:*** The copyright page states: "Note: This is a revised and updated version of a privately printed book, *How to Use the Soybean,* by Mildred Lager which was first printed in 1955 and reprinted in 1959." This lacto-ovo-vegetarian cookbook contains over 350 recipes, including 72 tofu recipes.

Contents: Preface to 1955 edition. Preface to 1963 edition. Part I: The versatile soybean. History of the soybean. Nutritional value. Abbreviations and special terms. Soup to nuts: Introduction, green soybeans [green vegetable soybeans], dry soybeans, roasted soybeans, sprouted soybeans, the cow of China–soy milk (kinds of soy milk), "the meat without a bone"–tofu or soy cheese, the little giant among protein foods–soy flour, soy grits and bits (puffed grits), soy oil and soy butter, meat replacement foods,

sandwich spreads, malts, coffee substitutes, soy sauce, other soy products (soy albumen, Glidden's product that contains on a dry basis 96.6% protein [soy protein isolate]).

Part II: Soybean recipes. Green soybeans. Dry soybeans. Roasted or toasted soybeans. Sprouted soybeans. Meat replacement dishes. Soy noodles, macaroni, and spaghetti. Sauces and gravies. Soy soups. Salads. Soy spreads and soy butter ["a butter resembling peanut butter may be made from finely ground soybeans or soy flour... Roasted soy butter is made from the roasted beans that have been ground into a fine flour."]. Soy milk. Tofu or soy cheese. Soy cereals and breakfast dishes. Soy desserts. Soy candies. Soy flour breads: Full-fat soy flour, low-fat or fat-free soy flour. Pastry. Cookies. Cakes. Extra tips. Appendix. Menus.

The chapter titled "History of the Soybean" (p. 3-7) discusses: W.J. Morse and the U.S. Department of Agriculture, Dr. J.A. LeClerc, the American Soybean Association (which has held a national convention every year since it was founded in 1920), its publication *Soybean Digest,* Henry Ford and his work with both industrial and edible soy products, T.A. Van Gundy, Harry W. Miller, M.D., Dr. Clive McCay of Cornell University (Ithaca, New York), and the Sept. 1961 Conference on Soybean Products for Protein in Human Foods (held at Peoria, Illinois).

Concerning T.A. Van Gundy we read (p. 5): "The father of one of the authors, T.A. Van Gundy, became interested in the nutritional value of soybeans while attending the World's Fair in San Francisco in 1915, where they were featured in the Oriental exhibits. Upon going home he purchased some soybeans and began experimenting in them. As far as we know he was the first person on the Pacific Coast to develop a line of commercial foods from this wonder bean. By 1927 he had developed a number of palatable products which he manufactured and sold through health food stores. Soybean foods were virtually unknown at this time, and it took courage and perseverance to put them across."

Recipes for "Soy Ice Cream" (p. 175-76) now include vanilla, maple nut, orange, and strawberry flavors. A recipe for "Granola" (p. 161) calls for 1 cup soy flour. The rest of the ingredients (such as wheat and barley flour) appear to be similar to those found in the earliest granola recipes of the mid-1800s. Address: Southern California.

1170. *Soybean Digest.* 1965. Honorary life members [American Soybean Assoc.]: Russell S. Davis and Jake Hartz, Jr. Sept. p. 10.

• ***Summary:*** Russell S. Davis of Clayton, Illinois, was a lifelong grower of soybeans and a seed producer. He first became interested in soybeans in his late teens, in 1906 and 1907. He was one of the few early sellers of seed soybeans in western Illinois. He developed his own pedigreed strain, Sable. When W.J. Morse of the U.S. Department of Agriculture returned from the Orient with his many hundreds of selections of Oriental varieties–from which strains most of today's U.S. soybean varieties are descended–Mr. Davis tested a large number of these selections on his farm.

Jake Hartz, Jr. was one of the original partners in Jacob Hartz Seed Co. when it was formed in 1942 and now heads that firm. "Mr. Hartz was born [on 2 Aug. 1920] at Wheatley, Arkansas, and moved with his parents to Stuttgart at the age of 4. He was educated in the local schools and attended Subiaco Academy in Subiaco, Arkansas. He worked part time in his father's business while still in school. The firm has been one of the most active in promotion of the soybean crop in Arkansas and the Midsouth. Mr. Hartz has seen the production of soybeans in Arkansas grow from practically nothing to 61 million bushels in 1964. Mr. Hartz' father, Jacob Hartz, Sr., was also elected an honorary life member of the American Soybean Association, in 1949." Besides being a great seedsman and soybean producer, Mr. Hartz was also a president of the ASA.

Photos show Russell Davis and Jake Hartz, Jr.

1171. Hartwig, Edgar E. 1965? Recollections of John E. Wannamaker. Stoneville, Mississippi. 2 p. Undated. Unpublished typescript.

• ***Summary:*** "I first met John Wannamaker in 1943. He was one of the few people having a sizable acreage of soybeans in South Carolina at that time. I was located at North Carolina State University at Raleigh to conduct research to develop soybean varieties more productive and better adapted for production in the South. I had plantings in North Carolina and South Carolina. W.J. Morse, who was in charge of soybean production research with the U.S. Department of Agriculture and located in Beltsville, Maryland, had had considerable correspondence with John Wannamaker and asked that I stop to see him whenever I went to observe my plantings near Monetta, South Carolina.

"At that time there were few organized soybean research programs in the South. W.J. Morse would furnish seed for a planting to anyone interested in the crop. He had received some introductions from Nanking, China in 1927. Several of these appeared to make excellent growth in the Coastal Plain area of South Carolina and Georgia. These were types that were considered to be suitable for either production of hay or for harvesting for seed. One of these types had been named Clemson and another Palmetto. When growing the Clemson variety, John Wannamaker observed a type that was shorter and held its seed better than the major type in Clemson. He designated the selection CNS to designate Clemson non-shattering. He make an increase from this plant and CNS later was widely grown in the Coastal Plain Region.

"John Wannamaker was a keen observer. Whenever he would observe a plant in his fields that looked somewhat different, he would tag it and harvest it separately and then plant an increase from this plant the following year. If the progeny continued to look good, he would increase it further. These selections were not made with the intent to make a

profit by selling seed of the different strains, but rather to merely find types that he considered more productive for his area. In many cases, he would give seed of the selection to some of his neighbors and friends so that they might plant them and make comparisons on their own farms with the variety that they were then growing.

"His selections differed somewhat in maturity and growth type. Some were much better suited than others for extremely late planting after small grain. JEW 46 was one of the types that was well suited for the extremely late planting. JEW 45 was somewhat later in maturity than the original Clemson variety and made more errect growth.

"John Wannamaker had great enthusiasm for the potential of soybeans in the Coastal Plain area of South Carolina. He used good management practices on his own farm. Thus, he encouraged growers interested in planting soybeans to use proper management to insure that their plantings would be successful. John Wannamaker played a major role in establishing soybeans as a major crop in the Coastal Plain area of South Carolina and especially in Calhoun country, in his keen observation in selecting types particularly adapted to the area, and also in his enthusiasm for the crop which he transferred to his neighbors and friends." Address: ARS, U.S. Dep. of Agriculture, Stoneville, Mississippi.

1172. *Soybean Digest.* 1966. Work for soybeans spanned 40 years. Jan. p. 60.

• ***Summary:*** "Jackson L. Cartter retired as director of the U.S. Regional Soybean Laboratory, Urbana, Illinois, on Dec. 30. His retirement ended a professional career in soybeans spanning nearly 40 years.

"Mr. Cartter began his work on soybeans in 1928, joining the late W.J. Morse, who was among the pioneers in bringing the potential of soybeans to public attention. Mr. Cartter worked first at Holgate, Ohio, where the first soybean laboratory was established. He later worked at Arlington, Virginia, before moving to Urbana in 1936 when the U.S. Regional Soybean Industrial Products Laboratory was established. He has been in charge of the soybean production research since that time and has been director of the Urbana laboratory since the utilization research was moved to the Northern Regional Research Laboratory at Peoria, Illinois, in 1942.

"He is an author of many research papers and is one of the most widely known authorities on soybean production problems. His early research established the range of adaptabilities that exist in the soybean variety collection and contributed to the basis for the maturity group concept that has been so valuable in the variety development program. He also led in determination of oil and protein and while at Holgate set up a chemistry laboratory and, conducted a vigorous study of oil and protein in soybean varieties.

"To an unusual degree, Mr. Cartter is able to see the 'big picture' and to understand the interaction of different scientific disciplines. Thus his leadership has continued its effectiveness as the soybean research staff has grown to add first chemists, then plant pathologists, physiologists, geneticists and biochemists to the nucleus of agronomists who began the regional research program in the thirties.

"His interests and talents are remarkable in their extent. He is not the only person to design and do most of the work in building his house but he has done it twice: his beautiful home in Urbana and another on a lake near Danville, the latter referred to quite inaccurately as a 'cabin.' Few can match his feat of rebuilding a baby grand piano–a magnificent job, lacking only the name plate to be a duplicate of a factory-new instrument. He had a remote control device to eliminate TV commercials before these were stock items.

"Mr. Cartter is a very human person who is equally at ease with the great and the humble. He is sympathetic to the problems and aspirations of all of his associates and on many occasion has led young men into useful and rewarding careers.

"He was active in the Exchange Club for many years, serving in various offices including president. He is a real pillar in his church and for a long time has conducted a weekly service at the Veterans Hospital in Danville.

"About the only thing you can fault Mr. Cartter on is his distaste for in- activity. Although he is giving up his responsibilities in soybean research, it is expected that he will continue to lead a full life of service to mankind."

A small portrait photo shows Cartter.

1173. Simerl, L.H. 1967. Soybeans are now the no. 1 U.S. cash crop! Continued strong market seen for soybean meal, oil depends on government help. *Soybean Digest.* Jan. p. 12-13, 16-17.

• ***Summary:*** "This is an especially appropriate time to consider the soybean situation and outlook, for it appears that soybeans have become the leading cash-producing crop of the United States.

"The U.S. Department of Agriculture probably won't release official estimates of cash receipts from farm marketings of individual commodities in 1966 until next July. Since official figures are not available, we have made our own calculations. These indicate that soybeans rocketed to the top of the standings in the cash-crop league. Sales of soybeans produced about $2.4 billion for farmers in 1966, compared with less than $2 billion in 1965.

"Cotton, the longtime leader, fell to fourth place with about $1.7 billion from sales. Sales of cotton produced $2.3 billion in 1965. These amounts included the return from cottonseed as well as lint.

"Cash receipts from sales of corn also increased in 1966, but not so much as receipts from soybeans. We estimate receipts from corn at $2.3 billion, up from about $2.1 in 1965. Corn ranked second below cotton in 1965 and second

below soybeans in 1966, we believe.

"Wheat, holder of fourth place for 2 years, probably climbed to third in 1966. Receipts from sales of wheat totaled about $1.9 billion in 1966, up from $1.6 billion the 2 previous years.

"Tobacco, the fifth member of the big cash crop league, continued in last place with cash receipts of about $1.3 billion.

"Soybeans are, as most readers of the *Soybean Digest* well know, the newest major crop in the United States. Some were brought to this country as early as 1804, but their potential value was largely unrecognized for more than a century."

Outstanding leaders have been W.J. Morse of USDA and J.C. Hackleman of Univ. of Illinois.

Export market: The U.S. exports nearly half of our soybeans in 3 main forms: whole soybeans, soybean oil, and soybean meal.

Demand is the biggest factor in making forecasting difficult.

Exports of soybean meal continue to increase in great steps.

The rising demand for soybean meal has caused a decrease in the demand for cottonseed meal.

Tables: (1) Leading states in soybean production and rank of soybeans among cash-producing crops. The ranking is by sales of soybeans in millions of dollars.

(1) Illinois 402.

(2) Iowa 296.

(3) Indiana 188.

(4) Missouri 180.

(5) Arkansas 162.

(6) Minnesota 161.

(7) Ohio 115.

(8) Mississippi 77. Address: Univ. of Illinois Extension Economist, Agricultural Marketing.

1174. Disoy: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1967. Seed color: Yellow, hilum yellow.

• ***Summary:*** Sources: U.S. Regional Soybean Laboratory, comp. 1967. "The Uniform Soybean Tests, northern states, 1966." *RSLM* (U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois) No. 227. Feb. 145 p. See p. 39-40.

Soybean Digest. 1967. "Announce three new large-seeded soy varieties." March. p. 6. Disoy is one of three new large-seeded soybean varieties announced by Iowa State University [ISU]. C.R. Weber, USDA and ISU soybean specialist who developed the varieties, said their release was prompted by the increased demand in foreign and domestic markets for completely yellow, large-seeded soybeans.

Weber, C.R. 1967. "Three new and better large-seeded soybeans." *Iowa Farm Science* 21(12):3-5. June. This is the most detailed article seen on Disoy, Magna, and Prize.

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. 6-7, 30. "Disoy. Prior designation: AX80-21. Source: (F6 Ottawa Mandarin x Kanro) x (F6 Richland x Jogun). Year named or released: 1967. Developer or sponsor: Iowa AES (Agric. Exp. Station) & USRSL" (U.S. Regional Soybean Laboratory) (p. 6-7). Table 6–Grown at Urbana, Illinois in 1968. Disoy. Maturity group: I. Weight (grams per 100 seeds): 27.0 [1681 seeds/pound]. Yield: 38.2 bu/acre. Seed composition: 42.4% protein, 22.9% oil (p. 30-31).

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Disoy is [Mandarin (Ottawa) x Kanro] x (Richland x Jogun). Maturity group I. Address: USA.

1175. Magna: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1967. Seed color: Yellow.

• ***Summary:*** Sources: U.S. Regional Soybean Laboratory, comp. 1967. "The Uniform Soybean Tests, northern states, 1966." *RSLM* (U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois) No. 227. Feb. 145 p. See p. 39-40.

Soybean Digest. 1967. "Announce three new large-seeded soy varieties." March. p. 6. Magna is one of three new large-seeded soybean varieties announced by Iowa State University [ISU]. C.R. Weber, USDA and ISU soybean specialist who developed the varieties, said their release was prompted by the increased demand in foreign and domestic markets for completely yellow, large-seeded soybeans.

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Magna is [Mandarin (Ottawa) x Jogun] x [Mandarin (Ottawa) x Kanro]. Maturity group II. Address: USA.

1176. Prize: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1967. Seed color: Yellow, hilum pale/clear.

• ***Summary:*** Sources: U.S. Regional Soybean Laboratory, comp. 1967. "The Uniform Soybean Tests, northern states, 1966." *RSLM* (U.S. Regional Soybean Laboratory Mimeograph, Urbana, Illinois) No. 227. Feb. 145 p. See p. 39-40.

Soybean Digest. 1967. "Announce three new large-seeded soy varieties." March. p. 6. Prize is one of three new large-seeded soybean varieties announced by Iowa State University [ISU]. C.R. Weber, USDA and ISU soybean specialist who developed the varieties, said their release was prompted by the increased demand in foreign and domestic markets for completely yellow, large-seeded soybeans.

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Prize is sister line to Magna. Maturity group II. Address: USA.

1177. Bentley, Orville G. 1967. Soybean production in the world–Limitations and potentials. *USDA Agricultural Research Service.* ARS-71-35. p. 2-19. May. Proceedings of International Conference on Soybean Protein Foods. Held 17-19 Oct. 1966 at Peoria, Illinois. [18 ref]
• ***Summary:*** This is the first paper in Session I, titled "Potentials for soybean production and use as related to world protein needs," Nevin S. Scrimshaw presiding. Contents: Introduction: "It is generally agreed by students of world food problems that the shortage of protein is the most critical need now and in the foreseeable future." Historical overview: Piper and Morse, Mildred Lager. An overview of worldwide soybean production: USA, Europe. Production in Eastern Asia: China, Indonesia, Japan, Taiwan, Thailand, India, Soviet Union, Latin America (Brazil, Paraguay), Mexico, Colombia, Argentina, Australia (no statistics given), Europe (European Russia, Bulgaria, Yugoslavia, Rumania, and Czechoslovakia).

Prospects for further production: USA, southeastern Europe, Russia, Thailand, Japan, Brazil, Colombia, Argentina, Mexico. Summary.

"In southern European Russia, commercial soybean plantings were reported in the 1870s. In the Far East, soybean cultivation may be even older as a part of the culture of the local Chinese. Before the revolution, acreage was small, however."

"Latin America is a relative newcomer in soybean production. Brazil is the only country where large acreage has been planted for more than a decade. In recent years soybeans have been planted in Argentina, Colombia, Mexico, Paraguay, and Surinam. Brazil is the major exporter with smaller amounts coming from Paraguay and Surinam. Venezuela is a major importer and Mexico imports some.

"Estimates for 1965 show that Brazil produced 16,610,000 bushels (453,000 metric tons), Mexico produced 2,482,000 bushels (67,690 metric tons), Colombia produced 1,835,000 bushels (50,000 metric tons), Paraguay 660,000 bushels (18,000 metric tons), and Argentina 360,000 bushels (9,800 metric tons). Total production of Central and South America would be only slightly more than 1 percent of world output. In Brazil about 90% of the production is concentrated in the state of Rio Grande do Sul, the southern-most part of the country. The balance is grown in nearby Santa Catarina and Parana. The climate is similar to some of our southern states... A major processing plant has been built near Porto Alegre."

"In Mexico, production began very recently. Almost all acreage is in the State of Sonora, bordering Arizona and Southern California. Here plantings started in 1959... In the Yaqui Valley, soybeans are always grown under irrigation where they fill in successfully as a second crop following wheat and cotton." In Colombia, acreage is concentrated in the Cauca Valley on the western slope of the Andes. In Argentina, acreage up to a few years ago amounted to about 1,000 hectares, most of which is grown in the state of Misiones, the far northeast area bordering upon Rio Grande do Sul in Brazil. In recent years there has been expansion in the pampas.

In the USA, "some expansion to the West is possible under irrigated conditions. Research trials in Oregon, Washington, and California show yields as high as 80 bushels an acre. But where water is limited, the highest value crops will be favored." Address: Dean, College of Agriculture, Univ. of Illinois.

1178. Milner, R.T. 1967. Program for furthering the production of soybeans in India by the University of Illinois. *USDA Agricultural Research Service.* ARS-71-35. p. 221-22. May. Proceedings of International Conference on Soybean Protein Foods. Held 17-19 Oct. 1966 at Peoria, Illinois.
• ***Summary:*** For many years the University of Illinois has been working to help establish two universities in India. "These universities are a departure from the previous type of educational institutions in India inasmuch as they are being modeled after the land-grant colleges of the United States. At Pant Nagar, which is in Northern India, State of Uttar Pradesh, the Uttar Pradesh Agricultural College is being built from the ground up on something like 15,000 acres cleared from the jungle... The characteristics of our land-grant universities are the combination of teaching, research, and extension in one interrelated unit, each contributing to the other. This is an entirely American idea, one that I don't think can be found anywhere else in the world.

"At the J. Nehru Agricultural University at Jabalpur in the State of Madhya Pradesh, we have established a university. It was started when the British were in India, and it is being transformed into a land-grant type of college."

The University of Illinois is studying the potential of soybeans as a major crop in India. "Soybeans have been tried in India before with varying success, but there has been no concerted effort." One of the goals of this program is to develop people with a deep belief in the potentialities of the soybean–like W.J. Morse, E.F. "Soybean" Johnson, and

W.L. Burlison in the early days of the soybeans in the USA. Address: Head, Dep. of Food Science, Univ. of Illinois, Urbana, Illinois.

1179. Verde: New U.S. domestic soybean variety. Large-seeded and/or vegetable-type soybean. 1967. Seed color: Green, hilum light buff, with green cotyledons.
• ***Summary:*** Sources: Delaware Agricultural Experiment Station; United States Department of Agriculture, Agricultural Research Service, Crops Research Division. 1967. "Notice of release of Verde soybean." Newark, Delaware. 3 p. Unpublished manuscript. May 1. 28 cm. Verde, a green vegetable soybean, has large green seeds which possess a fine flavor. It will be released on 1 May 1967.

Crittenden, H.W.; Rahn, E.M.; Wisk, E.L.; Woodmansee, C.W. 1968. "The green vegetable soybean Verde." *Soybean Digest.* April. p. 8. Verde, which has green seeds, was selected in Delaware.

Crittenden, H.W. 1971. "Registration of Verde soybean." *Crop Science* 11(2):312. March/April.

Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Verde is Aoda x (Richland x Jogun). Maturity group III. Year named or released: 1967. This soybean has green cotyledons, which is rare; that means the soybeans are green all the way through. Address: USA.

1180. Strayer, George M. 1967. A review of 27 years. *Soybean Digest.* June. p. 5.
• ***Summary:*** "In 1940 soybeans to many people were still an oriental curiosity that had affected certain people like W.J. Morse, W.L. Burlison, Keller Beeson, Bill Riegel, John T. Smith, Glenn McIlroy, Dave Wing and others, but had never really caught on as a crop. Total soybean production in 1940 was only 78 million bushels, much of it used for forage purposes.

"Then came the war, with the intense drive to replace the fats and oils which had been imported up to that time–two-fifths of our entire consumption of fats and oils. The sea lanes were cut off, ocean shipping was scarce, we had to produce our own oil and some for our allies. We doubled soybean production, built processing plants, provided that oil. In so doing we also provided something which triggered the greatest explosion in livestock production the world had ever seen–high-quality protein at a relatively cheap price. Out of it came our broiler industry, our turkey industry, and all livestock feeding as we know it today.

"There were those who said soybeans were a 'War Baby'–that we never again would have use for a 100-million-bushel crop when the war ended. They were sincere in their beliefs, but they were looking backward and not forward. Instead of reducing production we have continued to move upward rapidly to the expected 1-billion-bushel mark in 1967...

"I was hired by the board of directors on a part-time basis in September 1940 at Dearborn, Michigan, to start a soybean news letter. The time had come, in the estimation of that board, that we needed some medium of exchanging information about the soybean crop. As the first and only part-time employee of the Association I sold the advertising, wrote the copy, read the proofs and did the mailing of the *Soybean Digest.*

"Back in 1949 I was asked by what was then ECA [European Co-operation Administration] to be a member of a two-man technical assistance team to go to Europe–particularly Germany–to make a study of possible use of and production of soybeans as human food supplies were still the major postwar problem. The huge potential markets for U.S. soybeans and products became apparent to me on that trip. Again in 1952 and 1954, trips through Northern Europe–not at Association expense–brought home to me the huge potential market which someone was going to supply.

"In 1955 I was asked by USDA to make a survey of potential markets for U.S. soybeans in Japan. This resulted in the formation of our market development project in Japan, the organization of the Japanese American Soybean Institute, and the execution of the contract with USDA to use foreign currency funds to promote markets for U.S. soybeans and soybean products. This is the largest market development project on any commodity in any country of the world today.

"In 1956 I was asked to do the same type of job in Europe, surveying market potentials for soybeans and soybean products in 10 countries. Out of this survey came the organization of the Soybean Council of America...

"As I leave my responsibilities in the American Soybean Association after these 27 years I do so with great regret." This is the last issue of Editor's Desk, which ceases with Strayer's departure from the magazine. A photo shows Strayer.

1181. Martin, John H.; Leonard, Warren H. 1967. Principles of field crop production. 2nd ed. New York, NY: The Macmillan Co. ix + 1044 p. Illust. Index. 24 cm. First ed. 1949. [53 ref]
• ***Summary:*** Chapter 26 (p. 643-62) is titled "Soybeans." Its Contents: Economic importance. History of soybean culture. Adaptation. Botanical description. Varieties. Chemical composition. Rotations. Cultural methods: Fertilizers, Seeding practices, harvesting for seed, harvesting for hay, soybean mixtures. Soybean-oil extraction. Quality of soybean oil. Soybean utilization. Diseases: Bacterial blight, bacterial pustule, wildfire, brown stem rot, stem canker, pod and stem blight, frog-eye leaf-spot disease, brown spot, target spot, downy mildew, mosaic, other diseases.

Nematodes (tiny eelworms). Insect pests. Rabbits.

The section titled "History of soybean culture" begins: "The soybean is one of the oldest of cultivated crops. Its early history is lost in antiquity. The first record of the plant in China dates back to 2838 B.C. (McClelland & Cartter 1937; sic, Morse & Cartter 1937). It was one of the five sacred grains upon which Chinese civilization depended."

Kudzu (*Pueraria thunbergiana* or *P. lobata*) is discussed on pages 719-21. It probably occupied 500,000 acres in the USA by 1945. Address: 1. Formerly Research Agronomist, Agricultural Research Service, USDA; 2. Late Prof. of Agronomy, Colorado State Univ.

1182. Chen, Philip S.; Chen, Helen D. 1968. Soybeans for health, longevity, and economy. 3rd ed. South Lancaster, Massachusetts: The Chemical Elements. xii + 242 p. Nov. Illust. Index. 21 cm. 1st ed. 1956. [24 ref]
• ***Summary:*** This book is identical to the original 1956 edition, third printing. Address: 1. Prof. of Chemistry, Atlantic Union College, South Lancaster, Massachusetts; 2. National Science Foundation Fellow, Cornell Univ.

1183. 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 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).

1184. McMillen, Wheeler. 1969. The green frontier: Stories of chemurgy. New York, NY: G.P. Putnam's Sons. 192 p. Illust. Portrait. Index. 21 cm.
• ***Summary:*** The folded-inside front book jacket (dust cover) flap features the soybean: "Agricultural scientists turned the soybean into a major raw material for industry and perfected the same bean as a nourishing food [feed] for livestock. The soybean story is just one example of how existing plants have been improved in their natural growth and processed into valuable commodities."

Page 41 states: "The greatest of all the new crop stories is that of the soybean. That *is* a success story and will have a chapter to itself."

Chapter 5, titled "The Soybean: America's Big New Crop," notes: "There is no great miracle about the soybean, unless it is that men were so slow to discover its amazing usefulness, and that they have been endlessly surprised at the apparently inexhaustible values that turned up after they really began to look." The author then chronicles the rise of the soybean in America, including the work of Piper and Morse (with many photos of Morse in East Asia in 1929-31). By 1966, with 931 million bushels produced, it had become the nation's third-largest cash crop. Henry Ford and Robert Boyer used soys extensively to make automobile parts. Despite earlier expectations, the strictly industrial consumption of soybeans has probably taken not more than 7% of the annual crop.

A photo (frontispiece, facing the title page) shows Dr. George Washington Carver in his laboratory with his assistant, Dr. Austin W. Curtis. Address: Anna Maria Island, Florida.

1185. Dies, Edward Jerome. 1970. In the beginning... *Soybean Digest.* Aug. p. 42-44.
• ***Summary:*** The article begins: "Far back when the Pyramids were being built, 3 centuries before the Tower of Babel, and 12 centuries before Solomon fashioned his temple, the little soybean was hoary with age.

"As to the first brave men to eat the legume, we must accept a charming little vignette from antiquity. It tells of a rich caravan, laden with gold and furs, crawling homeward from an east China town. It was surrounded by bandits. The fat merchants took refuge in a rocky defile easy of defense. Days later, with food supplies exhausted, in desperation they ate beans from a curious plant until rescued.

"For the first written record of the soybean one must turn to 'Materia Medica' by Emperor Shennung [Shennong, Shên Nung of China] in 2838 B.C.

"It was not until 1712 that the soybean was introduced to Europe by Engelbert Kaempfer, a German botanist, who had spent 1691 and 1692 in Japan. Europe was mildly bored."

"In 1804 a Yankee Clipper ship in full sail glided down the coast of China searching for a cargo. Uncertain as to the length of the return journey home the captain ordered several bags of soybeans tossed into the hold as a reserve food supply."

This history of the early days of the soybean also discusses William Morse (who graduated from Cornell University 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), Burlison, Hackleman and Woodworth

of Illinois, Beeson and Ostrander of Indiana, Delwiche and Briggs of Wisconsin, Wilkins of Iowa, Park of Ohio, [R.G.] Wiggans of Cornell and New York, [C.B.] Williams of North Carolina, and [J.E.] Barr of the USDA.

The pioneer growers were Smith and Riegel in Illinois; Elmer and E.F. (Soybean) Johnson, and G.G. McIlroy in Ohio; J.B. Edmondson, the three Fouts brothers, and Charles Meharry in Indiana. The pioneer soybean processors and NSPA, the American Soybean Assoc., and Henry Ford.

"E.J. Dies is a former staff correspondent of the Associated Press, magazine writer, and public relations man. He is the author of at least eight books including the well-known 'Soybeans: Gold from the Soil,' which he wrote while he was president of the National Soybean Processors Association. He headed the processor group in a period 'when products had to fight every inch of the way into a fiercely competitive field,' terminating his association in 1945."

1186. 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.

Before 1920, the soybean was used mostly as a forage crop. It 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." In 1924 the first official U.S. production statistics showed that 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."

"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."

"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."

"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."

"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.

"During the past few years, a few number of private companies have entered the field of soybean breeding."

Two main factors have led to yields of 100 bushels/acre or more: Better soybean varieties combined with improved cultural practices.

Small portrait photos show: George Kimmons (Ozark, Missouri; the first person to get 100 bu/acre yields, in 1968 with 109.6 bu/acre). 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. The work of each man in soybean variety development is discussed briefly on p. 70. Address: USDA Research Economist, and Prof. of Agronomy, Purdue Univ. [Indiana].

1187. *Soybean Digest.* 1970. ASA's honorary life members 1946-1969. Aug. p. 40-41.

• ***Summary:*** A full-page photo shows individual photos of the men awarded this honor: 1946–W.J. Morse,* agronomist,

W. J. Morse | W. L. Burlison | I. C. Bradley | J. Hackleman | G. G. McIlroy | J. B. Edmondson | David G. Wing | C. Woodworth

Keller E. Beeson | Jacob Hartz Sr. | E. F. Johnson | G. H. Banks | E. J. Dies | Taylor Fouts | Frank Garwood | J. W. Hayward

Garnet Cutler | Geo. M. Briggs | J. Ward Calland | Geo. M. Strayer | J. L. Cartter | John P. Gray | Howard Roach | Ersel Walley

Harry W. Miller | John W. Evans | R. E. Hodgson | F. Dimmock | E. E. Hartwig | Shizuka Hayashi | A. H. Probst | Chester B. Biddle

J. E. Johnson | Allan K. Smith | C. R. Weber | A. J. Ohlrogge | Leonard Williams | Russell Davis | Jake Hartz Jr. | Dwayne Andreas

Dale McMillen | Whitney Eastman | Chas. Simpson | Frederic Senti | John Sawyer | Walter W. Sikes | H. W. Johnson | Hays Sullivan

USDA, president, ASA; W.L. Burlison,* chief, agronomy division, University of Illinois, president, ASA. 1947–I.C. Bradley, J.C. Hackleman, G.G. McIlroy. 1948–J.B. Edmondson, David G. Wing, C.M. Woodworth. 1949–Keller E. Beeson, Jacob Hartz Sr., E.F. (Soybean) Johnson.

1950–G.H. Banks, E.J. Dies, Taylor Fouts. 1951–Frank S. Garwood, James W. Hayward. 1952–Garnet H. Cutler. 1953–George M. Briggs. 1954–J. Ward Calland. 1955–Geo. M. Strayer. 1956–J.L. Cartter, John P. Gray. 1957–Howard L. Roach, Ersel Walley. 1958–Harry W. Miller. 1959–John W. Evans, W.E. Hodgson.

1960–Frederick Dimmock, Edgar E. Hartwig. 1961–Shizuka Hayashi, Albert H. Probst. 1962–Chester B. Biddle, Joseph E. Johnson. 1963–Allan K. Smith, C.R. Weber. 1964–A.J. Ohlrogge, Leonard F. Williams. 1965–Russell Davis, Jake Hartz Jr. 1966–Dwayne Andreas, Dale W. McMillen. 1967–Whitney Eastman, Chas. V. Simpson. 1968–Herbert W. Johnson, John Sawyer, Walter W. Sikes. 1969–Frederic R. Senti, Hays Sullivan.

As shown above with Burlison and Morse, with each person's name is give their current position or title, whether or not they are still living (* = deceased), and offices they have held in the American Soybean Association (ASA). Page 41 is filled with small, individual photos of each of ASA's honorary life members.

1188. *Soybean Digest.* 1970. Whole beans: The past-future link. Aug. p. 72.

• ***Summary:*** Contains a detailed chronology of USDA's Northern Utilization Research Laboratory (Peoria, Illinois) work with soyfoods–starting in 1926, about 15 years before the Lab began operations.

"Since 1960, the Northern Utilization Research Laboratory, Peoria, Illinois, has reported new information on using U.S. soybeans in traditional oriental foods–miso, tofu, and tempeh, and on making full-fat soy flour in extruders and hand-powered equipment.

"Under study as sources of vegetable protein for future generations, these foods may be as old as civilization itself. 'The annals of Old China,' W.J. Morse wrote in the 1917 *Yearbook of the Department of Agriculture,* 'set forth the fact that the soybean was an important food with the Chinese fully 5,000 years ago.'

"1926 Yearbook: Soy sauce, bean curd from domestic beans listed as new developments.

"1933 Extensive investigations of soybeans in food by commercial interests in past 3 or 4 years. Soy flour (either full-fat or defatted) used in malted milk, macaroni, vermicelli, spaghetti, noodles, crackers, cookies, ice cream cones, breakfast foods, health foods, diabetic foods, infant foods.

"1942 *Soybean Digest* (Feb.): Mention of soya milk processing patent held by Dr. H.W. Miller, International Nutrition Laboratory, Mt. Vernon, Ohio.

"1943 *Soybean Digest* (May): Use of soy milk in allergy diets, Dr. J.F. Muller, Borden Co. (Sept.) Northern Lab review: Soy flour, other soybean food products now receiving attention; successful experiments on debittered soy flour.

"1947 Research on producing soy sauce. 1948 Soy food methods studied in China, Japan, Korea; seed samples, microorganisms collected.

"1949 Series (Soybean Digest) on oriental uses of soybeans.

"1957 Use of U.S. beans in Japan, market development survey, by American Soybean Assn., and USDA's Foreign Agricultural Service, Agricultural Research Service. Identity-preserved bean export started by L.E. West, Farmer City.

1958-60 New miso process reduces fermentation time 50%. U.S. soybean varieties equal Japanese varieties for tofu processing.

"1962 Tempeh process improved; 39 tempeh molds isolated.

"1963 Extruded full-fat soy flour.

"1964 Research on soy-cereal fermentations. Japanese report U.S. varieties accepted for tofu, miso, shoyu.

"1966 Hand-powered full-fat soy flour process for primitive areas. Tempeh made from soy-wheat, soy-rice mixtures.

"1967 Study of food value of wheat-soy tempeh. Laboratory-scale tofu process published in response to processors' interest.

"1968 Sufu studies by P.L. 480 contractor. Yeast hybrid developed for shoyu production (P.L. 480).

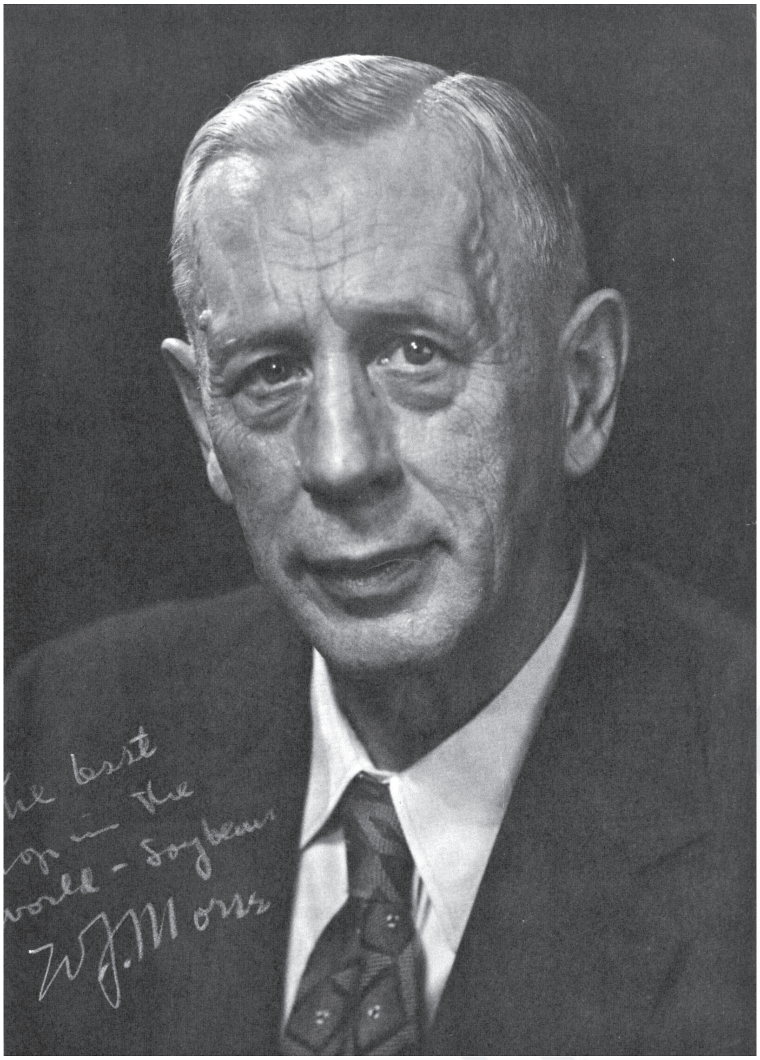
"1969 Antibacterial compounds found in tempeh. Milk-curdling enzyme produced by tempeh mold. New fermented food, hakko tofu [fermented tofu] (P.L. 480).

Photos show: (1) 1957: C.W. Hesseltine and A.K. Smith of the NRRL with visiting Japanese scientists Tokuji Watanabe and Kazuo Shibasaki. (2) 1963: "Extruder-cooked full-fat soy can be ground to flour."

1189. *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.”

1190. *Soybean Digest.* 1970. ASA officers 1920-1970. Aug. p. 38-39.

• ***Summary:*** 1920–pres., Taylor Fouts, Camden, Indiana; secy., W.A. Ostrander, Lafayette, Indiana. 1920-21–pres., W.E. Riegel, Tolono, Illinois; secy., W.A. Ostrander, Lafayette, Indiana. 1921-22–pres., C.E. Carter, Columbia, Missouri; secy., W.A. Ostrander, Lafayette, Indiana. 1922-23–pres., G.M. Bridges, Madison, Wisconsin; secy., W.A. Ostrander, Lafayette, Indiana. 1923-24–pres., W.J. Morse [USDA], Washington, D.C.; vice presidents, E.C. Johnson, Stryker, Ohio, and J.L. Robinson, Ames, Iowa; secy., C.L. Meharry, Attica, Indiana. 1924-25–pres., W.J. Morse, Washington, D.C.; vice presidents, E.C. Johnson, Stryker, Ohio, and J.L. Robinson, Ames, Iowa; secy., C.L. Meharry, Attica, Indiana

1925-26–pres., W.E. Ayres, Stoneville, Mississippi; vice pres., F.P. Latham, Belhaven, North Carolina; secy.-treas., C.L. Meharry, Attica, Indiana. 1926-27–pres., F. P. Latham, Belhaven, North Carolina; vice pres., Taylor Fouts, Camden, Indiana; secy.-treas., W.E. Ayres, Stoneville, Mississippi. 1927-28–pres., Taylor Fouts, Camden, Indiana; vice pres., Walter Godchaux, New Orleans, Louisiana; secy.-treas., W.E. Ayres, Stoneville, Mississippi. 1928-29–pres., G.I. Christie, Guelph, Ontario, Canada; vice pres., C.K. McClelland, Fayetteville, Arkansas; secy.-treas., J.B. Edmondson, Clayton, Indiana. 1929-30–pres., W.L. Burlison, Urbana, Illinois; vice pres., F.S. Wilkins, Ames, Iowa; secy.-treas., Roy Chasteen, Crothersville, Indiana.

1930-31–pres., W.C. Ethridge, Columbia, Missouri; vice pres., E.A. Hollowell, Washington, D.C., secy.-treas., W.L. Burlison, Urbana, Illinois. 1931-32–pres., W.J. Morse, Washington, D.C.; vice pres., H.D. Hughes, Ames, Iowa; secy.-treas., J.B. Park, Columbus, Ohio. 1932-33–pres., John P. Gray, Baton Rouge, Louisiana; vice pres., C.K. McClelland, Fayetteville, Arkansas, secy.-treas., W.E. Ayres, Stoneville, Mississippi. 1933-34–pres., C.K. McClelland, Fayetteville, Arkansas, vice pres., unknown; secy.-treas., P.A. Webber, Madison, Tennessee. 1934-35–pres., K.E. Beeson, Lafayette, Indiana; vice pres., E.S. Dyas, Ames, Iowa; secy.-treas., P.A. Webber, Madison, Tennessee.

1935-36–pres., E.S. Dyas, Ames, Iowa; vice pres., J.C. Hackleman, Urbana, Illinois; secy.-treas., K.E. Beeson, Lafayette, Indiana. 1936-37–pres., J.C. Hackleman, Urbana, Illinois; vice pres., J.B. Park, Columbus, Ohio; secy.-treas., K.E. Beeson, Lafayette, Indiana. 1937-38–pres., J.B. Park, Columbus, Ohio; vice pres., Geo. Briggs, Madison, Wisconsin; secy.-treas., K.E. Beeson, Lafayette, Indiana. 1938-39–pres., G.G. McIlroy, Irwin, Ohio; vice pres., Jacob Hartz Sr., Stuttgart, Arkansas; secy.-treas., J.B. Edmondson, Clayton, Indiana. 1939-40–pres., G.G. McIlroy, Irwin, Ohio; vice pres., Jacob Hartz Sr., Stuttgart, Arkansas; secy.-treas., J.B. Edmondson, Clayton, Indiana.

1940-41–pres, G.G. McIlroy, Irwin, Ohio; vice pres., David G. Wing, Mechanicsburg, Ohio; secy.-treas., J.B. Edmondson, Clayton, Indiana; exec. secy., Geo. M. Strayer, Hudson, Iowa. 1941-42–pres., David G. Wing,

Mechanicsburg, Ohio; vice pres., Joe Johnson, Champaign, Illinois; secy.-editor, Geo. M. Strayer, Hudson, Iowa; treas., J.B. Edmondson, Clayton, Indiana.

1942-43–pres., David G. Wing, Mechanicsburg, Ohio; vice pres., Joe Johnson, Champaign, Illinois; secy., Geo. M. Strayer, Hudson, Iowa; treas., J.B. Edmondson, Clayton, Indiana. 1943-44–Joe Johnson, Champaign, Illinois; vice pres., Howard Roach, Plainfield, Iowa; secy., Geo. M. Strayer, Hudson, Iowa; treas., J.B. Edmondson, Clayton, Indiana. 1944-45–pres., Howard Roach, Plainfield, Iowa; vice pres., Walter McLaughlin, Decatur, Illinois; secy., Jeanne Strayer, Hudson, Iowa; treas., J.B. Edmondson, Clayton, Indiana.

1945-46–all officers held over, no convention. 1946-47–pres., Walter W. McLaughlin, Decatur, Illinois; vice pres., J.B. Edmondson, Clayton, Indiana; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1947-48–pres., Ersel Walley, Fort Wayne, Indiana; vice pres., W.G. Weigle, Van Wert, Ohio; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1948-49–pres., Ersel Walley, Fort Wayne, Indiana; vice pres., John Evans, Montevideo, Minnesota; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1949-50–pres., John W. Evans, Montevideo, Minnesota; vice pres., Jake Hartz Jr., Stuttgart, Arkansas; secy.-treas., Geo. M. Strayer, Hudson, Iowa.

1950-51–pres., John W. Evans, Montevideo, Minnesota; vice pres., Chester B. Biddle, Remington, Indiana; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1951-52–pres., Chester B. Biddle, Remington, Indiana; vice pres., Jake Hartz Jr., Stuttgart, Arkansas; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1952-53–pres., Chester B. Biddle, Remington, Indiana; vice pres., Jake Hartz Jr., Stuttgart, Arkansas; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1953-54–pres., Jake Hartz Jr., Stuttgart, Arkansas; vice pres., Albert Dimond, Lovington, Illinois; secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1954-55–pres., Jake Hartz Jr., Stuttgart, Arkansas; vice pres., Albert Dimond, Lovington, Illinois; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa.

1955-56–pres., Albert Dimond, Lovington, Illinois; vice pres., H.H. Huddleston, Lamont, Mississippi; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1956-57–pres., Albert Dimond, Lovington, Illinois; vice pres., John Sawyer, London, Ohio; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1957-58–pres., John Sawyer, London, Ohio; vice pres., C.G. Simcox, Assumption, Illinois; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1958-59–pres., John Sawyer, London, Ohio; vice pres., C.G. Simcox, Assumption, Illinois; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1959-60–pres., C.G. Simcox, Assumption, Illinois; vice pres., Chas. V. Simpson, Waterville, Minnesota; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa.

1960-61–pres., Chas. V. Simpson, Waterville, Minnesota; vice pres., Hubert Baker, Dalton, Illinois; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1961-62–pres., Chas. V. Simpson, Waterville, Minnesota; vice pres., Hays Sullivan, Burdette, Arkansas; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1962-63–pres., Chas V. Simpson, Waterville, Minnesota; vice pres., Hays Sullivan, Burdette, Arkansas; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1963-64–pres., Hays Sullivan, Burdette, Arkansas; vice pres., Lyle Trisler, Fairmont, Illinois; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1964-65–pres., Hays Sullivan, Burdette, Arkansas; vice pres., L.C. Meade, West Lafayette, Indiana; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa.

1965-66–pres., L.C. Meade, West Lafayette, Indiana; vice pres., Harris Barnes Jr., Clarksdale, Mississippi; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1966-67–pres., L.C. Meade, West Lafayette, Indiana; vice pres., Harris Barnes Jr., Clarksdale, Mississippi; exec. vice pres. and secy.-treas., Geo. M. Strayer, Hudson, Iowa. 1967-68–pres., Harris Barnes Jr., Clarksdale, Mississippi; vice pres., Seeley Lodwick, Wever, Iowa; secy., Leslie Tindal, Pinewood, South Carolina; treas., John Sawyer, London, Ohio; exec. vice pres., Chet Randolph, Hudson, Iowa. 1968-69–pres., Harris Barnes Jr., Clarksdale, Mississippi; vice pres., Seeley Lodwick, Wever, Iowa; secy., Leslie Tindal, Pinewood, South Carolina; treas., John Sawyer, London, Ohio; exec. vice pres., Chet Randolph, Hudson, Iowa. 1969-70–pres., Leslie Tindal, Pinewood, South Carolina; vice pres., Harold Kuehn, Du Quoin, Illinois; secy., W.B. Tilson, Plainview, Texas; treas., Howard Adler, Sharpsville, Indiana; exec. vice pres., Chet Randolph, Hudson, Iowa.

1191. *Soybean Digest.* 1970. ASA directors of 50 years. Aug. p. 39.

• ***Summary:*** These directors of the American Soybean Assoc. are listed alphabetically by last name: O.H. Acom, Wardell, Missouri 1948-64; Howard Adler, Sharpsville, Indiana 1969-70; W.E. Ayres, Stoneville, Mississippi 1925-29, 1932-33.

Hubert Baker, Dalton, Illinois 1959-61; G.H. Banks, Osceola, Arkansas 1937-38; K.E. Beeson, West Lafayette, Indiana 1934-38; Harris Barnes, Clarksdale, Mississippi 1961-69; Chester B. Biddle, Remington, Indiana 1949-1969; C.E. Bowen, Champaign, Illinois 1964-67; G.M. Briggs, Madison, Wisconsin 1922-23, 1937-38; J.B. Buchanan, Guelph, Ontario, Canada 1928-30; W.L. Burlison, Urbana, Illinois 1929-31; John Butterfield, Pana, Illinois 1956-62; Frank Byron, Waseca, Minnesota 1969-70.

C.E. Carter, Columbia, Missouri 1921-22; Roy Chasteen, Crothersville, Indiana 1929-30; G.I. Christie, Guelph, Ontario, Canada 1928-29; Harvey S. Clapp, Accotink, Virginia 1928-29; H.I. Cohn Sr., St. Louis, Missouri 1949-52; Joe Coleman, Clare, Iowa 1967-70; J.S. Cutler, Columbus, Ohio 1925-28.

E.J. Delwiche, Madison, Wisconsin 1925-28; Gilles

DePutter, Appin, Ontario, Canada 1953-56; Albert Dimond, Lovington, Illinois 1951-59; W.R. Dodson, [Louisiana] 1932-33; John Dries, Saukville, Wisconsin 1940-51; E.S. Dyas, Ames, Iowa 1934-36.

J.B. Edmondson, Clayton, Indiana 1928-29, 1935-49; W.C. Ethridge, Columbia, Missouri 1929-31; John Evans, Montevideo, Minnesota 1949-69.

Milton Farough, Maidstone, Ontario, Canada 1968-70; Robert Ford, Merlin, Ontario, Canada 1966-68; Taylor Fouts, Camden, Indiana 1926-28; Eugene Funk, Bloomington, Illinois 1935-37.

Frank Garwood, Stonington, Illinois 1946-49; Harry Gatton Jr., Rumsey, Kentucky 1959-66; Ben Gildersleeve, Hudson, Illinois 1961-67; Thomas Gilmore, Sandersville, Georgia. 1935-37; Walter Godchaux, New Orleans, Louisiana. 1926-28, 1932-33; John P. Gray, Baton Rouge, Louisiana. 1932-35, 1938-40.

J.C. Hackleman, Urbana, Illinois 1935-37; Joe Hammer, Des Moines, Iowa 1960-62; Jacob W. Hartz Sr., Stuttgart, Arkansas 1938-49; Jake Hartz Jr., Stuttgart, Arkansas, 1949-69; Calvin Heilman, Kenton, Ohio 1949-52; E.A. Hollowell, Washington, DC. 1930-31; Frank Hoxie, Shenandoah, Iowa 1967-70; H.H. Huddleston, Lamont, Mississippi 1950-57; H.C. Hughes, Ames, Iowa 1931-32; Frank W. Hyatt, Wheatley, Ontario, Canada 1962-64.

E.C. Johnson, Stryker, Ohio 1923-25; Joe Johnson, Champaign, Illinois 1941-44; A.E. Jolly, Chatham, Ontario, Canada 1956-59.

Harold Keller, Dyersburg, Tennessee 1966-70; Roger Killingsworth, Jonesville, Louisiana. 1967-70; Harold Kuehn, Du Quoin, Illinois 1967-70.

F.P. Latham, Belhaven, North Carolina 1925-27; F.C. Laughinghouse, Pantego, North Carolina 1967-70; Frank W. Lewis, Ursa, Illinois 1962-64; Seeley Lodwick, Wever, Iowa 1964-69; Lester Longhurst, St. Thomas, Ontario, Canada 1964-66; J.G. Loo Jr., Baton Rouge, Louisiana. 1932-33; Harold Lumsden, Essex, Missouri 1954-57.

Martin Manning, Ladd, Illinois 1966-70; C.K. McClelland, Fayetteville, Arkansas 1928-29, 1932-35; G.G. McIlroy, Irwin, Ohio 1938-50; Walter McLaughlin, Decatur, Illinois 1943-47; L.C. Meade, West Lafayette, Indiana 1962-70; C.L. Meharry, Attica, Indiana 1923-26, 1930-35; Wm. Merschman, West Point, Iowa, 1969-70; Gerald Michaelson, Dawson, Minnesota 1969-70; Roy H. Monier, Carrollton, Missouri 1943-44; W.J. Morse, Washington DC. 1923-25, 1931-32; Glen Myers, Memphis, Missouri 1959-68.

Stuart D. Ormsby, Belleville, New York 1941-43; W.A. Ostrander, Lafayette, Indiana 1920-23.

J.B. Park, Columbus, Ohio 1930-32, 1936-38; R.H. Peck, River Canard, Ontario, Canada 1947-53; Don Pemberton, Cape Girardeau, Missouri 1969-70; Joe Pepper, Weston, Missouri 1968-70; W.R. Perkins, State College, Mississippi 1934-35; LeRoy Pike, Pontiac, Illinois 1948-56; Harry A. Plattner, Malta Bend, Missouri 1944-48; Wm. Prichard, Louisville, Georgia. 1969-70.

Howard Roach, Plainfield, Iowa 1941-67; J.L. Robinson, Ames, Iowa 1923-25; Everett Royer, Irwin, Ohio, 1968-70.

John Sand, Marcus, Iowa 1943-46; John Sawyer, London, Ohio 1952-69; Walter M. Scott Jr., Tallulah, Louisiana 1957-61; Richard Simcoke, Kennett, Missouri 1964-69; C.G. Simcox, Assumption, Illinois 1949-61; Chas. Simpson, Waterville, Minnesota 1957-69; Gilbert Smith, Taylorville, Illinois 1944-46; J.T. Smith, Tolono, Illinois 1925-26; Richard Smith, Tilbury, Ontario, Canada 1960-62; Robert Smith, Walnut Ridge, Arkansas 1969-70; L.F. Stoner, Holly Bluff, Mississippi 1946-48; Bert S. Strayer, Hudson, Iowa 1930-31; George Strayer, Hudson, Iowa 1937-67; Jeanne Strayer, Hudson, Iowa 1944-46; Hays Sullivan, Burdette, Arkansas 1960-70.

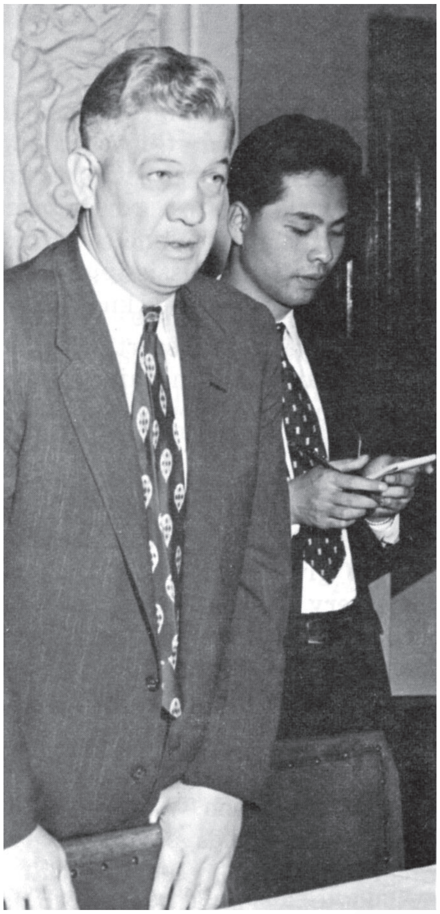
C.W. Tabaka, Ivesdale, Illinois 1926-28; Edward Tillman, Caruthersville, Missouri 1952-54; Leslie Tindal, Pinewood, South Carolina 1967-70; W.B. Tilson, Plainview, Texas 1967-70; Lyle Trisler, Fairmont, Illinois 1961-66.

W.W. Wallace, Woodslee, Ontario, Canada 1959-60; Ersel Walley, Fort Wayne, Indiana 1941-62; P.A. Webber, Madison, Tennessee 1933-35; W.G. Weigle, Van Wert, Ohio 1946-49; R.G. Wiggins, Ithaca, New York 1937-38; F.S. Wilkins, Ames, Iowa 1925-26, 1929-30; Harry D. Wilson, [Baton Rouge, Louisiana] 1932-33; David G. Wing, Mechanicsburg, Ohio 1940-68; John Wing, Mechanicsburg, Ohio 1969-70; LaVerne Workman, Chatham, Illinois 1967-70.

Note: These directors come from only 16 U.S. states plus Ontario, Canada. Illinois has the most directors with 21, followed by Iowa with 14 and Indiana with 10.

1192. Strayer, George M. 1970. Basic problems haven't changed. *Soybean Digest.* Aug. p. 54-57.

• ***Summary:*** This is an interesting history of the American Soybean Association as seen through the eyes of its first executive director.



"Geo. M. Strayer served as executive officer of the American Soybean Assn. from 1940 until 1967, through the formative years when most of the present structure was established. His term of service on the board of directors started 3 years earlier and was probably longer than that of any other one man. Today he is secretary of Associated Hybrid Producers, as he has been for many years. He exports corn, soybeans, grain sorghum, popcorn, and other midwestern products through Agricultural Exports Inc. He is associated with his brother Gordon and other members of his family in Strayer Seed Farms. He recently was elected mayor of Hudson where he has resided for the past 30 years. The above sketch [illustration] of Mr. Strayer as mayor is by Jack Bender of the Waterloo (Iowa) Daily Courier.

"Soybeans to me 52 years ago were just a lot of work–a novelty of which a small amount of seed had been secured by my father from W.J. Morse in the Department of Agriculture. Planted in the hills of a small patch of popcorn, they had to be pulled by hand, dried, and then threshed out by hand and with a flail. They were too late for complete maturity in our latitude–but we found out they would grow here!

"By the spring of 1924 there were enough varieties (all imports from the Orient) that my father, B.S. Strayer, in cooperation with USDA and the local Smith-Hughes agricultural instructor, planted a testplot of about 3 acres, and included some 15 or 20 strains of varying maturities. There were black, green, brown, yellow, and vari-colored varieties."

"First exposure to the American Soybean Assn. came in September of 1924 when my father attended the fifth meeting at Ames, Iowa. It was a 2-day meeting, in the days of dirt and gravel roads, and the 100 miles to Ames was a major journey taken the day prior to meetings. I heard the stories of the wonders of the soybean crop secondhanded–I was in high school, the meetings came after school started, and such meetings were no place for kids anyway!

"Wonders of the soybean world: It was not until 1930 that I had my first exposure to the American Soybean Assn., except for reading the proceedings of each of the annual meetings as mailed to all members. The sessions that year were held at the University of Illinois.

"Four of us drove over for the meetings. We stayed at a private home in Urbana. I was indoctrinated into the wonders of the world of such men as W.L. Burlison, J.C. Hackleman, Soybean Briggs, Bill Riegel, John T. Smith, W.K. Kellogg, Keller Beeson, W.J. Morse, Charlie Meharry, Taylor Fouts, Scott Wilkins, and others.

"Today, only Soybean Briggs is still living. But they were the men who had the vision and the foresight and the fortitude to preach and talk soybeans, to plant and harvest them, and to interest people in their possible uses.

"At these 1930 meetings, held while I was a college student, I found my real interest for future years. I believe it was in 1937 after graduating and starting to farm that I was first elected to the board of directors of ASA. My father had served several years ahead of me.

"In 1936 the ASA annual convention was held in Iowa, and I was a member of the committee given the responsibility for planning the program. The first day was held at Iowa State University at Ames, the second day at Cedar Rapids, where processing facilities could be visited, and the third day was held at Hudson on our farms.

"In preparation for the big event we had freshly painted our farm buildings with paint made with soybean oil."

Also discusses: The launching of *Soybean Digest* (Nov. 1940). First trips abroad (1949 with Jack Cartter as members of ECA Technical Assistance Mission No. 1 to Europe, especially Germany; in 1952 to visit potential customers in Western Europe at his own expense; in 1954 as a member of the official USDA-sponsored agricultural trade mission; in 1955 weeks with Paul Quintus, head of USDA's fats and oils division, to study the possibilities of selling soybeans to that country. "I spent 7 weeks in Japan meeting with processors, foods manufacturers, shoyu manufacturers, tofu makers, miso makers, and Japanese government officials").

"The Japanese American Soybean Institute was formed in early 1956, and became the first overseas market development project on soybeans or any oilseed.

"With soybean production zooming, and with the

Japanese project well underway, it appeared logical to explore other possible markets. In May of 1956 Paul Quintus again asked me to serve as an emissary of USDA and the soybean industry, this time to survey market possibilities and potentials in 10 Western European countries. Given a free hand, I spent about 2 months on this assignment, came back convinced that we had both problems and opportunities in Europe.

"I recommended that an industry-wide organization be formed. The European market was not solely a soybean market. Some countries would use oil, others meal, still others soybeans. It was too big a job for the small American Soybean Assn. Processors as well as growers had a stake in that market. Out of the arguments, discussions and deliberations the Soybean Council of America was formed to do the market development work in Europe and eventually in South America and in parts of Asia, with both growers, through ASA, and processors, through the National Soybean Processors Assn., participating.

"The problems are the same: Today's problems are the same as those of 1945–creation of larger and larger markets for U.S. soybeans." Address: Former Executive Vice President, American Soybean Assoc. and former editor, Soybean Digest.

1193. USDA Northern Regional Research Laboratory. 1970. Soy as a food oil. *Soybean Digest.* Aug. p. 73.

• ***Summary:*** This is a brief chronology of major developments with soy oil in the USA from 1916 to 1969.

"Research on food oil and other utilization studies were underway in 1916-17. Soybeans were grow for hay at this time, but the beans were not a significant domestic crop.

1916–Secretary of Agriculture D.F. Houston wrote, "A systematic study of the soybean... has been underway for several years... Through the efforts of the Department, cotton oil mills crushed during the past season over 100,000 bushels of southern-grown soybeans with satisfactory results from the oil standpoint."

1917–W.J. Morse, USDA assistant in forage crops wrote in the 1917 Yearbook [of Agriculture] that soybean oil had been "found to compare favorably with the more common table oils with respect to digestibility... This oil has a good color, has but a faint odor and is rather palatable... Until the present season it (the soybean) has been grown primarily as a forage crop."

"1929 Soy oil, protein lab established at the Bureau of Plant Industry.

"1933 Yearbook: Effect of light on rancidity in foods... Properties qualify soy for use as cooking oil, shortening, margarine, salad oil; prejudice against domestic crude oil, said to be inferior to Manchurian product, has been 'entirely overcome.'

"1934 Yearbook: Grass-green or black wrappers or containers proposed to delay rancidity in foods, including salad oils.

"1936 U.S. Regional Soybean Industrial Products Laboratory (SBL), Urbana, established. Miami Margarine Co., Cincinnati, Ohio, makes the first 100% soy oil margarine.

"1938 Northern Regional Research Laboratory (NRRL), Peoria, one of four authorized in Agricultural Adjustment Act.

"1938-41 Series of reports on soy oil composition, SBL.

"1939-43 Quality of oil from green, damaged beans.

"1940-59 Series on "The Stability of Vegetable Oils" and on soybean oil solvent extraction.

"1942 SBL chemistry and engineering research transferred to NRRL. First of NRRL research reviews published in Soybean Digest.

"1943 Processing capacity increased to meet war needs through screw-press speedup. (Items not otherwise identified are Northern Laboratory research developments.)

"1946 German use of citric acid reported.

"1947 Human tasting combined with statistical analyses in oil taste panel. Critic acid use explained; other metal inactivators studied."

"1948 Soy oil fractionation by liquid-liquid extraction.

"1949 Color in edible oil

"1951 Minute amounts of iron, copper accelerate flavor deterioration. Linolenic acid confirmed as primary source of off-flavors, thus a primary target of flavor stability studies. Iron, copper in commercial oil determined by spectrochemical method.

"1952 Processing shown to increase metal content of oil.

"1955-56 New edible spreads from soybean oil.

"1958 Heat frees metals; affects oil flavor stability. Tritium labeling of fatty acids."

"1959-60 Hydrogenated, winterized soy oil appears on retail market. (Commercial.)

"1960 Hydrogenation of linolenate, first of a series on removing the primary source of off-flavors. Low linolenate soy variety gives a more stable oil.

"1961 Hidden oxidation detected by partition chromatography. Synthetic cocoa butter.

"1964 Analog computer and nuclear magnetic resonance spectroscopy in oil studies.

"1965 Solvents, metal-organic catalysts, copper chromium catalysts improve selective hydrogenation of linolenate in soybean oil. Effect of light on oil flavor stability measured.

"1966 Miami makes 100% soy, soft margarine. Micro reactions introduced in soy oil studies. Computer simulations of hydrogenation reactions based on chemical analyses of oils. Effects of time, temperature in deodorizing oil.

"1967 Platinum-tin and other hydrogenation catalysts.

"1968 Improved method of determining copper in soy oil.

"1969 New oil washing method saves water, reduces

pollution."

A photo shows a person pouring soy oil onto a salad. Caption: "Returns from USDA soy oil flavor studies have been estimated at more than $900 million for the period 1945-1946." Address: Northern Regional Research Lab., Peoria, Illinois.

1194. *Soybean Digest.* 1971. Honorary life members [American Soybean Assoc.]: Laurel C. Meade and Dr. Martin G. Weiss. Sept. p. 14.
• ***Summary:*** Laurel C. Meade was one of the organizers and the first president of the American Soybean Institute. Dr. Martin G. Weiss began as a soybean breeder at Iowa State University in 1936, the year the U.S. Regional Soybean Laboratory was established. Dr. Weiss succeeded the late W.J. Morse as USDA soybean project leader at Beltsville, Maryland, in 1950. Perhaps his most outstanding contribution was the establishment of a permanent world germplasm collection of soybeans. In 1954, Dr. Weiss left the soybean project to move through a series of high administrative posts in USDA's Agricultural Research Service. Photos show Meade and Weiss.

1195. Kwon, Shin-Han. 1972. History and the land races of Korean soybean. *SABRAO Newsletter* 4(2):107-11. July. [17 ref]
• ***Summary:*** 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 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.

1196. Dunn, William Ellis; Nave, W.R.; Butler, B.J. 1972. Combine header component losses in soybeans. MSc thesis in Agricultural Engineering, University of Illinois at Urbana-Champaign. vii + 59 p. 28 cm. [21 ref]
• ***Summary:*** "The methods used to harvest soybean seeds in this country have almost always been the same as for the small grains. One exception to this was a special harvester for soybeans which was common to Virginia and North

Carolina. This was a two wheeled horse drawn design which straddled the row between the horses (Piper & Morse 1923, p. 91-95). A rotating cylinder with long teeth functioned as a reel to gather in the plants over the front of the machine and to shatter the beans from the pods into the harvester. Harvesting losses from this method ranged from 20 to 60 percent (Norman 1967, p. 219).

The objectives of this investigation were to design and employ a unit to (1) isolate the loss associated with the following three header gathering components: cutterbar, reel, and auger, and (2) evaluate the relative magnitude of each gathering component loss. Results: The cutterbar was charged as having caused 81% of the total header loss. There was no significant loss contributed by the reel or the auger. Therefore any attempt to design equipment for fewer gathering losses should start with the cutting device. Address: Univ. of Illinois.

1197. 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).

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.

1198. 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 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.

1199. *Watertown Daily Times* (*New York*). 1973. "Soybean" Morse. Sept. 8.
• ***Summary:*** An article about William Morse and soybeans. Besides being a cousin of Mrs. Marjorie Colligan of Black River, New York, "Dr. Morse was described by many in agriculture as 'the father of the soybean industry in America.'"

1200. Caldwell, B.E. ed. 1973. Soybeans: Improvement, production, and uses. American Society of Agronomy, 677 S. Segoe Rd., Madison, WI 53711. xviii + 681 p. Illust. Index. 24 cm. Agronomy series: No. 16. [1500+ ref]
• ***Summary:*** Contains 20 chapters by various authors, each cited separately. Address: USDA, Beltsville, Maryland.

1201. 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 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. Address: Agricultural Research Service–USDA, Stoneville, Mississippi.

1202. Miller, Harry W., Jr. 1973. Observations from forty years of soy protein processing and engineering. Cedar Falls, Iowa: Soypro International, Inc. 8 p. Undated. Unpublished manuscript.

• ***Summary:*** "It was a late summer morning 1922 in the State of Maryland that my father announced at the breakfast table that I would accompany him on a short trip to Frederick, Maryland to look at a stone burr mill he wished to purchase for some soy milk experiments he wanted to conduct.

"Protein had always been a high priority topic in our house as Dr. John Harvey Kellogg had made a deep impression on my father (Dr. Harry W. Miller, Sr.) during his student medical days at Battle Creek, Michigan.

"On the way to Frederick my father explained to me that the mill he wished to purchase was to be used to prepare soybeans so that a white milky fluid of suspensible protein could be extracted from the beans. Little did I realize that I was to be introduced to a research field that would dominate my work and studies the rest of my life.

"Having purchased the mill the next step was to find a proper location to conduct the experiment. One of Maryland's larger dairy farms was chosen for this, and after transporting the mill to the farm, it was bolted to heavy timbers and one of the dairy's tractors was used to turn the pulley on the mill.

"To a boy of ten it was more interesting than spectacular to see a white milky liquid run down out of the mill instead of seeing the milk being drawn from the udder of a cow. However, this experiment made a lasting impression on a ten year old who was always experimenting and constructing contraptions of his own.

"No, the liquid from that mill did not replace the milk produced on the farm. However, at the present rate of population increase, and ever-increasing shortages of grazing area to produce milk, we may in the future be looking to the use of this mill and its complementary equipment to supplement the animal products in lands of large dairy production.

"Shortly after my introduction to the first experiments on that dairy farm, I traveled to the land of the soybeans. This country was to become my home and source of information as my parents had accepted a call to mission service in China.

"Having been raised a strict vegetarian, the foods made from vegetables and grain sources were always a challenge to my curiosity.

"Roaming the streets of Shanghai every portable food caterer, street sidewalk restaurant, as well as the more sophisticated Buddhist (vegetarian) restaurant held a new horizon of future products made from the soybean.

"It was indelibly inscribed on my young mind that each procedure in each shop had a very definite and end-resulting purpose behind it.

"The first visit I made to a shop which produced these foods, the owner would address me. 'What is your honorable name,' and my answer would be, 'my humble name is "Show Me,"' translated small rice.

"My childish curiosity either amused the shop keepers or my youth intrigued them. Regardless, I was soon known as 'small rice.' in all these shops and home processing establishments and was allowed to roam at will and have my questions answered frankly–so much so, that I was able to get answers and ingredient names that my elders were unable to secure.

"Basically, the first step in extracting protein was to hydrate the bean. I found that each shop had some variation in soaking the bean. Hot water was used in one place and cold in another. Some added chemicals to the soaking water and others varied by prewashing the bean before soaking while others washed the beans after soaking.

"Although I knew that all their variations were vital to the end product, it was to be several years before I would be using these various steps to achieve end results.

"During my earliest experience with processing, I learned that enzyme action is definitely affected by these variations in procedure.

"The Orientals extract soy protein to produce soy curd, in its various forms, and soy skin or film membrane. Note: This is the earliest English-language document seen (Oct. 2012) that uses the term "soy skin" or the term "film membrane" to refer to yuba.

"Soy curd is produced by coagulating the extracted, liquid-suspended protein. After being pressed from the granular residue [okara] of the bean, a liquid white protein suspension is left. Each shop had a different heat to bring the liquid to before adding the coagulatory chemical.

"Each producer had a different product for the customer. One would have a large cake of rather coarse curd. This they cut into blocks according to the purchaser's need. The buyer taking it would flavor and prepare it as he desired.

"Another shop would produce a firmer curd which was pressed into small cakes; some were flavored with sesame oil; some peanut oil in which they were deep fried; and others were boiled in soy sauce and sold in this form to the customers.

"They also had what I called the yogurt shop. This was a very exacting procedure of heat control and quantity of coagulant to produce a yogurt-like curd which was chilled in

bowls and served with rice malt poured on top to flavor it.

"There was one shop that pressed a fine curd till it was rather dry. These cakes were cut into square pieces about 3/4 of an inch square, were stacked on bamboo mat trays and placed in a culture-inoculated, heat-controlled room for three days. After this period the mold-covered squares were put loosely in glass jars in a hot pickling juice with ginger, ground red peppers, rice wine, brown sugar, and salt, and were sealed so the sauce would preserve the curd and flavor it [to make fermented tofu]. This product is sent all over the world to delight the palates of the Orientals.

"Perhaps the most interesting to me was the film protein [yuba] produced by heating the liquid extract to a definite regulated temperature and allowing a film to form on the top of it. This is picked up with a long chopstick and hung on a wire line to dry.

"Here again, liquid flavored films were produced by temperature changes. One way of changing the thickness of the film was to allow the liquid to evaporate so that the last films to be produced from a pot of liquid would be thicker than the first. Also, the fuel used would change the flavor of the film as the smoke from coal, charcoal rice straw and wet saw dust, or bamboo splints each had a definite taste.

"Not being satisfied with seeing these products made, I was determined to see how they were used; so 'Small Rice' would go to the kitchen of the Buddhist Restaurant long before dawn to watch the cooks soak these films in various sauces, some to be rolled tightly into bologna-like rolls and broiled for hours in a soy sauce, ginger, and anise flavored juice. This roll, when sliced, had a beef-jerky like flavor. Another was to lay the films one after another on top of each other to be sprinkled (each one) with rice wine, sesame oil and monosodium glutamate. These films were folded into a half moon shape, placed in bamboo trays and steamed for several hours. They were then placed on a screen to dry the surface moisture, then fried in deep sesame oil or peanut oil whichever flavor was desired.

"When these foods with various seasonings were served you would have anything from fish to turkey or duck.

"It was the eating of these Buddhist meats that gave me the courage in later life to learn to eat animal tissue, as I had been raised a strict vegetarian.

"Had I not learned to eat and taste these various animal products, I am afraid I would be like the official in India: when describing to him how we could make meat analogs from soy milk residue he asked, 'Well, what does chicken taste like?'

"This early experience in China was a challenge to make extensive study into each country's dietary and food flavor habits before designing a product for them.

"In the early 1930's with the encouragement of W.J. Morse and La Clara Reed of the U.S. Department of Agriculture, my father and I, using equipment supplied jointly by the Department and ourselves, produced a spray-dried soy milk formula which was granted a patent by the U.S. Patent Office, and which the American Medical Association accorded its own highly valued seal of acceptance for an infant formula.

"The first commercial plant was installed in Shanghai, China, during 1936 and 1937. Although we were using soy milk for feeding babies and institutional employees, due to the high price of pasteurized cow's milk there was a challenge to install a soy dairy to produce a vegetable milk at a low price."

Note 1. This is the earliest document seen (Aug. 2013) that uses the term "soy dairy" to refer to a facility which makes soymilk and related products from soybeans. Continued. Address: Cedar Falls, Iowa.

1203. Probst, A.H.; Judd, R.W. 1973. Origin, U.S. history and development, and world distribution [of soybeans]. In: B.E. Caldwell, ed. 1973. Soybeans: Improvement, Production, and Uses. Madison, Wisconsin: American Society of Agronomy. xviii + 681 p. See p. 1-15. Chap. 1. [74 ref]

• ***Summary:*** This chapter contains the best account seen to date, with an excellent bibliography, of the early history of the soybean in the United States. Many of the earliest citations for the soybean in America, including many letters from farmers to the Patent Office, are first cited in this chapter.

Contents. 1. Origin and early history. 2. Early uses. 3. Introduction into the United States. 4. Early soybean trade expansion in Asia and Europe. 5. Development of the soybean industry in the United States. 6. Rise to prominence in the United States. 7. Major production areas in the United States. 8. Status of soybeans as a farm crop in the United States. 9. Status in the world with special reference to the United States position.

In section 1, titled "Origin and Early History," the authors cite two main sources. The first, Morse (1950) was written before truly scholarly and critical study of the subject was begun by Hymowitz in 1970. Many of the statements by Morse have subsequently been shown to be without basis in historical fact and incapable of being documented. Unfortunately, because Morse was probably the world's leading authority on the soybean up to 1950. his statements were later cited or quoted repeatedly. The second main source is Hymowitz (1970) who "has challenged the version of history related by Morse." Hymowitz's version is now generally accepted as the more scholarly and accurate one. Address: 1. ARS-USDA and Purdue Univ., Lafayette, Indiana; 2. National Soybean Improvement Council, Urbana, Illinois.

1204. Bernard, R.L. 1975. Soybeans in the People's Republic of China (Continued–Document part II). *Soybean News* (*NSCIC*) 26(2):1, 3-4. Jan.

• ***Summary:*** (Continued): "The predominant plant type is indeterminant with semi-determinant next and determinant last. Predominant characteristics of varieties currently grown in Kirin are white flowers, gray pubescence and about one-third have narrow leaves. Scientists preferred the narrow leaves 'to get better light penetration' but they didn't feel that seed yield was necessarily higher.

"Intervarietal crossing has involved varieties from Kirin and other provinces in China. Pollination is done on an unusual time schedule with emasculation beginning at 5 AM and pollination from 8 to 10 AM. After 10 the pollen is gone. A winter nursery on Hainan Island is used to grow F1 and alternate generations to accelerate the breeding program. There was about one hectare of F2 populations being grown at Kungchuling involving about 50 different combinations. The F5 to F8 generations are grown in progeny rows there (1300 in 1974) and visually selected lines are performance tested in subsequent years.

Note: When the Japanese controlled Manchuria, they did extensive and very professional soybean varietal development at Kungchuling. This work is described by W.J. Morse in his unpublished log in 1930.

"Final strain testing is done in a regional test grown at Kungchuling and over 30 other locations in the province. The 1974 test consisted of 25 varieties including experimental strains developed at Kungchuling and at 5 district research institutes. The Kungchuling tests were at 2 population rates in plots 5 rows wide spaced 60 centimeters apart and 10 meters long in 4 replications with 1 replication at a higher fertility level. The expected yield level was 2000 to 3500 kilograms per hectare (30 to 50 bushels per acre).

"There was also a test of 11 U.S. varieties of maturity groups I to IV being grown at Kungchuling for the first time. Amsoy 71, Beeson, Calland, Clark63, Corsoy, Harosoy63, Kanrich, SRF 307, Wayne, Wilkin, and Williams were the U.S. varieties being tested. Growth was good with a height of nearly 4 feet on the taller varieties with no lodging, partly because of the low population of 170,000 plants per hectare. The varieties were similar to their appearance in the U.S. except Williams was stunted and poorly podded.

"In addition to intervarietal hybridization, a mutation breeding program is underway using x-rays or gamma rays to develop earlier maturity. Some progeny rows in the R5 generation appeared to be earlier than the check variety.

"Objectives of their breeding program are: (1) higher yield, (2) high oil content, (3) resistance to pests (4) adaptation to intercropping, and (5) strong stems. They have developed 8 improved varieties at Kungchuling and popularized them in the Kirin province and nearby areas. The major pest problem in Kirin is the soybean pod borer. Fields not treated with insecticide have 10 to 20 percent of the pods infested. A local variety has been found to have moderate resistance. Although soybean mosaic is not considered important in the breeding program, Dr. Bernard observed that a mosaic-like disease appeared to be affecting yields. Aphids are a major insect problem but resistant varieties have not been found.

"The only cultural research on soybeans was seen at Kungchuling where experiments were conducted on intercropping with corn. Preliminary results indicated 6 row strips of soybeans alternated with corn produced more total yield from the land.

"The soybean breeding program at the Genetics Institute, Peking, started in 1968 with emphasis on disease resistance. Two varieties have been developed which are resistant to purple stain and are being grown by farmers. The main disease problems now are 3 viruses, soybean mosaic (the most serious), soybean stunt, bud blight, and the leaf disease target spot. Soybean mosaic stunted plants were almost podless and had much more severe symptoms than plants associated with the disease in the U.S. Resistance has been identified by observing plants in the field, checking with inoculation tests and by use of the electron microscope. Two varieties were found to be moderately resistant and 2 appeared to be immune.

"Having found disease resistance, their next step will be to breed for yield and lodging resistance. Determinant varieties having lodging resistance are being grown in the lowland, and indeterminant varieties are grown which do well in poor soil areas in the upland. North of Peking soybeans of an indeterminant type with medium to small seeds were interplanted with corn and grain sorghum but did not appear to have good yields in competition with the taller crops. Grown alone, the varieties appeared to be much better. Soybean breeding at the Northwest College of Agriculture west of Sian was initiated more than 10 years ago and is in cooperation with the nearby Academy of Agriculture which is the source for germplasm. Their first objective is to develop early maturing varieties to be planted after wheat harvest in mid-June for harvest during the first half of October. Disease resistance is their second objective with work concentrated on an unidentified virus which causes stunting of the plant and wrinkling of the leaves. The only other disease considered is bacterial leaf spot. Although pod borer is the most important insect pest, adequate resistance has not been found.

"A new determinant variety was developed in 1970 at the College by pedigree selection. It grows 70 to 80 centimeters tall when planted after wheat, matures early in 105 to 110 days, is shatter resistant and virus resistant. Farmers are growing it in central Shensi province. Local varieties in Shensi are used for bean curd or annual fodder for cattle and hogs. There are a number of black-seeded indeterminant varieties grown for fodder. Sometimes the threshed grain is fed to cattle and hogs.

"In the remainder of China there does not appear to be much soybean research. Because the crop is widely grown in China and is an important source of protein, especially in the

diet of rural people, Dr. Bernard believes more research is justified in the PRC.

"Wild soybeans: The wild soybean is a source of germplasm that is apparently not being used in China. It occurs in many areas and was observed to be abundant in the Northeast. Perhaps it was eradicated from many agricultural areas of China since it was not found in the Peking, Sian and Canton areas. It was only found in forest parks and wasteland around a factory and airport in the Nanking-Shanghai area. At the Institute of Botany of the Academy of Science at Peking the herbarium has a collection of about 100 sheets of *Glycine soja* from 17 provinces or regions. An interesting report of *G. hainanensis* (or *Teyleria koordersii*) was found by Dr. Bernard at the herbarium of the Sun Yat Sen University in Canton. This specimen, collected in 1933 on Hainain Island was listed as an annual with seeds and pods appearing to be close to *G. soja.* However, the pods occur in rather large clusters and have up to 7 seeds per pod which would make it an interesting variant of *G. soja,* if not a distinct species. This species should be obtained for further study and as potential germplasm for soybean breeding."

A small portrait photo shows Dr. Richard L. Bernard. Address: Univ. of Illinois.

1205. Howell, Robert W. 1975. Golden beans from China now our No. 1 cash crop. *Yearbook of Agriculture* (*USDA*) p. 225-36. For the year 1975. [2 ref]

• ***Summary:*** This is an excellent historical overview of soybeans in America. Contents: Introduction. Travels in Manchuria (Dorsett and Morse, U.S. Regional Soybean Industrial Products Laboratory, U.S. Regional Soybean Lab. at Urbana, O.S. Aamodt of USDA who was Morse's immediate superior, Herbert W. Johnson, Lincoln variety released in 1943, Richard Bernard, C.R. Weber, E.E. Hartwig). Phytophthora rot (The first major threat to the soybean crop, first observed in 1948). China variety saved day (Peking variety contained resistance to cyst nematode). Living together (nitrogen fixation, chemical control of weeds, mechanized agriculture). Deodorizers developed (deodorized soybean oil, shortening & margarine, food uses of soybeans, Sybil Woodruff and Olive Zwerman of Illinois). Beans and the world scene (India, INTSOY, NSPA, National Soybean Crop Improvement Council).

"By 1973, soybeans had become our No. 1 cash crop, the leading export commodity, the major alternative crop of midwestern and southern farmers, the world's most effective producer of protein per acre, and the hope of starving millions for a better diet.

"How was this miracle achieved? It was made possible by a combination of fortuitous conditions... a need for oil and protein, accentuated by war-time demands and post-war population growth... land newly available as production of other crops outpaced demand, partly because there were fewer draft animals and thus less need for land for feed grain production... the ability of soybeans to adapt to a wide range of climates and to farming methods already known to corn and cotton farmers... and removal of legal restrictions on margarine.

"But there was another element, just as important or even more so. First a few and then many more men and women of vision, imagination, energy, dedication–remarkable people and institutions who saw the potential of the soybean and worked hard to make that potential a reality."

"In 1961 the Minnesota legislature authorized several soybean research positions. This was the first State action specifically directed toward building a soybean research program" (p. 242).

"A significant private (commercial) soybean breeding effort began during the 1960s. Stuart and Hampton varieties were developed at Coker Pedigree Seed Co. in South Carolina. In 1964 a group of seed producers organized Soybean Research Foundation, Inc. to conduct a breeding program based at Mason City, Illinois. In 1967 a soybean breeding program was initiated by Peterson Seed Co. of Waterloo, Iowa, now a division of Pioneer Seed Co."

"Enactment of the Plant Variety Protection Act in 1970 has stimulated more companies to begin breeding soybean varieties." (p. 235).

Photos show: (1) Geneticist Richard L. Bernard. (2) A food plant making spun soy protein fibers. Address: Head, Dep. of Agronomy, Univ. of Illinois.

1206. Rasmussen, Wayne David. ed. 1975. Agriculture in the United States: A documentary history. 4 vols. New York, NY: Random House. [97 ref]

• ***Summary:*** This is a collection of articles previously published elsewhere. In Vol. 3, p. 2629-36: "Soy beans in 1917." From: Morse, W.J. 1918. "The Soy-Bean Industry in the United States." *Yearbook of the U.S. Department of Agriculture* For the year 1917. See p. 101-11. Address: Agricultural historian, National Economic Analysis Div., USDA.

1207. 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.

1208. Shanmugasundaram, S. 1976. Important considerations for the development of a soybean classification system for the tropics. *INTSOY Series* No. 10. p. 191-95. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [20 ref]
• ***Summary:*** Contents: Introduction. Soybean classification systems. Inapplicability of existing classification systems in the tropics. Factors to be included in a tropical classification system. Proposed tropical soybean classification system.

"Because of their photoperiod sensitivity, varieties from the temperate zone flower too soon and mature too early when grown in the tropics and subtropics. Thus, a variety's range of adaptation is limited. However, experimental results show that varietal differences in response to photoperiod do exist in soybeans...

"The first classification based on maturity was developed by Piper and Morse (1923 [p. 159]), who classified the germ plasm into seven groups: very early, 81 to 90 days; early, 91 to 100 days; medium early, 101 to 110 days; medium, 111 to 120 days; medium late, 121 to 130 days; late, 131 to 150 days; and very late, more than 150 days." Address: AVRDC, Taiwan.

1209. Shore: New U.S. domestic soybean variety. 1976.
• ***Summary:*** Sources: Hymowitz, Theodore. 1984. "Dorsett-Morse soybean collection trip to East Asia: 50 year retrospective." *Economic Botany* 38(4):378-88. Dec. See p. 384. Table 3 shows eight "vegetable-type soybean cultivars developed in the U.S. by hybridization and selection from germplasm introduced by Dorsett and Morse." Shore is P.I. 80837 x Hood. Maturity group V. Year named or released: 1976. Address: USA.

1210. Hymowitz, T. 1976. Soybeans. In: N.W. Simmonds, ed. 1976. Evolution of Crop Plants. London and New York: Longman. xii + 339 p. See p. 159-62. [10 ref]
• ***Summary:*** "Introduction: The soybean is the most important legume grain crop in the world in terms of total production and international trade...

"Cytotaxonomic background: Plant breeders and geneticists attempting to improve the soybean have often been frustrated by the state of confusion concerning its taxonomy. Over 280 species, subspecies and taxonomic varieties have been listed under *Glycine.* Fortunately, recent studies by Hermann (1962) and Verdcourt (1966, 1970) have greatly clarified the taxonomy of the genus *Glycine.* There are nine species listed here.

"Early history: Probably, the eleventh century B.C. date will be pushed back in time as additional archaeological evidence is uncovered in the People's Republic of China.

"Recent history: However, starting in 1924, soybeans began their almost incredible rise to prominence in the United States... The northern central states of Illinois, Iowa, Missouri, Indiana, Minnesota and Ohio produced 66 per cent of the US total and the Mississippi river delta states of Arkansas, Mississippi, Louisiana and Tennessee produced 16 per cent... Starting in the 1940s, the US Department of Agriculture initiated a programme to maintain germplasm and to screen the germplasm for certain economic traits... Soybeans are responsive to day length.

"Prospects: The last major international collecting effort was made by W.J. Morse and P.H. Dorsett... collected over 4,000 soybean seed samples. Unfortunately, less than one-third of their collection still survives. The other seed was either thrown out or lost. Obviously, a new effort must be undertaken to collect soybean seed samples from the Orient to provide new germplasm for contemporary plant breeders... Soybean breeding, thus far, has been directed towards the needs of temperate countries. The trend in the next decade will be toward breeding the crop for subtropical and tropical countries." Address: Univ. of Illinois, Urbana, Illinois.

1211. 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.

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

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.

1212. National Archives Trust Fund Board. 1978. Expedition reports of the Office of Foreign Seed and Plant Introduction of the Department of Agriculture 1900-1938. Washington, DC: National Archives. 14 p. National Archives Microfilm Publications, pamphlet describing M840. [38 ref]
• ***Summary:*** "The records reproduced in the microfilm publication are from Records of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Record Group 54. On the 38 rolls of this microfilm publication are reproduced 150 bound volumes of reports prepared by the staff of the Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, Department of Agriculture, during the period 1900-1938. The reports relate to the search for and introduction of foreign plants in the United States...

"This Office originated in 1897 as the Section of Foreign Seed and Plant Introduction. After March 1, 1901, when the Section was placed under the Bureau of Plant Industry, it was referred to successively as the Office of Foreign Seed and Plant Introduction, the Office of Foreign Plant Introduction, and the Division of Foreign Plant Introduction. In 1934 it was reorganized and designated the Division of Plant Exploration and Introduction, and in the 1950's the name was changed to New Crops Research Branch...

"The introduction and distribution of new and useful seeds and plants has been continuous. Some of these activities are traceable to the Agricultural Section established in the Patent Office in 1839. With the establishment of the Department of Agriculture in 1862, these activities were centered in the Department's Division of Gardens and Grounds and the Division of Seeds, created in 1862 and 1868, respectively. It was not until 1898, however, that a program of plant and seed introduction was formally authorized by an appropriation act that allocated $20,000 'to collect, purchase, test, propagate, and distribute rare and valuable seeds, bulbs, trees, shrubs, vines, cuttings, and plants from foreign countries for experiments with reference to the introduction into this country...'" Address: Washington, DC.

1213. Hartwig, Edgar E. 1979. Soybean varietal development 1928-1978. In: R.W. Judd, ed. 1979. 50 Years with Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 2-7.
• ***Summary:*** "To satisfactorily discuss soybean varietal development over the past fifty years, some attention should be given to developments prior to 1928.

"Interest in soybeans had become great enough by 1907 for the U.S. Department of Agriculture to hire a man to spend most of his time on soybean research. Along with his work with soybeans, W.J. Morse had responsibilities for cowpeas, mung beans, and several other annual legumes. In addition to his own plantings in the Washington [DC] area and on a farm near Monetta, South Carolina, W.J. Morse distributed seed of new introductions to anyone expressing an interest in soybeans. This program served to get many of our older varieties established. Among his closest contacts at the State Experiment Stations were C.B. Williams in North Carolina and W.L. Burlison at Illinois.

"All varieties grown in 1928 to be harvested for seed, were to a great extent the result of someone primarily involved in some other activity planting soybean seed that was sent to them by W.J. Morse. It is also quite likely that W. J. Morse visited these plantings and permitted his quiet enthusiasm to somehow influence the individual toward thinking he was growing a crop with a great potential.

"About 1928, the U.S. Department of Agriculture employed a second man to do research with soybeans. However, J.L. Cartter's role was primarily to evaluate the many soybean introductions from eastern Asia for their composition of oil and protein. At this time soybeans were a forage crop. That a man was employed to study the composition of the seed indicates that men in a leadership role within the research organization of the U.S. Department of Agriculture recognized the future of the soybean to be in utilization of the seed for oil and protein rather than in the use of the entire plant in an immature stage for forage. In their book, *The Soybean,* by Piper and Morse published in 1923, the authors express optimism of soybeans becoming a major farm crop but state 'but not as a forage crop.'

"In 1936 the U. S. Regional Soybean Laboratory was established to serve the 12 North Central States. The concept of this Laboratory was never fully financed. Plans called for production research and research to develop industrial uses for the beans. The first research programs for improvement of soybeans by breeding were included in the production research program.

"The breeding research was supported in a rather limited manner. Martin Weiss, who had completed work toward a Master of Science degree, was employed on a full-time basis to work cooperatively with the Iowa Agricultural Experiment Station, but was allowed to continue his studies toward a PhD degree. Upon the retirement of W.J. Morse in 1950, Martin replaced Morse as Investigations Leader for soybean research within the Agricultural Research Service. This then became a full-time position as responsibilities for cowpeas, mung beans, etc. were directed elsewhere.

"One-half time positions for varietal development work were established in cooperation with the Illinois, Indiana,

Ohio and Missouri Agricultural Experiment Stations. Leonard Williams was hired at Illinois and he became a full-time employee after completing studies leading to a PhD degree in 1937. Al Probst at Purdue was also one of the original employees, but did not become a full-time employee until 1938.

"A cooperative program for the Southern States was initiated in 1943 with research located at Stoneville, Mississippi and Raleigh, North Carolina. Paul Henson, now famous as the father of Jim Henson of the Muppets, was located at Stoneville until he was transferred to other work at Beltsville [Maryland] in 1948. I was located at Raleigh, North Carolina until I transferred to Stoneville. Herbert Johnson then took over at Raleigh. In 1955 a third location for breeding research was established at Gainesville, Florida.

"By 1954 U.S. soybean acreage harvested for beans had reached 17 million with an average yield of 20 bushels per acre. At that time there were six people employed by the U.S. Department of Agriculture as soybean breeders. It was another 10 years before any State Experiment Station had an employee giving full time to soybean breeding research.

"The Coker Pedigreed Seed Company of Hartsville, South Carolina has given some attention to soybean selection and breeding for about 50 years [i.e. since about 1929]. They have had a full-time breeding program with soybeans since the mid-fifties. For many years Coker's were the only commercial seed company actively engaged in soybean breeding. After establishing the Plant Variety Protection Act in 1971, many commercial companies became interested in soybean varietal development. The number of federal, state, and private plant breeders is now approximately 75. However, the 29.5 bushels per acre average on over 63 million acres harvested in 1978 was made with varieties developed by the 12 to 15 breeders on the job in the mid-1960's.

"Morse and Cartter, in 1939, described 108 varieties of soybeans. All were introductions from Asia, selections from introductions, or natural crosses that had occurred among introductions. Of the 108 varieties described, 37 were considered to be seed producing types. Only 14 of these were grown on any appreciable acreage. Dunfield, Illini, Macoupin, Manchu, Mandarin, Mandel, Mukden, Richland, and Scioto were the principal varieties grown in the North Central States for seed production. Arksoy, Haberlandt, Mammoth Yellow, Tokyo, and Woods Yellow were the major varieties planted for seed harvest in the South. Several of these varieties are in the parentage of varieties now in production.

"Since 1942 one hundred twenty-four soybean varieties have been registered by the Crop Science Society of America. Of these number five of the older varieties were selections from introductions. All other were selections from segregating populations resulting from planned crosses.

"Introductions from the northeastern providences of China were the source for varieties such as Dunfield, Illini, and Mukden which were some of the more widely grown varieties in the north central region. A major step in varietal improvement was made with the release of Lincoln in 1944. Lincoln resulted from a cross made by Woodworth at Illinois and selected jointly by Williams and Woodworth. Lincoln had a 4-year average yield 17% greater than the mean for Dunfield and Illini, the varieties it replaced. Lincoln was also superior to these two varieties in resistance to lodging and in oil content of the seed. Another variety having a major impact on production was Hawkeye, released in 1948. Hawkeye was earlier in maturity than Lincoln. It remained a major variety for approximately 20 years.

"In addition to the impact Lincoln had on soybean production, it also played an important role as a parent. Leonard Williams crossed Lincoln with Richland and then backcrossed to Lincoln. Four major varieties came out of this material–Clark of maturity group IV, Chippewa of maturity group I, and Ford and Shelby of maturity group III. In 1965 these four varieties were estimated to be grown on approximately 30% of the U.S. acreage. Lincoln parentage is very evident in the highly productive and widely grown variety Williams.

"In the South, the first variety to have a major impact on production was Ogden, released from the Tennessee Agricultural Experiment Station about 1943. Ogden produced well but was weak in seed holding and had green seed coats. The green seed coat was disturbing to Japanese buyers after purchasing yellow soybeans. Lee released in 1954 had an even greater impact on production in the South. Lee yielded well, held its seed extremely well, and was resistant to several foliar diseases which were responsible for reducing seed yield. Because of Lee's performance acreage began to increase. For several years Lee was grown on about 85% of the soybean acreage in the South. Lee or lines closely related are in the background of most varieties now grown in the South. Bragg, released in 1963, had a sister line of Lee as one parent. Bragg was 10 days later than Lee and soon became one of the major varieties in the U.S.

"Soybean production in the U.S. covers a range of over 20 degrees latitude. This means that productive varieties were needed of different maturity classifications and with production qualities to fit the different production regions." Continued. Address: ARS, SEA, USDA, Delta Branch Exp. Station, Stoneville, Mississippi 38776.

1214. Hartwig, Edgar E. 1979. Soybean varietal development 1928-1978 (Continued–Document part II). In: R.W. Judd, ed. 1979. 50 Years with Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 2-7.

• ***Summary:*** (Continued): "As soybeans were grown in Asia with small units and hand culture, shattering was no problem. In fact, varieties that shattered could perhaps be tramped out more readily. Planting for machine harvest and at higher

fertility required that our varieties have greater standability as well as an ability to hold their seed for several weeks after reaching harvestable maturity.

"Foliar diseases and root-knot nematodes were recognized as factors limiting yield as research on variety development began in the South. Consequently parents were selected to contribute resistance to major disease problems. Less attention was given to disease resistance in the North until phytophthora rot was recognized as a problem in the area of northeast Indiana–northwest Ohio in the early 1950's. Breeding programs were modified to permit incorporating resistance to phytophthora rot. Several varieties were modified by back-crossing. Harosoy 63 and Clark 63 were among the first phytophthora rot resistant varieties to be released.

"Breeding varieties with resistance to phytophthora rot continues to receive major attention in the central south as well as the north central region. We now recognize nine races of the organism causing phytophthora rot. The variety Tracy is resistant to all of these races. However, additional isolates have been found which will kill Tracy when the hypocotyl is inoculated in the greenhouse. Thus the plant breeder must be continually alert to new strains of pest problems.

"Identification of the soybean cyst nematode in North Carolina in 1954 has made it necessary for plant breeders to search the germplasm collection for sources of resistance. A productive resistant variety was supplied to Foundation Seed Stocks organizations in four states within 10 years after a source of resistance was identified. Second cycle varieties such as Forrest and Centennial not only had good resistance to the more common forms of cyst nematodes, but are top producers in the absence of cyst nematodes. However, as cyst resistant varieties came into production we recognized another strain of the cyst which reproduced readily on varieties such as Forrest and Centennial. Another search for resistance had to be made and a new program initiated to incorporate this resistance. The variety Bedford, resistant to the newly recognized strain of cyst nematodes as well as the old, was released in 1977.

"Although resistance to cyst nematodes is important for a variety to be grown on infested soil, it now appears that much of the yield depression attributed to cyst nematodes in the central south, is the result of low fertility resulting from continuous cropping of soybeans with inadequate fertilization.

"In order to make progress in developing more productive soybean varieties, the plant breeder must recognize factors which limit yield. The physiologist has offered little assistance in identifying factors which would contribute to increased yield. Thus, incorporating resistance to pest problems has been one of the major approaches for improving seed yields or reducing the hazards to production. Pest problems have offered greater limitations to production in the South than in the North.

"In addition to resistance to fungi, bacteria, viruses, and nematodes, we have also identified good resistance to foliar-feeding insects. No varieties have been released from this program, but progress is well underway. We have recognized a considerable range in rate of insect development among varieties now in production.

"Loss from stink bug feeding is severe in some areas each year. Feeding by the stink bug on the developing soybean seed may cause the pod to fail to develop or for the seed to be of lower quality. The grower suffers a loss in yield and frequently a lower price. The stink bug transmits a yeast fungus on its mouth parts which causes much of the problem in the seed. We have identified a soybean strain which appears highly resistant to the yeast fungus when it is introduced into the developing seed. Work is underway to transmit this quality to productive varieties.

"Seed quality is frequently a problem where varieties mature under conditions of high temperature and frequent light rains. An impermeable seed coat character has been transferred from the wild soybean to a productive cultivated type. Pilot studies show greatly reduced deterioration in the field. The normal harvesting operation gives sufficient scarification for most of the seed to germinate. Further scarification will occur in seed processing and handling.

"At times we read that the germplasm base for soybean varieties is narrow and thus our varieties are vulnerable to destruction. Variability in itself does not insure protection. High levels of resistance to pest problems are usually rare and must be identified in carefully conducted research programs. Once the resistance is identified it must be transferred to a productive type in a well managed breeding program. For example, in developing a variety with resistance to race 4 of the soybean cyst nematode, we screened over 35,000 F2 seedlings in 3 cycles of a modified backcrossing program to obtain 125 agronomically desired types for advancing to replicated tests for yield evaluation.

"Many germplasm lines have been used in breeding programs. Unless a specific quality is obtained or high productivity they are not continued in the breeding program. It is the lines with the Lincoln or Lee backgrounds that give the productivity. There is no reason for a farmer to select a variety with a 10% lower yield level just to achieve diversity, since diversity in itself offers no protection. In the U.S. we have people of many backgrounds. With an outbreak of influenza we see little protection from diversity.

"Where protection is needed we do have diversity, but this diversity was identified and incorporated in a planned program covering a 30-year period. The variety Forrest has in its background several strains from northeast China, two strains from south central China, plus strains from Korea and Japan. However, Forrest is widely accepted because of its productivity, not because of its diverse background. Forrest is resistant to two species of root-knot nematodes, two races of soybean cyst nematodes, reniform nematodes, to the major

foliar diseases that we have in the South, and has a moderate level of resistance to phytophthora rot.

"Progress has been made in developing highly productive types higher in protein and lower in oil than the general trend of varieties in production. These types may have a place in our production program should sunflower, palm oil, or other oilseed crops be greatly expanded. High protein types may also have a specialty market for direct food uses.

"Interest has been expressed in greatly modifying soy oil composition. The variability within the soybean germplasm collection does not offer promise for rapid progress in this regard.

"Any variety developed by a plant breeder must be productive if it is to be grown. At times appearance factors may influence acceptance. However, we must realize that U.S. markets frequently offer discounts, never premiums. Thus, however seed composition may be modified, seed yield cannot be sacrificed. Similarly as we build in protection against pest problems, yield cannot be sacrificed.

"Soybean varieties have been available for production in the northern latitude of the U.S. for some time. This year we will have several thousand acres of soybeans grown in the Rio Grande Valley [of southern Texas]. This gives us a series of productive varieties covering a latitude range of about 48º to 26º. As the plant breeder develops more productive varieties, he must have the help of other disciplines in identifying factors which limit productions. As these limiting factors are identified, then our germplasm collection becomes an even more valuable asset as a place to search for characters which can permit us to improve our breeding material.

"Variety development is a continuous building program. As new limiting factors are recognized the character to correct these factors must be added, not substituted for other desired qualities. In the past 30 years the number of soybean breeders has increased manyfold. However, we will probably continue to depend on a few moderately well financed research centers for major varietal improvements." Address: ARS, SEA, USDA, Delta Branch Exp. Station, Stoneville, Mississippi 38776.

1215. Scott, Walter O. 1979. Cooperative extension efforts in soybeans. In: R.W. Judd, ed. 1979. 50 Years with Soybeans. Urbana, IL: National Soybean Crop Improvement Council. 86 p. See p. 64-67.

• ***Summary:*** The Smith Lever Act officially established the Extension Service in 1914. But prior to 1914 the word "extension" was already an accepted word at U.S. colleges. Cornell [Ithaca, New York] had established a Department of Extension in 1900. Illinois organized an extension staff in 1901, and these people worked through Farmers' Institutes.

William J. Morse "probably deserves more credit than any other one person for the establishment of soybeans in the U.S. Even though he was a member of the USDA research staff, he was a tremendously effective extension educator... I have heard the late J.C. Hackleman talk about him on many occasions. In 1974 Martin Weiss wrote Dr. Howell the following: '... on rare occasions he (Morse) would let his hair down and describe some of the early experiences– how he would take a few bushels of soybeans with him as he traveled by train into the southeast; how he would hire a spring wagon and team of horses at the livery stable and strike out across country; how he would induce them to plant a few rows from the seed he had.' This is how he found some of the strong cooperators, such as the family at Monetta, South Carolina.'" Note: In 1936 a soybean variety was named "Monetta."

The "beginning of real acceptance of soybeans by American farmers started in the late teens. Notes made by J.C. Hackleman state that the soybean acreage in Illinois increased from 500 acres in 1914 to 3,288 acres in 1919. The persons who are linked with the early history of soybeans were mostly on the job before 1929 and had already fallen in love with soybeans. By 1929 they had developed their extension education program to promote soybean production. In the Midwest these would include the familiar names of J.C. Hackleman in Illinois, Keller Beeson in Indiana, Ed Dyas in Iowa, and George 'Soybean' Briggs in Wisconsin." In the early days you had to sell soybeans to farmers. These extension pioneers were "soybean evangelists."

"The popularity of soybeans really took an upward turn in about 1920. The first Corn Belt Soybean Day was held on the Fouts Brothers farm near Camden, Indiana, September 3, 1920. Over 1,000 people from Indiana, Ohio, Illinois, Michigan, Wisconsin, Kentucky and the USDA attended. The following year the second annual Soybean Day was held on the A. P. Meharry farm on which there were 400 acres of soybeans, of which 300 were for seed and hay, and 100 acres of corn. This farm was near Tolono, Illinois. About 1600 attended that meeting... As you might expect, Morse was at both of these events. The National Soybean Grower's Association was organized at the Fouts farm in 1920. The name was changed to American Soybean Association in 1925.

"An extension educational program needs practitioners-farmers who believe in the program. The late J.C. Hackleman mentioned two farmers more than any others; these were W.E. Riegel of Tolono, Illinois and John T. Smith also of Tolono. There were many others including Frank Garwood and T.H. Lloyd."

Also discusses: Dr. W.L. Burlison and Dr. C.W. Woodworth of Illinois, soybean research dealing with fertility and cultural practices, soybean hay, extension work on inoculation and soybean variety demonstrations in Illinois. A note attached to a page of a 1922 report said that Charles Vulgarnot furnished the first load of soybeans to the A.E. Staley Company in Decatur. Staley processed the beans

and reported it was not successful–they gummed up the machine."

Since World War II the nature of extension work with soybeans has changed to providing farmers with the most recent research information.

Two men who were not members of any state extension staff but who have had a tremendous influence on the acceptance and use of soybeans in the USA are Ward Calland (first director of the National Soybean Crop Improvement Council) and Bob Judd (who currently holds that position). Address: Univ. of Illinois.

1216. Shurtleff, William. 1980. Notes from INTSOY Short Course in soybean processing, SANA Conference (Urbana, Illinois), and subsequent research trip. Lafayette, California: New-Age Foods Study Center. 143 p. Unpublished manuscript. 28 cm. Spiral bound.
• ***Summary:*** This five-week INTSOY short course at the University of Illinois at Urbana began on 16 June 1980. Contents: Introduction (John Santas, Tom McGowen, Dr. Siedler, D. L.S. Wei). Tour of Food Science Lab. History of INTSOY, by Dr. Thompson. Soybean nutrition, by John Erdman. Soybean grading methods, by D. Wei. A.E. Staley Mfg. Co., by Hank Parker. Soybean oil and margarine, by E.G. Perkins. Soybean crushing, by Ross Brian. Soybean agronomy, by Bill Judy. Antinutritional factors in soybeans, by Dr. Wei. Harvesting, drying, and handling raw soybeans, by Gene Shove. Field trip to University of Illinois agricultural machinery dept. Soybean nutrition, by Barbara Klein. Livestock feeding, by Don Bray. Processing whole soybeans for food, by Dr. A.I. Nelson. Ralston Purina Co. and soy protein isolates, by Dr. Kolar. Film titled "Protein for People" from Ralston Purina.

Third week: Margarine, by Dr. Wei. Quality control of soy protein products, by Dr. Wei. Field trip to Kraft Foods Humco plant in Champaign, Illinois (Margarine, Vegemite). Wenger, extrusion cooking, and textured protein foods, by Randy McDonald. Low-cost extrusion cookers and cooking, by A.I. Nelson. Field trip to Lauhoff Grain Co. (good manufacturing practices). Drying foods, by Dr. Wei. Soya in Third World countries, by Dr. Thompson.

Fourth week: Soybean dal, by Dr. Nelson. Visit to Ted Hymowitz who is writing a book on the history of soybeans (p. 56). Sensory evaluation, by Dr. Tobias. Oriental soyfoods, by Dr. Wei.

Fifth week. Soymilk, soy yogurt, and soynuts, by Dr. Nelson (Kibun). Griffith Laboratories, by Ann Daniels (incl. history, HVP, soy protein concentrate, TVP). Home and village level production of soybean foods, by Dr. Nelson. Soy flour and soy fortified baked goods, by Dr. Cho-Chen Tsen of Kansas State Univ. Soybean crushing, soy flour, and plant sizes, by Sheldon Williams.

Shurtleff research trip. Visits to ADM and A.E. Staley Mfg. Co. in Decatur, Illinois, American Soybean Assoc. in St. Louis, Missouri (Read William Morse's 1929-31 journal of trip to East Asia). Talks with David Hildebrand, Mike Tarano. Address: P.O. Box 234, Lafayette, California 94549.

1217. Thalman, Margaret Morse. 1980. Re: William J. Morse, her father. Letter to William Shurtleff at Soyfoods Center, Aug. 26. 2 p. Handwritten.
• ***Summary:*** "It has taken me a few days to locate some articles and photos that I think you could use. [While in East Asia] We made copies of articles from several publications of various dates. Most of the photographs were glued into scrapbooks and I was hesitant about taking pages from them to send to you. However, I found a few loose photos that I hope will do."

"I am very impressed at how much the soy foods industry has progressed these past few years.

"It might interest you to know that one of my grandsons, Michael Morse Garrison, was allergic to cow's milk as an infant and had to have soy milk. My father would have been very pleased to know how all his exploration and research helped his great-grandson." Address: 22 Interlaken Rd., Eastchester, New York 10709.

1218. Thalman, Margaret Morse. 1980. Memories of her father, William J. Morse (Interview). Conducted by William Shurtleff of Soyfoods Center, Sept. 18 and Oct. 3. 1 p. transcript.
• ***Summary:*** William Morse, her father, as born on 10 May 1884 in Lowville, New York (upstate). His father was a butcher. W.J. Morse's wife, Edna, went on the trip to East Asia, as did Margaret, who was an only child. Edna kept diaries for her daughter and wrote down what happened every day–in child's language such as "Played in the park."

William Morse wrote much of the book about soybean foods that he hoped to publish. He wrote it by hand on yellow lined paper; it was never published and she has sent the manuscript to the American Soybean Association.

During World War II W.J. Morse was under a great deal of pressure. A great many people called on him for information. He first became aware that he had an ulcer in about 1943, and this affected his diet. He lost a lot of weight (you can see it in the photos of him from that period) and he had to go on a "baby food diet." He ate soft, bland foods including soymilk, tofu and acidophilus soymilk and yogurt. He bought soyfoods at the Seventh-day Adventist health food store in Takoma Park, Maryland–including the soy ice cream he loved. She does not recall that he ever made tofu or soymilk at home.

After returning from their two years in East Asia, he and his wife used soyfoods regularly in their diet. He liked very much to make sukiyaki for dinner, especially for guests or special occasions. He had a low sukiyaki table made by having the legs cut of a regular table. Everyone would sit on cushions on the floor, with an electric hot plate on the table.

His sukiyaki recipe always included tofu.

He and his wife liked to put soy flour in homemade breads and waffles. He did not eat a lot of meat but neither was he a vegetarian. He ate Boston baked soybeans when his wife fixed them.

William Morse bought the house in Tacoma Park, DC, in 1917 and lived there until he retired, shortly after which he and his wife moved to Eastchester, New York, where he lived the rest of his life.

He spent the last ten years of his life writing his book (from time to time she typed up his notes), doing lots of gardening and reading, and writing many letters. He kept in touch with the world of soy.

His office, where he had shelved with packaged soyfoods, was in Washington, DC. He did not move his office to Beltsville until about 1939–when all of USDA moved there.

Note: P.H. Dorsett was born on 21 April 1862. So at the time the expedition first arrived in Japan he was age 67. Dorsett had a grown daughter.

"William Morse was a gentle, soft-spoken person, who liked others and they liked him. He liked to tease, and the secretaries at his office all loved it. He was a very easy person to get along with; he was slow to anger and never cursed. He wasn't aggressive; where some might push, he would give in. He was intelligent. His work came first. He was not financially ambitious." He was a rather heavy cigarette smoker. His daughter remarked that "If anything upset him, he didn't let it out on his fellow workers."

"His friends and co-workers called him "Bill." His family called him "Will."

She still has her diaries and some of her father's small notebooks of the trip plus many photographs glued into scrapbooks. She has no files of his left; she sent them all to the American Soybean Association.

Verna Donavan was W.J. Morse's secretary at USDA starting not long before he went to the Orient to study soybeans. After Morse returned, when the Bureau of Home Economics became interested in soybeans, the two of them were often asked to come over and to taste the soybean dishes they had prepared.

Update. 2004. April 14. She has a book that was given to her father when he retired from USDA. In it are letters from many companies (cereal companies, oil companies, etc.) praising his work. It also has letters of praise from his co-workers and his superiors. Address: 22 Interlaken Rd., Eastchester, New York 10709. Phone: 914-632-2508.

1219. 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.).
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.

1220. 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 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.

1221. Weiss, Martin G. 1980. Re: Recollections of William Morse and work with soybeans (Continued–Document part II). Letter to William Shurtleff at Soyfoods Center, Sept. 26. 3 p. Typed, with signature.
• ***Summary:*** (Continued): "You may enjoy just a bit of irony. After the collections made by W.J. and Dorsett, Japan overran China. After World War II when we were on friendly terms with China, we were told that the Japanese had mandated that standard varieties would be grown throughout

and many of the village varieties were lost. We then had requests for seed of some of their old varieties–and Dorsett's and W.J.'s accurate notes enabled us to replace some of the varieties lost to China!

"Back to W.J. While in the Orient he became very fond of Chinese and Japanese foods. He brought recipes back. When I was invited to his home in Takoma Park, D.C., he took delight in preparing the Japanese dish, Suki Yaki [sukiyaki], on a grill while we were sitting at the table–just like the Japanese girls do in Tokyo. And, it was just as delicious as the Suki Yaki I've eaten in Tokyo!

"Every year, W.J. would make a field trip–to the State Agricultural Experiment Stations with an interest in soybeans. In the early days he would allocate a small amount of Federal funds to each State who wanted to try soybeans–just a little 'seed money.' He looked forward to those trips, and, particularly when he acquired assistants stationed in the States. He would take us along to visit the adjoining States.

In his capacity as 'Soybean Project Leader,' he was just that. He was never dictatorial, never demanding. As long as his employees were 'trying' he seemed satisfied. You were on your own. If asked advice he would give a kindly opinion. He dearly loved to visit 'his boys' as he called us.

"Every winter 'his boys' would gather at Urbana [Illinois] to survey plans for the ensuing year, and he liked nothing better than to spend an evening with 'his boys.' The ideal evening–meet in a bar and have a few drinks (his chief assistant, Mr. Cartter, was a Christian Scientist so he was never invited) and then to a Chinese restaurant for an oriental dinner.

"A personal note (may help you)–his wife [Edna] was diagnosed by 'us boys' as being very dominating, unfriendly, and almost anti-social. She seemed 'severe.' We thought she dominated W.J. That's why he loved his field trips and an evening with his boys–he could, and did, relax!

I've rambled on and on. But it may serve to give you background. In summary, W.J. would never rank high in this era of forceful and domineering executives. He was a kindly man, always willing to encourage and give moral support to his subordinates. He was loved by all, and his employees worked hard–they never wished to disappoint him."

Sincerely,..."

Note: Talk with Martin Weiss. 1980. Oct. 4. I should visit the USDA National Agricultural Library in Beltsville, Maryland. While there, find out where Morse's films and the original report of his 1929-31 trip to the Orient are located.

Weiss was a youngster compared with Morse; they all called him 'Mr. Morse.' "We looked up to him too much–with respect or reverence or something like that.

Morse's office in Beltsville had no maps on the walls. It did have "a raft of files and many food samples. A typical government office."

Weiss knew that Morse smoked but was not aware that he was a heavy smoker.

Weiss was a professor of plant breeding and genetics at Iowa State University; that's important. Address: 11122 Emack Rd., Beltsville, Maryland 20705.

1222. Strayer, George M. 1980. Re: Memories of William Morse. Letter to William Shurtleff at Soyfoods Center, Oct. 10. 2 p. Typed, with signature on letterhead.

• ***Summary:*** W.J. Morse had an ulcer. After he had retired and moved to East Chester [Eastchester], New York, Morse told Strayer that, "with his ulcer, he felt that soy foods had greatly extended his life and good health."

In East Chester, he had a vacant lot available to him between his home and that of his daughter. He grew vegetable type soybeans on that lot and froze them in large quantities. "One time when Mrs. Strayer and I were visiting Mr. and Mrs. Morse at East Chester, they served us some of the frozen green vegetable type soybeans which he had prepared. They were delicious. He prepared them in rather large quantities and ate them as a major source of protein." Address: President, Agricultural Exports, Inc., P.O. Box 266, Hudson, Iowa 50643. Phone: 319-988-4593. Cable address: Agriport. Telex: 465631.

1223. Hymowitz, Theodore. 1981. Re: Comments on manuscript History of the Dorsett-Morse Expedition. Letter to William Shurtleff at Soyfoods Center, Jan. 5. 1 p. Typed, with signature on letterhead. [1 ref]

• ***Summary:*** "My numbered comments refer to the numbers on the manuscript.

"1. In 1979, corn was the number one crop in the U.S. in total acreage and production. On the other hand soybeans were the number one cash income crop (mainly due to the fact that a high percentage of the corn is used on the farm for swine, poultry or cattle feed) and soybeans were the number one export crop in dollar value.

"2. According to George Sprague the Pentagon was constructed on the lowland part of the Arlington Farm [in Virginia]. It was built up by dredging the Potomac River.

"3. The party [on the Dorsett-Morse Expedition of 1929-31] consisted of Mr. and Mrs. Morse and daughter, P.H. Dorsett and his daughter-in-law (Ruth).

"4. The 17 [typewritten] hardback volumes primarily were the work of Dorsett. Morse kept his own log as you indicate below."

5. The Morse party returned to the United States in "March 1931.

"6. Dr. Jack Harlan questions whether Beltsville existed in 1931. Sprague believes Beltsville opened about 1939.

"7. I believe you mean varieties of commercial soybeans."

Happy New Year! Address: Prof., Plant Genetics, College of Agriculture, Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

1224. Hymowitz, Theodore. 1981. Re: Introduction of vegetable soybeans to America. Letter to William Shurtleff at Soyfoods Center, Feb. 5. 1 p. Typed, with signature on letterhead. [1 ref]
• ***Summary:*** William "Morse was the first to popularize vegetable soybeans [in the USA] and indeed the Dorsett-Morse expedition [to East Asia] introduced a great many 'vegetable type' soybeans into the U.S. However, Hahto, a vegetable type soybean was introduced into the U.S. from Japan in 1915. Vegetable type soybeans are nothing more than large seeded soybeans. Hahto seed weighs 27.8 grams per 100 seed. Morse mentions Hahto on page 7 of the U.S.D.A. Farmers Bulletin No. 1520 [April 1927]. He also mentions the variety Easycook which was first introduced into the U.S. in 1894. So please forget about Morse being the first to introduce vegetable soybeans in the U.S. Rather he recognized the potential of soybeans as a vegetable crop and introduced many such accessions into the U.S.

"There are vegetable type soybeans in China. In fact I had some in Shanghai."

Note: William Morse was aware of the suitability of the Hahto variety for use as "immature or green soybeans" as early as 1923, when he and C.V. Piper showed a photo of shelled Hahto soybeans with pods in their classic book *The Soybean* (p. 222). The caption below the photo reads: "Seeds and pods of the Hahto variety of soybeans, the seeds being especially valuable as a green vegetable." Morse was also aware of the special characteristics of Easycook and Hahto as mature or dried beans. On page 259 of the same book we read: "The Easycook and Hahto varieties need no more preparation than the ordinary bean as they cook up very readily." Address: Prof., Plant Genetics, Dep. of Agronomy, 1102 S. Goodwin Ave., Turner Hall, Univ. of Illinois, Urbana, IL 61801.

1225. Shurtleff, William. 1981. Dr. Harry Miller: Taking soymilk around the world. *Soyfoods* 1(4):28-36. Winter.
• ***Summary:*** Contents: Introduction. Growing up (1879-1902): Birth, early contact with Dr. J.H. Kellogg, marriage. Early years in China (1903-1911). Washington, DC (1912-1925). Pioneering soymilk in China (1925-1939): Research, development of plant, destruction of plant 13 Aug. 1937, U.S. patent, No. 2,078,962 for soymilk process and equipment, work before return to U.S. Introducing soyfoods to America (1939-1949): In Mt. Vernon, new products, work with AMA, American Soybean Assoc. speaker and lifetime member 1958, contact with K.S. Lo and Vitasoy. Research and work around the world (1949-1977): Quick visit to Shanghai, death of second wife, sale of International Nutrition Foundation, Taiwan work, Indonesian plant, Trinidad, Libya, Japan, old age and relationship with William Shurtleff, the "Great Man." Contains 5 photos, and a sidebar titled "Early History of Soymilk."

Among the many people who pioneered in bringing soyfoods to America and to the West, two men of great vision, dedication, and perseverance deserve special mention: Dr. Harry W. Miller and William J. Morse. Dr. Miller, the well-known 'China Doctor' (after his biography by that title), was a world-famous missionary doctor and surgeon, and founder of more than 15 Seventh-day Adventist hospitals around the world. He was one of those unique individuals who was both a dreamer and a doer, and who inspired almost everyone who knew him.

"Like W.J. Morse, he considered it his personal 'responsibility to awaken the West to the wonders of the soybean and to promote its use as food. (But where Morse was interested in soybean agronomy, livestock feeding, and food, Miller was interested only in food uses.) Dr. Miller can also be considered the founder of the modern soymilk renaissance in Asia. The development and popularization of soyfoods, and especially soymilk, was his lifelong hobby and despite his other numerous and demanding careers, he never lacked the time, over a span of almost 75 years, to continue his ongoing research and work in this new field that he loved so well.

"Growing Up (1879-1902): The first of five children of Amanda Ehlers and John Oliver Miller, Harry was born in a log cabin on a farm in the small town of Ludlow Falls, Ohio (just north of Dayton) on 2 July 1879. His father was a school teacher. He later wrote that he delighted in working on the family farm but found it 'disgusting' to have to kill and eat the animals he had raised. When he was 12, Harry's parents became Seventh-day Adventists. Two years later, after much study, at the annual camp meeting, he and a friend decided to be baptized and become Adventist church members.

"At age 15 Harry entered secondary school at the Adventist-run Mt. Vernon Academy in Mt. Vernon, Ohio. He loved the strict, puritan atmosphere, the vegetarian diet, and the teachings of the church. In 1898, at age 19, he enrolled in medical school at the newly opened, Adventist-run American Medical Missionary College in Battle Creek, Michigan, which was associated with Dr. John Harvey Kellogg's Battle Creek Sanitarium (founded in 1866), the largest and most progressive medical institution of its kind in America at that time, and the birthplace of modern dietetics. Opposing the popular cures of the day (drugs, bleeding, etc.), the sanitarium recommended diet (especially a simple grain-based vegetarian diet), exercise, hydrotherapy and good mental health as the foundations of healthful living and natural healing. These teachings had a lifelong effect on Miller.

"Working to pay his own tuition, room, and board, Miller led guided tours through the sanitarium and food factory, which forced him to learn more about the various foods (America's first meat analogs and breakfast cereals) and how they were made. Miller was deeply influenced by the personality and teachings of Dr. J.H. Kellogg, who

personally taught a number of the classes Miller attended, treated him like a son, and helped put him through college. One of America's great pioneers of both nutrition and of soyfoods, Kellogg stressed to the small class the importance of preventive medicine, nutrition, and diet. He strongly opposed the use of alcohol, tobacco, caffeine, and narcotics. Miller later noted that almost all the students in the small class lived past the age of 90; Kellogg lived to age 91, Miller to 97½ and one classmate to 101.

"Miller graduated in 1902 and was married to a classmate-doctor, Maude Thompson, the same year. During an internship autopsy, Dr. Miller cut his finger badly and suddenly contracted systemic blastomycosis, an infection considered at the time to be fatal. With deep faith he prayed to God, promising that if he were to be healed, he would go anywhere in the Lord's service. To the astonishment of his doctors, Miller was miraculously healed. This greatly deepened his faith. Shortly thereafter a call came from the Adventist church for a missionary doctor in China. Miller accepted the challenge. For the rest of his life he prayed for his patients before all operations (minor or major), and, according to others, apparently his great faith was rewarded by their recovery.

"Early Years in China (1903-1911): In October 1903, Dr. Miller and Maude, together with another physician couple, sailed for China, stopping briefly in Japan. In Kobe, at the home of fellow Adventists, Myrtle Lockwood first introduced Miller to soyfoods serving an entree called Tofu Loaf, with which Miller was particularly impressed. In China the couple went deep into the interior, near the center of Honan Province, where they found great poverty and malnutrition. They both learned Chinese, dressed like the local people, and even adopted the hair style of a long queue and shaved pate. They also ate Chinese foods, and soon Miller was visiting local tofu shops, learning about and sampling tofu, yuba, curds, soymilk, and the like. He found that tofu was much more widely consumed than soymilk, although the latter was quite widely used as a spicy hot breakfast soup and a warm, sweetened beverage. Dr. Miller later said (1961) that many Chinese and other East Asians told him that they did not drink much soymilk since they believed it caused them intestinal disturbances, which tofu did not. Perhaps this was why soymilk was not generally fed to infants-and children.

"In 1905, Dr. Miller's beloved wife died suddenly of an unknown disease. He was 26. 0ut of his deep sadness grew an even deeper commitment to help the impoverished and suffering millions of China. After a brief return to America two years later, where he married Marie Iverson, Miller returned to Shanghai. Two daughters were born in 1908 and 1910. Then Dr. Miller contracted a severe unknown disease and was forced to return to America in 1911.

"Washington, D.C. (1912-1925): Miller eventually managed to heal himself of what he later learned was a vitamin deficiency illness called sprue. During recovery he taught the Bible at Mt. Vernon Academy, his former alma mater and in 1912 his first son. Harry Willis, Jr., was born. Soon he was called to the position of medical superintendent and surgeon of the Adventist-run Washington Sanitarium and Hospital, which he developed into a Mecca for congressional leaders of the day. He became consulting physician to three U.S. presidents. In Washington he pioneered new techniques of thyroid goiter surgery, which lowered fatalities from 50 percent to about one percent. He eventually performed over 6,000 goiter surgeries around the world. In Washington he also met Dr. W.J. Morse and Dr. J.A. LeClerc, both soy pioneers from the USDA. He later wrote that these men filled him with 'inspiration, enthusiasm, and information,' and both later made frequent visits to Miller's soymilk plant in Ohio. In 1915 a fourth child, Clarence, was born.

"Prior to 1917 the Sanitarium had used a lot of dairy products on its vegetarian menus, but in that year, with World War I under way, all milk supplies from the local dairy were requisitioned by the Walter Reed Military Hospital. The sanitarium bought its own herd, but the problems that Miller found with contamination, animal disease (tuberculosis), and the like, convinced him of the need to develop a good alternative to dairy milk. In the small food plant connected with the hospital, where several soyfoods were already being produced for use in the lacto-vegetarian diet, Miller began a few basic soymilk experiments in 1925." Continued. Address: Lafayette, California.

1226. Cartter, J.L. 1981. Re: Recollections of William J. Morse and work with Morse. Letter to William Shurtleff at Soyfoods Center, March 12. 3 p. Handwritten. Preceded by a phone interview on March 9.

• ***Summary:*** Mr. Cartter first got involved with soybean research in 1928 at the Ohio Agric. Exp. Station farm, Holgate, northern Ohio; his work was to evaluate soybean introductions under northern Ohio conditions. He first came under William Morse's supervision in the fall of 1929 when Morse placed him on an Ohio Experimental Farm, Elyira, Ohio, to work on soybeans. He was Mr. Morse's only employee on soybean production research. At the time, Morse was in charge of all USDA's forage legume research. In 1933 the Ohio research, including a chemical laboratory, was transferred to Arlington Farm. In 1936, when the U.S. Regional Soybean Laboratory was organized at the University of Illinois at Urbana, he first became in charge of the soybean breeding program for the 12 midwestern states.

It has been said that many of the more than 6,000 soybean varieties that Morse brought back from East Asia during 1930-31 were lost, discarded, or not grown out. This is not true. Morse grew out and carefully evaluated all varieties at Arlington Farm, and he (Cartter) did the chemical analysis on many of these soybeans. He had a couple of men growing them out at the farm. The good varieties were

kept and later distributed to agricultural experiment stations throughout the USA for further evaluation and industrial use. "The U.S. soybean germplasm was consistently maintained prior to, during, and after World War II. I know; I helped to do it."

During the early years, small packets of seed, including the vegetable types, were distributed to farmers for growing. Of the poor ones, small packets of seed were kept, but they had to get rid of some material. They were not lost. He has been retired for 15 years.

Note: This letter follows a letter containing 4 questions sent to Cartter by Wm. Shurtleff on 27 Feb. 1981 and a brief interview with Jackson Cartter on 9 March 1981 (see transcript). Address: 108 W. George Huff Dr., Urbana, Illinois 61801. Phone: 217-344-5235.

1227. Howell, R.W. 1981. Soybean germplasm collecting and collections (Interview). Conducted by William Shurtleff of Soyfoods Center, March 13. 1 p. transcript.

• ***Summary:*** Discusses the fate of the soybeans collected by Dorsett and Morse in East Asia, then grown out by Weiss and Cartter. The ancestry of almost all of the northwestern soybean varieties was collected by Dorsett on his 1924-1926 trip. Yet none of the seeds that Morse brought back became major ancestors [except for green vegetable type soybeans].

Martin Weiss said that lots of soybean introductions were grown out once and then discarded, or lost–but Jackson Cartter disagrees. Weiss took over the collection from Morse and was the one who began to really give it some permanence. He was leader of the work when the collections were established at Urbana (Illinois) and Stoneville (Mississippi) in their present form. So he knew what types of problems emerged. Cartter did the actual growing out. Howell doubts that any soybeans with any potential would have been discarded–just because it didn't look too good in the field–unless it was duplicate material. Plant breeders don't throw away stuff. Richard Bernard and Edgar E. Hartwig cleaned up the collection.

The first chromosome map of soybeans was made by Dr. C.M. Woodworth in the early 1930s [1933], at which time breeders and geneticists were already aware of genes, gene linkages, etc. It is possible that soybean seeds stored during World War II failed to germinate later. Weiss and Cartter are speaking from two different vantage points. Weiss was in the army in World War II. He hadn't worked with soybeans in Washington, DC, or at Arlington Farm [in Virginia] until after the war. He had to pick up all the loose ends. Cartter was working in Urbana throughout World War II; he grew out everything he had. Weiss saw the problem. That was the time [1939] the farm and USDA's main operations were moved to Beltsville, Maryland [which is about 7 miles northeast of Washington, DC]; USDA had some operations in Beltsville in the mid-1930s. The farm still has 5,000 acres in Beltsville, including fruit trees and livestock.

In 1974 Dr. Richard Bernard was a member of the of the first group of 10 agronomists that went to China, not specifically for the purpose of collecting seeds or germplasm, however they did get a few soybean seeds–about 5-6 varieties. Walter Fehr (Dep. of Agronomy, Iowa State Univ., Ames) and Kuell Hinson (USDA and Univ. of Florida Dep. of Agriculture) did travel to China to collect soybeans. None, including Hymowitz, brought back very much. Hymowitz thinks he laid the groundwork for us to get all of the things in the Chinese current systematic soybean collection nationwide in 2-3 years–some 9,000 to 10,000 accessions. Only some of these soybean varieties will be new, but we expect a large number we don't have. Address: Dep. of Agronomy, Univ. of Illinois.

1228. Strayer, George M. 1981. Re: History of the American Soybean Association, and of soybeans in America. Questions answered on Soyfoods Center letterhead (dated 23 March 1981). 1 p.

• ***Summary:*** Mr. Strayer answered 6 specific questions: (1) Strayer believes that William Morse was the first editor of the *Proceedings of the American Soybean Assoc.* When Keller E. Beeson (of Lafayette, Indiana) took over as secretary of ASA [in Sept. 1936] he also assumed editorship of the Proceedings.

(2) After graduating from college in 1932, George Strayer returned to the family farm and went into partnership with his father in the farm operation and the farm seed business which he conducted on the farm. His father was elected to the ASA board in the early 1930s; George was elected to the board in 1937.

(3) George did not work for ASA full time after 1940. He also served as secretary-manager of Associated Hybrid Producers, an organization of hybrid seed corn producers–in which capacity he still serves. In 1937 he had started to edit a magazine published by the Associated Hybrid Producers, and this experience was very valuable as he began to edit and published *Soybean Digest* in Nov. 1940. He also retained his interest in the farm operation and seed business, but did not actively work on those jobs after taking the ASA job–which was a part-time job at $50/month.

(4) Where was ASA's first office? "When I first took the ASA job I had already established an office in a former grocery store building in Hudson, so ASA shared the space for the first few years. In 1945, while I was in the Army, the office was moved to another building her in Hudson, where it remained until ASA built its own office building in 1964. My wife served as ASA secretary while I was in the Army."

(5) At the annual ASA conferences, each person paid a registration fee, which included the banquet cost. Each person took care of arranging his or her own living costs–there was no subsidization.

(6) In 1949 George Strayer and Jack Cartter took part in a 5-week ECA (Economic Cooperation Administration)

mission to Europe. The ECA was the first operational unit of the Marshall Plan, and his was the first technical assistance team sent outside the USA under the Marshall Plan. Their mission was to study the possibilities of soybean production in northern European countries, and particularly the possible expanded used of soybeans as a source of protein in human nutrition. Address: President, Agricultural Exports, Inc., P.O. Box 266, Hudson, Iowa 50643. Phone: 319-988-4593.

1229. Shurtleff, William. 1981. William Morse: The father of soybeans in America. *Soyfoods* No. 5. p. 56-60. Summer.
• ***Summary:*** The most detailed biography of William Morse (1884-1959) written to date. "America now occupies the enviable position of producing more soybeans than all other countries in the world combined, some 62 percent of the total output. And our country is increasingly the center of innovation in soyfoods research, development, and marketing. What caused this remarkably rapid transformation of the soybean from a virtually unknown Oriental curiosity as recently as 1910 to America's largest cash crop, export crop, and total acreage crop in 1979? Of course many factors have played their part; the vast and flat expanses of fertile Corn Belt cropland, a good climate, an efficient and mechanized farming system, to name but a few.

"But the soybean could never have started its rise to fame in America without the help and bold initiative of a small group of men, truly men of vision and courage, who saw possibilities when the rest of the country scoffed, and who were willing to work and persist for a cause in which they believed deeply. Foremost among these men was William J. Morse who, more than any other man, has made America the soybean center of the world. During a career spanning 42 years and with great singleness of purpose, he focused his entire life on popularizing soybeans and soyfoods in America. He wrote the first major book in English on soybeans, introduced some two thousand soybean varieties and strains from East Asia, including large-seeded vegetable-type soybeans, did extensive research on East Asian soyfoods and helped introduce them to America, and was a great source of inspiration to all who knew and worked with him.

"Early years (1884-1929): William Joseph Morse was born in Lowville, New York, on May 10, 1884, the son of John Baptist Morse, a butcher shop owner. He attended Lowville Academy, then in June 1907, received his Bachelor of Science in Agriculture degree from Cornell University. Two days later he went to Work for the U.S. Department of Agriculture (USDA) in the Division of Forage Crops and Diseases, Bureau of Plant Industry just at the time the Bureau was planning to carry on research in the growing of soybeans.

"At the Bureau, Morse, then 24 years old, was assigned work under Dr. Charles Vancouver Piper, who was to have an immense influence on the rest of Morse's life. Born in 1867 and then 40 years old, Piper was head of the USDA's Office of Forage Crops. Often referred to by his colleagues as "The Prophet," Piper was the first man to see clearly the potential of the soybean in America. A dignified, handsome, and austere plant scientist with great talent and drive, Piper was at once a practical farmer, and a theorist, philosopher, and dreamer. He was looking for a way to attract attention to the soybean, which had laid dormant in America for over a century, and to give it the impetus for growth. When Piper met Morse, a shy, gangling, studious young man from New York state, fresh out of college but with great energy and the adaptability of youth, he knew he had found his man. Morse became Scientific Assistant in Forage Crop Investigation within the Bureau of Plant Industry, Washington, D.C., and was assigned to grow and test a dozen or so distinct varieties of soybeans at Arlington Experimental Farm, located across the Potomac River in Virginia (on land on which the Pentagon now stands). Although he didn't have much to start with, Morse took his assignment seriously. Soon he was even spending his evenings and weekends selecting and propagating his soybeans. Dr. Piper often joined Morse at his work.

"Young Morse was eager to share the fruits and discoveries of his work with farmers. As soon as he had several bagfuls of good soybeans, he would take them to the Carolinas by train. North Carolina was America's largest soybean-growing state at the time, but most of the beans were still grown for hay or forage. There he would go to a livery stable, rent a spring wagon and horses, and set out across the countryside. Whenever he saw a farmer in the fields planting corn or hay-type soybeans, he would tether his horses to a fence post, climb over the fence, and visit the farmer. If the farmer was interested, Morse would give him enough soybeans to plant a few rows to determine their productivity. That was the beginning of growing soybeans for beans rather than for hay or forage. As early as 1914 Morse made a journey through the southeastern U.S. to study the feasibility of cottonseed mills launching a soybean crushing industry. He found the time too early. He soon became head of the USDA Office of Soybean Investigations and was in charge of developing soybean varieties in the 12 midwest states and the southern states.

"Piper's first writing on soy was a 16-page article entitled 'Soy Beans,' published in 1909 with co-author H.T. Nielsen. The only mention of soybeans as foods stated that, 'Their flavor, however, does not commend them to Caucasian appetites and thus far they have found but small favor as food in either Europe or America.' Piper also noted that they had been tested as a forage crop at most of the state agricultural experiment stations in the southeastern U.S. In 1910 Piper and Morse coauthored 'The Soybean: History, Varieties, and Field Studies,' an 84-page booklet; it contains no mention of food uses. This was Morse's first publication on soy. In 1911 Piper went to India and, among other things,

brought back to the U.S. 108 varieties of soybeans from different parts of the country. In 1914 Piper published 'The Name of the Soy Bean: A Chapter in its Botanical History,' in the Journal of the American Society of Agronomy. And in 1916 they coauthored 'The Soybean with Special Reference to its Utilization for Oil, Cake, and Other Products.' Other of Morse's early writings included 'Harvesting Soybean Seed' (1917), 'The Soybean Industry in the United States' (1918), and 'The Soybean: Its Culture and Uses' (1918). In the latter article he wrote: 'Until 1916 the soy bean had been used but little in the U.S. for food and only as a special diet for persons requiring foods of a low starch content. Much interest has been shown in the last two years in the possibilities of the soy bean for food. The USDA and many schools of domestic cookery and science have conducted successful experiments using the dried beans in the manner of navy beans and green beans when three-fourths to full grown as a green vegetable. The variety and palatability of the forms in which the bean can be served make it a very desirable article of food, and undoubtedly it will grow in favor as it becomes better known. Soybean meal and flour may be used as a constituent of bread and muffins and in pastry. Soy oil is utilized to a very considerable extent in Europe and America for culinary purposes.' A definite change in attitude had taken place since Piper's first article nine years earlier. Throughout his career, Morse also wrote numerous articles on other crop plants including azuki beans, alfalfa seeds, hyacinth beans, cowpeas, velvet beans, mung beans, peanuts and hay. By far the most important fruit of Piper and Morse's joint writing efforts was their classic, *The Soybean,* published in 1923 by McGraw-Hill and reprinted (unrevised) in 1943 by Peter Smith Co., New York. This 329-page work contains a 40-page chapter with 26 photographs from East Asia on soybean products for human food, plus an additional 20 pages of Western-style soyfoods recipes (developed for Morse by the USDA Office of Home Economics in Washington, D.C.), and a most valuable bibliography containing 500 entries on all aspects of the soybean, including most of the earliest English-language research papers on soyfoods published before 1922." Continued. Address: Soyfoods Center, P.O. Box 234, Lafayette, California.

1230. 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 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.

1231. Shurtleff, William. 1981. William Morse: The father of soybeans in America (Continued–Part III). *Soyfoods* No. 5. p. 56-60. Summer.

• ***Summary:*** Continued: "Later years in America (1931-1959): Morse returned to America in March 1931 with great enthusiasm and interest in transmitting to America all that he had learned in East Asia. He was now a principal agronomist at the USDA Bureau of Plant Industry. With the stage set for the fruition of years of work and research that would transform the place of the soybean in the Western world, let us pause for a minute to ask, 'What kind of a man was Bill Morse?'

"In appearance, he was tall and lean, with a kind face and soft features. Farmers all over America, with whom he had met and talked in their fields, might remember his baggy suspendered pants, loose tie, and slouched hat, his great interest in their problems and successes.

"George Strayer, editor for 27 years of the American Soybean Association's *Soybean Digest,* who had known Morse since 1927, said of him: 'He was a quiet, unassuming, yet brilliant fellow, not particularly dynamic as a speechmaker, but intensely interested in seeing soybeans progress. He would sit up half the night talking with people about soybeans and soyfoods.'

"An article by Mary Burr Pieters in the September 1944 *Soybean Digest* described Morse as 'modest and retiring but sure and right as rain... He studied, he traveled, he toiled, he experimented–he exhorted–and the result of all of this singleness of purpose and devotion surely borders on fantastic.'

"Edward J. Dies, his close colleague, described him in Gold from the Soil as 'heedless of material gain or personal honor, shy, modest, agreeable, and easy going, but with the repressed intensity of a crusader.' Martin G. Weiss, who worked under Morse for many years and succeeded him when Morse retired, said of him: 'He was a kindly man, always willing to encourage and give moral support to

his subordinates. He was loved by all, and his employees worked hard–they never wished to disappoint him.' His daughter Margaret described him in 1980 by saying: 'He was a gentle, soft-spoken person, who liked others and they liked him. He liked to tease, and the secretaries at his office all loved it. He was a very easy person to get along with; he was slow to anger and never cursed. He wasn't aggressive; where some might push, he would give in. He was intelligent. His work came first. He was not financially ambitious.'

"After returning from East Asia, Morse was more interested than ever in soyfoods, and much of the subsequent increasing interest in America derives from his efforts. He expanded his work with the USDA Office of Home Economics in Washington, D.C. and interested researchers in the Department of Home Economics at the University of Illinois to get involved with research on soyfoods, especially on use of the large-seeded, vegetable-type soybeans he had brought back from East Asia. He encouraged development of soyfoods recipes suited to American tastes and talked a lot about soyfoods at American Soybean Association meetings and many other gatherings. Working with others, he was largely responsible for the development of soy flour and grits. One entire wall of Morse's Washington office was covered with floor-to-ceiling shelves, filled with soyfood samples from Asia.

Except for Dr. Harry Miller, Morse was probably the first soy researcher in America to make soyfoods a regular part of his diet. While in East Asia, he and his family had become very fond of Oriental cooking, and especially of soyfoods, and they enjoyed them often after returning to America. Of the many recipes they brought back from the Orient, Morse's favorite was sukiyaki. He built a low sukiyaki table with a hot plate on top and cushions around it on the floor in his home and at every opportunity would invite over guests to serve them his specialty which of course featured tofu and sprouts. He also liked to take family and friends out to a good Chinese or Japanese restaurant. The family enjoyed using soy flour when making breads, muffins, or waffles. Morse's mother [Edna] liked to cook him fresh green soybeans and his wife regularly fixed him her favorite Boston Baked Soybeans. Morse loved soymilk ice cream; one magazine ran a full-page photo of him happily eating it. He also regularly enjoyed tofu, soymilk (plain and acidophilus), and soymilk yogurt, and these foods became increasingly important in his largely meatless diet after he found he had an ulcer. In fact he once told George Strayer that, with his ulcer, he felt these soyfoods had greatly extended his life and good health.

"Morse also actively continued his soybean selection and propagation work at the Arlington Farm. He realized more than ever that if the soybean was to become a national crop that hundreds of different varieties, adaptable to different latitudes, soils, and climates, would have to be found and developed by breeding. He was especially interested in working with farmers and the USDA to stimulate research and development on the vegetable-type soybeans, which had been little more than a curiosity prior to his trip to East Asia. While Morse was the first to popularize the vegetable-type soybeans, he was not the first to introduce them. The variety Easycook (which took less than half as long as most field-type soybeans to become tender after boiling) was introduced to the U.S. in 1894 and the Hahto was introduced in 1915. Morse mentioned both of these in *The Soybean* in 1923 but did not mention the term 'vegetable-type soybeans,' and was apparently unaware of their significance. Many of the vegetable-type soybeans that Morse brought back from East Asia were grown out and starting in 1934, distributed to various state agricultural experiment stations for trial.

"Up until 1928, Morse, in charge of soybean research, had been the only USDA employee working full time in this field. In 1928 the USDA hired a second full-time soybean researcher, Jackson L. Cartter, who had just graduated with a master's degree from Iowa State College. From 1928 to 1933 Cartter did soybean research on a farm in Holgate, Ohio that was managed by the Ohio Experiment Station. From 1933 to 1936 Cartter worked directly under Morse at the USDA Experiment Station, Arlington Farm, Virginia; he tested, grew out, and classified many of the soybeans from Morse's trip to East Asia. In 1936 Cartter helped to organize the U.S. Regional Soybean Laboratory at the University of Illinois. He became the first director of its agronomic division and was placed in charge of the soybean breeding program for the 12 Midwestern states; he studied the soybean's oil and protein composition, and served as director of the laboratory until his retirement in 1965.

"Unfortunately the long-term results of Morse's collection efforts in East Asia are not what they might have been. It was estimated in 1980 that only 25,000 acres of the 70.1-million-acre U.S. soybean crop were planted in vegetable-type soybeans, a mere 0.04 percent of the total. They have never become popular here for various reasons; they give 20 to 30 percent lower per-acre yields than field-type soybeans, tend to shatter easily at maturity and are thus hard to harvest, and consequently sell for 12 to 18 percent more than other soybeans. If they were less expensive, large amounts would probably be used in East Asia to make tofu, soymilk, tempeh, and miso by producers who already buy their beans from America." Continued. Address: Soyfoods Center, P.O. Box 234, Lafayette, California.

1232. Shurtleff, William. 1981. William Morse: The father of soybeans in America (Continued–Part IV). *Soyfoods* No. 5. p. 56-60. Summer.

• ***Summary:*** Continued: "Moreover, in the U.S. only about 11,350 tons of soybeans (a mere 0.02 percent of the total U.S. crop) are used directly as food in a lightly processed form that allows the virtues of the vegetable-type bean

(better flavor and texture, higher protein, larger seeds) to shine through. About half of the U.S. vegetable-type soybeans are exported to soyfoods producers in Japan and Europe and half are used for American soyfoods. The major uses, in order of importance, are for tofu, soynuts, soymilk, whole canned (mature) soybeans, and tempeh.

"Bill Morse was a strong supporter of the American Soybean Association. He was at the founding meeting in 1920 and was elected president three times (1924, 1925, and 1932). Pioneer soybean grower, E.F. 'Soybean' Johnson later said that 'for many years the ASA existed mainly through Morse's untiring efforts.' He was the mainspring that kept the clock ticking year after year through good times and bad. In 1944 George Strayer said: 'Morse might be called the 'daddy' of the American Soybean Association as well as of the soybean in America, since our organization has probably leaned on him more than any other man through the years. He has always been a guiding light and missed few if any meetings (except 1929-31 when he was in Asia). It is doubtful if anyone can equal his record.'

"Morse was a highly competent researcher and a prolific writer. Between 1910 and 1950 he wrote some 87 articles and bulletins on soybeans and soyfoods, including The Soybean–in addition to making hundreds of speeches. Many of his articles appeared in publications of the American Soybean Association. He was editor of the Association's first publication in 1928 entitled *Proceedings of the American Soybean Association,* which contained 192 pages of papers given at the annual ASA conferences between 1925 and 1927. He contributed several papers to this volume, including 'The Distribution of Soybeans in the U.S.' (1927). He was also a frequent contributor to the *Soybean Digest,* which the ASA started in November 1940.

"The first article on soyfoods run by *Soybean Digest* was an article by Morse about vegetable-type fresh green soybeans entitled 'Shanghied... A Super Food' (July 1941). His second article was also on vegetable-type soybeans, 'Soys in Food: Future of Vegetable Varieties' (September 1945). In 1951 he wrote 'What's in a Name,' describing the significance of the poetic names given to varieties of soybeans in East Asia.

"In November 1949, when Morse retired after 42 years of service, he was known throughout the world, but especially in the U.S. and East Asia, for his work on soybeans and soyfoods. In 1907, when he started work, the soybean was such a small crop that no records of its production were kept. One measure of the success of his work is the amazing expansion of the crop from about two million bushels in 1919 to 9.4 million in 1929, 91 million in 1939, and 200 million in 1949.

"On retirement, Morse turned his work over to Martin G. Weiss, a professor of plant breeding and genetics from Iowa State University. From his home in Takoma Park, Maryland, where he had lived since 1917, Morse moved to Eastchester, New York, next door to his daughter, Margaret, who had accompanied him on the trip to East Asia. During the last ten years of his life he worked from time to time on his book on soyfoods (which, unfortunately, he never finished), did a lot of reading and gardening (he planted his own vegetable-type soybeans and enjoyed them each spring as fresh green soybeans, or later in the season, as mature cooked soybeans), and kept in active touch with the world of soybeans and soyfoods through many visitors and an extensive correspondence. He continued to enjoy soyfoods in his home meals.

"On the morning of July 30, 1959, at age 75, William J. Morse died of a cerebral hemorrhage at his home in Eastchester, New York.

"The work of Bill Morse runs like a bright thread through the whole tapestry of soybean and soyfood development in the Western world. We can pay no greater tribute to the man than to carry on his work and help fulfill his dream.

"For their help in providing information related to this article, the author would like to thank Mrs. Walter Thalman (Morse's daughter), George Strayer, Martin G. Weiss, Theodore Hymowitz, Jackson Cartter, R.W. Howell, and Verna Donavan." Address: Soyfoods Center, P.O. Box 234, Lafayette, California.

1233. Windish, Leo G. 1981. Re: Copy of book and invoice enclosed. Morse probably did not have his doctorate. Letter to William Shurtleff at Soyfoods Center, Sept. 16. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "It was real good talking with you this morning. In a separate mailer, I have sent a copy of my book.

"The invoice is inclosed [enclosed]. I am most appreciative for the information which you gave me; especially with reference to W.B. Morse.

"The research material which I used from Illinois, referred to him as Doctor Morse...

"I am of the opinion that your in-depth and extensive research is accurate and that he did not have his doctorate. Somewhere along the line his title got changed from Professor [sic] to Doctor."

Note: Across the top of this letterhead, superimposed on the printing on the beige stationery, is a blue illustration of four wild geese flying. Address: Windish's Natural Resource Center, 101 Exchange St., Galva, Illinois 61434.

1234. Thalman, Margaret Morse. 1981. Re: Log of the Dorsett-Morse Expedition to East Asia (1929-1931). Letter to Dr. Kenneth Bader, President, American Soybean Association, P.O. Box 27300, St. Louis, Missouri 63141, Sept. 17. 2 p. Typewritten.
• ***Summary:*** "Let me introduce myself as the daughter of William Morse, who was one of the founders of the American Soybean Association and who devoted his entire

life to introducing soybeans and foods made from soybeans to America.

"At the time of my father's death, I gave all of his valuable personal records to Mr. George Strayer of the American Soybean Association in Hudson, Iowa, on the understanding that the Association would serve as a custodian for them and make them available to anyone interested in furthering my father's work with soybeans.

"Recently I was talking with William Shurtleff, who has written a biography of my father and his work with soybeans, and is now doing further research to expand that original article into a full-length chapter for a book entitled History of Soybeans and Soyfoods. He mentioned that he had written your librarian in January of this year requesting permission to borrow (with any-sized deposit you required) the microfilm of the Log of the Dorsett-Morse Expedition to East Asia (1929-31), which our family bequeathed to the ASA. He was refused permission to use this microfilm, although it had formerly been lent to a professor at the University of Illinois. I asked Mr. Shurtleff to send me copies of the correspondence, which I am enclosing. Mr. Shurtleff also mentioned that, when he was writing the original article about my father your librarian asked him to please not mention the fact the Mr. Morse's logs and writings were in the possession of the ASA, presumably because she did not feel that she had time to handle requests for interested people to see them. This is understandable from your point of view, but a shame, since my father did this work and wrote these logs for others to use.

"I am now thinking that it is essential that copies of these priceless documents be stored in at least four locations, both to ensure their safety in case of an accident or loss in one location and to assure that they can be easily used (copies or microfilms, that is) by researchers. At present, they are locked away and might as well be non-existent. It also seems to me that the most appropriate place for the original copies of all these documents should be the USDA National Agricultural Library at Beltsville, Maryland, since they are set up to keep good care of old documents, while at the same time making them available to those who want to use them–carefully, of course. In addition, I think it is important that Mr. Shurtleff have an opportunity to see the originals since he would like to use some of the photographs in his history book (he would have copies made) and would like to study the text.

"To the best of my recollection, there are at least three sets of documents that our family donated to the ASA: (1) The 17-volume Log of the Dorsett-Morse Expedition; (2) Wm. Morse's handwritten notebooks from that Expedition; and (3) notes my father took for various books he was planning to write after retirement.

"May I suggest the following. First, I would like to request that the ASA make three copies of its microfilm of the Log of the Dorsett-Morse Expedition and of any other microfilms it has of my father's documents. Then please make four copies of all documents that have not yet been microfilmed. It is my understanding that a copy of a microfilm can be made quite inexpensively. Second, send copies of each of the microfilms to your archives, the National Agricultural Library, the University of Illinois Library, and The Soyfoods Center. Third, hold all the original documents for several months. By that time Mr. Shurtleff will contact you and request no more than 30 copies of photographs from the Log. Please ask your photography department to make these and bill him for them. Fourth, send the original documents to the Acquisitions Director at the National Agricultural Library. Beltsville. Maryland, with a covering letter explaining their significance.

"If this approach is not acceptable, please just send all of the original documents to the NAL or back to me, by UPS.

"I hope this approach seems reasonable and fair to you. I assume that you are as interested as I in seeing that this priceless information is as widely and well used as possible. If you have any alternate proposals, feel free to contact me. However, I would not like to see the documents tied up out of use in your archives for more than a month or two more, since there are people who would like to use them now.

"I hope that you will give this matter your attention as soon as possible.

"Sincerely,

"Mrs. Walter A. Thalman, 22 Interlaken Dr., Eastchester, NY [New York] 10709, Phone. 914-632-2508

"cc:

"Acquisitions Dept., USDA National Agricultural Library, Beltsville, MD 20705.

"University of Illinois, Main Library, Urbana, IL 61801.

"The Soyfoods Center, P.O. Box 234, Lafayette, California 94549."

Note: This document was actually conceived of and written by William Shurtleff of Soyfoods Center. He sent it to Mrs. Thalman who sent it to Dr. Bader at ASA. Address: 22 Interlaken Rd., Eastchester, New York 10709. Phone: 914-632-2508.

1235. Cartter, J.L. 1981. Re: William J. Morse. Letter to William Shurtleff at Soyfoods Center, Sept. 18. 1 p. Handwritten, with signature.
• ***Summary:*** "Thanks for the reprint of your excellent article on Mr. Morse–where did you get the good photograph of W.J.–it brings out the twinkle in his eyes as well as the energy he exhibited in his work.

"As to the book and reprints I loaned you–keep them a little longer–just so they don't get lost. Glad I could be of help. Sincerely, Jack Cartter." Address: 108 W. George Huff Dr., Urbana, Illinois 61801. Phone: 217-344-5235.

1236. Shurtleff, William; Aoyagi, Akiko. 1981. The United States Department of Agriculture and state agricultural

experiment stations: History of work with soya. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 26 p. Sept. 26. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction: A key spark of support missing in many countries such as France, worldwide influence of publications, overview of chapter. Part I: Early history of the USDA, experiment stations, and plant introduction. Chronology of activities from before 1800 to 1920. Part II: Office of Seed and Plant Introduction (OSPI). Introduction and overview. David Fairchild and the founding of Section of Foreign Seed and Plant Introduction (FSPI): Birth in 1869, life to 1897, founding of OSPI in 1897, first sight of soybeans in Maryland in 1897, inoculation trial, early soybean introductions from 1898, Fairchild's travels 1898-1903, Dr. Yamei Kin's enthusiasm for soybeans, other founders and co-workers. Frank N. Meyer (1903-18): Early work, description of character, death 1918 en route to Shanghai, tribute of his friends and co-workers, growth of OSPI, soybean introductions from 1907, budget growth. P.H. Dorsett. Fairchild: Later life (1924-54). Plant introduction today. Part III: USDA work with soyfoods and nutrition. Brief chronology: 1877-1899: Early experiment stations, Bureau of Home Economics, Osborne and Mendel, Langworthy, Blasdale. 1900-1919: Abel, Oshima, King, Piper, Morse, Hawaii, World War I, Kin. 1920-1939: Thom and Church, Louise Stanley, LeClerc. 1940-1959: World War II, continued in chapter on Northern Regional Research Center, Peoria, Illinois. Address: Lafayette, California. Phone: 415-283-2991.

1237. Shurtleff, William; Aoyagi, Akiko. 1981. Dr. John Harvey Kellogg and Battle Creek Foods: History of work with soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 20 p. Sept. 29. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Early life and teachings: Birth, work with Ellen White, medical school, thesis, in 1876 took charge of institute he renamed Battle Creek Sanitarium (new meaning for this term), its research kitchen developed America's first meat analogs, start of *Good Health,* famous people who came to sanitarium, trip to Europe to deepen medical knowledge, primitive state of medical knowledge, "Biologic Living," dynamic man, living proof of his techniques. Early health food products: Granola, peanut butter (probably America's first), cereals, rift with church, meat substitutes (Nuttose, Protose), Harry Miller. Early writings about soyfoods: *The New Method in Diabetes* (1917), mentions to 1923, mentions in *Good Health* (1921-29), *Good Health* (1930-39), J.H. and W.K. Kellogg's speeches to American Soybean Association (1927 and 1930), Kellogg and Henry Ford, 1933 edition of *The New Method in Diabetes,* 1936 expanding interest, letters to Horvath and Admiral Byrd, 1937 speech to American Public Health Association. Development of early soyfoods: soy meal, early interest in fermented milks, Metchnikoff and Tissier, first soymilk (1930), soy acidophilus and diseases (1933), patent for soy acidophilus milk (SAM, 1934), Dionne quintuplets (1934), SAM from 1936-1950's, heyday of his work with soyfoods (1934-37). Later soyfoods developments: Correspondence with William Morse, products in Morse's office, 1937 Battle Creek Food Co. products, 1940 price list, first commercial soymilk (Soygal, 1942), Kellogg's first meat analog (Soy Protose, 1943), small price list in 1955, sale of company in 1960, Kellogg's death in 1943, his influence on others.

See: http://www.soyinfocenter.com/HSS/john_kellogg_and_battle_creek_foods.php Address: Lafayette, California. Phone: 415-283-2991.

1238. Shurtleff, William; Aoyagi, Akiko. 1981. T.A. Van Gundy and La Sierra Industries: History of work with soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 9 p. Sept. 30. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction and summary: Many soyfoods firsts. 1874-1926: Birth, education, birth of children, work at St. Helena Sanitarium Food Co. (1906-1912), first interest in soyfoods from 1915 World's Fair exhibits, Smoein (1915-16), soy Smoein (1918-21), moving and teaching (1920-27). La Sierra Industries: started 1928, names of soyfoods, how the foods were sold, Dorothea Van Gundy, competition (Haines, Loma Linda, Mr. Brown), criticism of work with soy, move to Ontario (California) in 1931, Theradophilus, Morse connection. The man and his legacy: Death in 1935 at age 61 of overwork, business stopped 1936-37, business problems, his major influence on the future.

See: http://www.soyinfocenter.com/HSS/van_gundy_and_la_sierra_industries.php Address: Lafayette, California. Phone: 415-283-2991.

1239. Hartwig, Edgar E. 1981. Re: First crushing of domestically-grown soybeans in the USA. Letter to Mr. Bill Meekins, North Carolina Telephone Co., 103 S. Road Ct., Elizabeth City, North Carolina 27909, Oct. 23. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Dear Mr. Meekins: To review some of the subject covered in our telephone conversation this morning, I checked some information I have in the office and note that the first record of soybeans being crushed for oil and meal in the U.S. was on the West Coast in 1910 using soybeans imported from China. My recollection of information given to me by Mr. W.J. Morse, who was the first and only person with the U.S. Department of Agriculture working with soybeans for many years, was that the cotton seed oil mill

in Elizabeth City crushed soybeans in 1915, and this was the first mill to crush domestically-grown soybeans in the U.S. I have a reprint from an article in the 1917 Yearbook of Agriculture written by W.J. Morse in which he states that there was a shortage of cotton seed in 1915, and that a few East Coast cotton seed mills crushed soybeans since there was a surplus of domestically-grown soybean seed at that time. Prior to this, all of the soybean seed had been used for planting for growing the crop for hay. The article does not state specifically that it was the Elizabeth City mill that crushed the soybeans. However, in my travels with W.J. Morse in the mid-1940s, he definitely stated that it was the Elizabeth City mill that was the first in the U.S. to crush domestically-grown soybeans.

"I trust that this information will be helpful to you.

Sincerely,... Address: Research Agronomist, Soybean Production Research, P.O. Box 196, USDA / SEA, Stoneville, Mississippi 38776.

1240. 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 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 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.

1241. Strayer, George M. 1981. Re: Pioneers in introducing and producing soybeans in America, and in starting the American Soybean Association. Letter to William Shurtleff at Soyfoods Center, Nov. 5. 2 p. Typed, with signature on letterhead.

• ***Summary:*** Concerning Iowa: The first work was done by H.D. Hughes, who was the head of the Department of Farm Crops and Soils. He was assisted by F. Scott Wilkins and E.S. Dyas, both of whom were extension agronomists. Martin G. Weiss came on the scene in Iowa at the same time that Probst started in Indiana and Williams started in Illinois, all of them part-time USDA and part-time local experiment station employees specializing in soybean breeding work. "Martin Weiss is a highly skilled plant breeder, a geneticist and a mathematician. He is responsible for the development of the cross-pollination and back-crossing techniques which have become the basis of practically all soybean breeding being done in the United States, and practically every soybean variety which has been developed since about 1940 has been developed through the techniques developed by Weiss...

"There are a number of theories on why so many men gave so generously of their time and effort to support the introduction of soybeans into the United States, and to support ASA. Certainly W.J. Morse was a part of the reason. Many changes were taking place in agriculture, and the people in the land grant colleges were looking for new crops and new uses for crops. The whole face of agriculture was changing from the use of horses and the large consumption of oats, corn and hay by those horses to the use of tractors and other petroleum fueled mechanical units. This meant we had to find new crops to grow on the acreages no longer needed for oat and hay production.

"For some reason the soybean crop always had a kind of halo around it, placed there by men such as Henry Ford, W.K. Kellogg, I.C. Bradley, W.J. Morse, 'Soybean' Johnson and others who had access to the news media and who used it. This was an era when farmers were still expanding acreage, looking for new crops and new uses for those crops and the publicity given to soybeans was being well received by farmers.

"This was also an era when the farmer was leaving the typified hayseed status and becoming a businessman. Extension work through Farm Bureau and the local extension offices was becoming an important factor in decision-making among farmers. Extension agronomists and other persons were listened to. Farm cooperatives, farmers elevators, and other organizations of farmers were coming into prominence. It was an era of growth in information and growth in knowledge in the field of agriculture, and soybeans lent themselves to the enchantry of the period.

"You're having a tough time getting anyone to do comparable work for the Soycrafters Association because you are dealing with an entirely different type of people. Most of them are small entrepreneurs who have come out of an era when it was every man for himself and the Devil take the hinder-most. The farmers whom we were considering were looking for ways to cooperate and work with their neighbors. When someone got sick the neighbors did the field work. When a new barn was to be built there was a barn-raising held. Contrast this with the people in the cities, where most of your tofu plants are located, and where no one stepped in to help his neighbor. This is still pretty much true. You are talking about people with two very different philosophies, two quite different backgrounds. When a farmer gets sick, even today, his neighbors do his chores for him. When a small business operator gets sick he closes the doors and no one particularly cares." Address: President, Agricultural Exports, Inc., P.O. Box 266, Hudson, Iowa 50643. Phone: 319-988-4593.

1242. 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.

1243. Windish, Leo G. 1981. The soybean pioneers: Trailblazers, crusaders, missionaries. Galva, Illinois: Published by the author. viii + 239 p. Illust. No index. 26 cm.
• ***Summary:*** Contains many interesting biographies, often based on the author's first-hand knowledge. Contents: Section I: 1. A time to pause and reflect. 2. Dr. W.B. Morse. 3. The Cinderella crop of this century and some orchids long overdue. 4. First soybean crushing plant (Hull, England; Seattle, Washington; Elizabeth City, North Carolina). 5. George M. Strayer (Contains a good history of the American Soybean Association and Strayer's role in it). 6. Ersel Walley. 7. Dr. Harry Miller. 8. Henry Ford. 9. Northern Regional Research Laboratory. 10. Dr. Reid Milner. 11. Soybeans in China. 12. The first combine harvesters, the western migration, and the passing of an era (a good history of combines in the USA from the 1850s to the present). 13. Prof. W. Ralph Nave (agricultural engineer, specializing in improving combine design for harvesting soybeans). 14. Soybean harvesting equipment.

Section II: 15. August Eugene Staley, Sr. 16. Eugene D. Funk, Sr. (and the Peoria Plan, p. 74). 17. Dale W. McMillen [of Central Soya]. 18. Jacob Hartz, Sr. 19. Archer-Daniels-Midland Company, Inc. 20. Jay Courtland Hackleman. 21. Dr. Robert W. Howell. 22. Dr. W.O. Scott. 23. Program. 24. Crop improvement associations. 25. Illinois Crop Improvement Association. 26. Professor Emeritus Alvin L. Lang. 27. Morrow Plots.

Section III: 28. Dr. Clyde Melvin Woodworth. 29. Dr. R.L. Bernard. 30. Theodore Hymowitz. 31. A reluctance to accept change or progress. 32. Episodes. 33. Russian Tour. 34. South Farm buildings. 35. Soybeans again assert their value. 36. Taylor Fouts. 37. Excerpts from the Mumford Files. 38. Excerpts from the Hackleman Files. 39. Soybean variety and inoculation demonstrations. 40. The frosted green soybean dilemma. 41. Soybeans in the Deep South. 42. Mr. H.G. [sic, George Heartsill] Banks. 43. Dr. E.E. Hartwig. 44. U.S. soybean production. 45 Aquaculture... the world's untapped resource (From 1974 to 1979 the harvest from aquaculture more than doubled to nearly 7 million metric tons). 46. Almost a century of progress. About the author (autobiographical): Leo Gilbert Windish was born in 1909. A retired seedsman, he attended the University of Illinois in 1927 and 1928. He was close friends with Hackleman, and wrote this book in fulfillment of a promise he made to Hackleman, whom he described as "the soybean's greatest missionary." Windish also knew Burlison (the first to promote soybeans heavily) and Woodworth (the first soybean geneticist).

Note: Most of the chapters about people contain a portrait photo of the person on the first page. Address: 101 Exchange St., Galva, Illinois 61434.

1244. 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:*** 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.

1245. Howell, Robert W. 1983. Historical development of the United States soybean industry. *INTSOY Series* No. 25. p. 11-15. 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). [8 ref]
• ***Summary:*** An excellent, comprehensive overview. "The soybean industry in the United States is unique for the speed with which it grew to play a dominant role in the nation's agricultural and economic sectors. Nowhere in the country's past, nor in the history of civilization, is there another example of a crop that advanced in importance as quickly as the soybean. Soybeans now are the second most valuable crop produced in the U.S., exceeded only by maize, and are a major export commodity serving strong and stable markets in western Europe and Japan, and developing markets in Latin America and elsewhere.

"Soybeans were not an important crop when Europeans

were settling and developing the Americas. The historically important crops were cotton, maize, tobacco, and wheat, which provided food and fiber, and were items of commerce that formed the economic foundation of the New World. The first report of soybeans in the U.S. was 1804, when soybeans were referred to briefly in an article by J. Mease, a physician in Pennsylvania who was an enthusiastic gardener. Mease did not report the source of the soybeans in his garden but presumably they came from Asia via Europe. [* Footnote. See 'Introduction of the soybean to North America by Samuel Bowen in 1765,' by Hymowitz and Harlan, in *Economic Botany,* vol. 37 (in press)]. By the end of the 19th century, the crop was known throughout the eastern and central parts of the U.S.

"How did the soybean miracle come about? How and why was it possible for soybeans to penetrate and dominate agricultural economic systems that had been stable for centuries?

"The soybean story is an illustration of the right commodity in the right place at the right time. Many factors came together to create a market and a new product which could respond to demand. Mechanized agriculture was reducing the use of animal power. The number of draft animals was declining, releasing millions of hectares that had been used to produce feed for horses and mules. Synthetic fibers were replacing cotton. Production of surplus crops was being curtailed by government policy. Meanwhile, a national shortage of vegetable oils was becoming more severe as population grew. There was growing appreciation of the importance of well-balanced protein in human and animal diets. It was known that soybeans were processed for oil and meal in China. The situation was favorable for a new crop that would maintain farm income and contribute to the national economy. Soy-beans could satisfy market demand, and proved well adapted to existing farming systems, especially in the maize system of the northern states and the cotton system of the south. The fact that soybeans yield two products, highly unsaturated oil and protein with amino acid distribution similar to cow's milk, brought acceptance by different groups of users and provided stability as markets for oil or protein meals fluctuated. The most important single event in soybean history in the U.S. was the appointment of W.J. Morse in 1907 as director of soybean research in the U.S. Department of Agriculture (USDA). Earlier, C.V. Piper initiated work on soybeans in the USDA. For more than 40 years, Morse promoted research, education, production, and marketing of soybeans. He was instrumental in the organization of the American Soybean Association in 1921 and served three times as its president. Morse traveled widely in the U.S., offering seed and persuading farmers to try this new crop. He spent 1929 to 1931 in China collecting soybean seeds. He led the cooperative research program of the USDA and state agricultural experiment stations, which began in 1936, until 1949.

"Soybean research began at the University of Illinois, as at many other universities, before the beginning of the 20th century. Our first research bulletin concerning soybeans was published in 1897. Soybeans have been grown at the Agronomy South Farm every year since the farm's establishment in 1903. The first breeder/geneticist with primary responsibility for soybeans at the University of Illinois was C. M. Woodworth, who joined the faculty in 1920. Woodworth was a geneticist and constructed the first chromosome map for soybeans. He developed the cultivars Illini and Chief and made the cross which led to the development of the cultivar Lincoln. Lincoln, released jointly by the University of Illinois, USDA, and several other universities in 1943, was the first cultivar to be developed from a purposeful hybridization, and the first to be produced from the cooperative program formalized in 1936.

"A contemporary of Woodworth, J.C. Hackleman, was a crop extension specialist in Illinois from 1919 until he retired in 1956. Hackleman was one of the organizers of the Illinois Crop Improvement Association and an ardent supporter of soybeans. He and his extension colleagues in other states appreciated the potential of soybeans and strongly encouraged farmers to try them. Along with Hackleman and Woodworth, W.L. Burlison, head of the Department of Agronomy at the University of Illinois from 1921 to 1951, was among those instrumental in establishing Illinois as the principal soybean producing state.

"Developments in Illinois were paralleled in other universities and states where interest in soybeans was growing. J.L. Cartter, a graduate student at the University of Wisconsin, was hired by USDA as a soybean agronomist in 1928 and stationed at Holgate, Ohio. In 1935, Congress enacted the Bankhead-Jones Act which provided for regional research on major agricultural problems. In 1936, under the authority of this act, the U.S. Regional Soybean Industrial Products Laboratory was established at the University of Illinois, and Cartter moved to Illinois to lead the production research at the Laboratory. In 1942, the utilization research was transferred to the Northern Regional Research Laboratory at Peoria, Illinois. The production research program remained at the University [in Urbana]. Plant breeders were employed by USDA and stationed at Illinois, Iowa State, and Purdue (Indiana) universities, and later at Stoneville (Mississippi), North Carolina State University, and the universities of Florida, Minnesota, and Missouri.

"The cooperative production research program of USDA and the states has had a strong foundation in breeding and genetics. Until recently, virtually all soybean production in the U.S. involved cultivars developed in the cooperative program of USDA and state breeders. Clark, Hawkeye, Lee, Wayne, and Williams are examples of cultivars developed in the cooperative program which have achieved dominant positions in various soybean producing areas. Some originated in Canadian programs with which U.S.

researchers have cooperated closely and effectively. The group of pioneering soybean breeders, who deserve much of the credit for the success of soybeans, included R.L. Bernard, E.E. Hartwig, A.H. Probst, C.R. Weber, M.G. Weiss, and L.F. Williams. Approximately 25 states participate in the cooperative program and have designated agronomists as collaborators. However, few had active state-employed breeders prior to 1960. One state breeder who should be mentioned with the above is J.W. Lambert, University of Minnesota.

"After the retirement of Morse, Weiss was leader of soybean investigations in USDA from 1949 to 1953. Then came H.W. Johnson, who, next to Morse, probably had the greatest influence on the development of soybean research. Johnson led soybean investigations from 1954 to 1964, a period during which the soybean cyst nematode was found for the first time in the U.S., the first disease-resistant cultivars were developed, and a significant increase in size and scope of soybean research staff occurred.

"Prior to 1965, the only company with a soybean cultivar development program was Coker's Pedigreed Seed Co., South Carolina, where H. Webb was the soybean breeder. In 1965, a group of midwestern seed companies formed the Soybean Research Foundation, Inc., and employed A.L. Matson of Missouri as a soybean breeder. Following enactment of the Plant Variety Protection Act of 1970, which enables the developer to retain ownership and control of a cultivar as if it were patented, several companies established soybean cultivar development groups. The act stimulated interest in new techniques, such as genetic engineering, and it is probable that company-developed cultivars will occupy more of the market in the future.

"B. Koehler, a contemporary of Woodworth at Illinois in the 1920's, was one of the first pathologists to become interested in soybean diseases. A few years after establishment of the cooperative program with breeders in 1936, plant pathologists were added. W.B. Allington joined the USDA group at Urbana during World War II and D.W. Chamberlain joined in 1947. Pathologists have worked closely with soybean breeders since breeding for disease resistance has proved to be a powerful means of controlling soybean diseases. Soybeans so far have been spared the ravages of a major pestilence, due at least in part to vigilance of soybean workers and some brilliant research to deal with emerging problems. Phytophthora rot devastated fields in parts of Ohio and Indiana and was beginning to appear elsewhere about 30 years ago." Continued. Address: Prof. Emeritus and former head, Dep. of Agronomy, Univ. of Illinois, and former leader, soybean investigations, USDA.

1246. Howell, Robert W. 1983. Historical development of the United States soybean industry (Continued–Document part II). *INTSOY Series* No. 25. p. 11-15. 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). [8 ref]

• ***Summary:*** (Continued): Prompt response, notably by pathologist A.F. Schmithenner of Ohio State University, breeder R.L. Bernard (USDA), and pathologist M.J. Kaufmann at Illinois, led to discovery of genetic resistance which was incorporated by backcrossing to produce resistant cultivars of good agronomic quality. The first such cultivars were released in 1963. Additional races of *Phytophthora megasperma* f. sp. *glycinea* have appeared but the disease has been adequately controlled.

"A more dramatic case involved the soybean cyst nematode. First identified in North Carolina in 1954, the cyst nematode soon was discovered in the Mississippi Delta. It is now known to be distributed in soybean production areas from the Gulf of Mexico almost to the Canadian border. Resistance to races 1 and 3 of the nematode was discovered in the cultivar Peking, which was introduced into the U.S. in 1906. Resistance involved a complex of several genes, one of which was linked closely to the gene for black seed coat, a trait unacceptable in the U.S. soybean market. However, intensive research by C.A. Brim and J.P. Ross (North Carolina), A.L. Matson and L.F. Williams (Missouri), J.M. Epps (Tennessee), E.E. Hartwig (Mississippi), and others resulted in the first commercially acceptable resistant cultivar in 1967, and others followed. However, additional races of the nematode were identified. Cultivars with resistance or tolerance are available in maturity groups for which the cyst nematode is a problem.

"Research on weed and insect control in soybeans was slower to develop. In the early 1960's, there was a significant increase in weed research. During the following decade, improved weed control methods probably contributed more than any other single factor to improvement in soybean yields. Increased emphasis on insect control research is very recent, reflecting awareness of the seriousness of insect and disease losses, especially in the southern states, and the opportunities for effective and safer insect control through integrated pest management. Integrated pest management is a coordinated system of chemical, physical, and cultural pest control measures that will ensure favorable economic, sociological, and environmental consequences.

"Plant physiologists have worked with soybeans for many decades. The pioneering work of H.A. Allard and W.W. Garner on photoperiodism in the second decade of this century included soybeans as one of the three crops studied. Their work and later studies on photoperiodism by H.A. Borthwick, S.B. Hendricks, and M.W. Parker led to identification of phytochrome and were the basis for the maturity group system. Soybean physiology did not become a subject of widespread interest until about 1960. Since that time, the number of physiologists and the scope of physiological research have expanded rapidly. W.L. Ogren (USDA/UIUC) and his associates have made

major contributions to the understanding of photosynthesis, especially photorespiration, a process occurring in noncereals and some cereals that drains the plant of some of the product of photosynthesis. The existence of photorespiration is a major biochemical difference between soybeans and maize, effectively limiting soybean production potential to something less than that of maize.

"Some proposed uses of soybeans have not succeeded. Use as a raw material for production of plastics has been mentioned frequently. About 1940, Henry Ford used plastics made from soybeans to build auto bodies. The bodies were highly resistant to damage, but other raw materials such as petro-chemicals were more economical than soybeans at the time.

"Meanwhile, research expanded on uses of soybeans at the USDA laboratory in Peoria, in universities, and in industrial laboratories. At Peoria, a strong utilization research group developed under the leadership of J.C. Cowan. Others who have made significant contributions included H.J. Dutton, J.J. Rackis, A.K. Smith, and W.J. Wolf. Research on food uses at UIUC began in 1930. Similar studies were undertaken elsewhere. The great development of soybeans in the U.S. has been based on oil extraction, followed by uses of oil and oilmeal. Soybean oil is used mostly in food products, 95% of domestic use being salad oils, shortenings, and foods prepared with them. The oilmeal, high in well-balanced protein, is used in poultry and livestock feeds. Only 3% is used to manufacture industrial or human food products. In recent years, soy protein has been used to create products which simulate other foods in texture, appearance, and other qualities.

"For many years there has been interest in soyfoods such as tofu, whey, cheese, and meat analogues, especially in international programs and for vegetarians. Recently, a number of soy beverage products were developed by a team including A.I. Nelson, M.P. Steinberg, and L.S. Wei of UIUC. Interest in soyfoods seems to be increasing. A number of small companies and individuals who are interested in soybean food use have formed the Soycrafters Association, Colrain, Massachusetts. They are active in disseminating information on use of soybeans as a human food, including traditional oriental food and western dishes.

"A key to the continued expansion of soybeans has been the parallel development of uses, markets, and products. In the beginning, U.S. soybeans were grown as a hay crop. The first production of soybean oil and meal in the U.S. occurred in 1911 in Seattle, Washington, with the soybeans imported from northeast China. The earliest record of processing of American-grown soybeans for oil and meal was at Elizabeth City, North Carolina, in 1915. Since 1941 soybean production primarily has been for processing and export, and hay use now is less than 1% of total production.

"Farmers need assurance of a market if they are to become interested in a new crop. In the early days of commercial soybean production, this assurance was given by a few pioneering processors. In 1922, A.E. Staley, founder of the company which today has oil and meal extraction facilities in Champaign and Decatur, Illinois, and elsewhere, announced that he would begin processing soybeans that year. He guaranteed that he would buy all the soybeans that farmers would grow. Not long after, E.D. Funk, of Funk's Seeds in Bloomington, Illinois, offered a guaranteed price. Another pioneer was D.W. McMillen of Fort Wayne, Indiana, founder of Central Soya, a major processor of soybeans.

"The decision of these and other business leaders to commit themselves and their organizations to soybeans, and especially their assurances to farmers, started soybeans on the tremendous expansion of the last 60 years. These steps could not have succeeded if the processors had not had markets for their products. One such early market was in New York, where the Grange League Federation needed meal for dairy cows. In subsequent years, swine and poultry feed has used a major fraction of soybean meal production. It is unlikely that the expansion of the U.S. poultry industry would have occurred without feeds based on soybeans.

"From the small beginnings of soybean processing in Seattle and Elizabeth City, a strong and extensive system of soybean mills developed. The mills have become larger and somewhat fewer. There are now about 115 mills listed in *Soya Bluebook,* a publication of the American Soybean Association. A modern mill can process 2,700 metric tons of soybeans per day, requiring the production from nearly 90,000 hectares annually. Median capacity is 1,257 metric tons per day. Although soybean processing still is referred to as "crushing," the transition from extraction by hydraulic presses to solvent extraction was completed by 1970. Parallel to development of the milling industry was development of facilities for transportation, storage, and futures markets.

"Establishment of the American Soybean Association in 1921 has been mentioned. The secretary of the association from 1940 until 1967 and the founder of the *Soybean Digest* in 1940 was G.M. Strayer of Hudson, Iowa. He was instrumental in guiding the soybean industry into foreign markets. In 1949 he and J.L. Cartter were the first people to be sent to Europe to explore possible markets for U.S. soybeans. After a trip to Japan in 1955, the Japanese-American Soybean Institute was formed in 1956" (Continued). Address: Prof. Emeritus and former head, Dep. of Agronomy, Univ. of Illinois, and former leader, soybean investigations, USDA.

1247. Howell, Robert W. 1983. Historical development of the United States soybean industry (Continued–Document part III). *INTSOY Series* No. 25. p. 11-15. 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). [8 ref]
• ***Summary:*** (Continued): "The National Soybean Processors

Association (NSPA) was formed in 1928 and is now a powerful organization representing the interests of the processors. The NSPA, like the growers' organization, the American Soybean Association, has been a strong supporter of research and education programs. The two associations have cooperated in market development activities abroad. Since 1948 the NSPA has sponsored the National Soybean Crop Improvement Council (NSCIC), which has an advisory board of university and USDA research administrators to promote communication between the soybean industry and soybean researchers. J.W. Calland was the first managing director of NSCIC; R.W. Judd has been managing director since 1961. Calland and Judd have contributed immeasurably to growth of the soybean industry by promoting interchange of information and by effective presentation of research needs to legislative bodies.

"Support and management of soybean activities is broadly based. Farmers control much of the planning and financing of research and market promotion through a system of 'check offs,' that is, a levy collected on soybeans at the first point of sale. Funds thus obtained amount to many millicns of dollars, approximately US$1.5 milliin annually in Illinois alone. Boards or committees of farmers at the state and national levels determine how these funds will be used. There are check-off programs in 21 states, collecting 0.5 to 1 cent per bushel.

"Check-off funds are allocated to market development or research and education, with somewhat more than half usually going to market development. In addition, the Foreign Agricultural Service of the USDA provides funds through contracts for specific projects related to foreign markets. Another important component of funding comes from so-called "third parties," that is, governments or other interests in host countries.

"Funds allocated for research and education supplement budgets appropriated by Congress and state legislatures, or support obtained through grants or contracts for specific projects. INTSOY, for instance, is financed almost entirely by grants and contracts. Our domestic soybean research and education program is financed by funds from all of these sources.

"Soybeans have been an important part of the U.S. efforts to improve nutrition at home and abroad and to assist developing countries to strengthen their economies. Meat extenders in school lunch programs improve the nutritional status of children. Simple ("village") methods of preparing foods from soybeans were developed at Peoria [at the NRRC] and UIUC [University of Illinois at Urbana / Champaign]. U.S. soybean researchers have been involved, since the end of World War II, in international assistance programs. The spectacular growth of the soybean industry in Brazil was possible in part because of training provided to Brazilians in the U.S., and more directly because of the assistance provided by U.S. scientists on long- and short-term assignments in Brazil.

"UIUC has had international programs for many years. In the mid-19607s, soybeans were chosen by the University as the means of demonstrating the land-grant concept of resident instruction, research, and extension in university development contracts in India. The International Soybean Program (INTSOY) evolved directly from the soybean work in India. INTSOY programs include production and utilization research and extension teaching, with emphasis on rural or village uses that involve a minimum of processing. INTSOY successfully has completed projects in Peru and Sri Lanka and UIUC is currently beginning a new one in Zambia with a soybean development component. INTSOY, from its inception, has been a joint effort of UIUC and the University of Puerto Rico, Mayaguez Campus.

"Soybean history in the U.S. is a story of many people in industry, on the farm, in government and the universities who recognized a need and opportunity. For most of this century they worked together to bring about the soybean miracle. Our industry is based on an ancient gift from the Orient. We look forward to increasing association with our colleagues from China as the soybean story continues." Address: Prof. Emeritus and former head, Dep. of Agronomy, Univ. of Illinois, and former leader, soybean investigations, USDA.

1248. 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:*** 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.

1249. *Soyanews* (*Sri Lanka*). 1983. William Morse and his campaign to popularise fresh green soyabeans [green vegetable soybeans]. 6(3):4-5, 8. Nov. [1 ref]
• ***Summary:*** "Condensed and adapted from a chapter in the forthcoming publication 'History of Soybeans and Soyfoods, by William Shurtleff of the Soyfoods Center, P.O. Box 234, Lafayette, California 94549, USA."

1250. *SoyaScan Notes.* 1983. Chronology of soybeans, soyfoods and natural foods in the United States 1983 (Overview). Dec. 31. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Jan. 16. Larry Needleman decides to sell Bean Machines. Looking for a buyer. Jan. 24. "Legume, Company Finds Niche Selling Frozen Foods Made with Tofu, published by The Wall Street Journal.

Feb. *Soyfoods* magazine No. 8 published by Richard Leviton. Blue cover, 5,000 copies

Feb. 6-8. Sixteen soyfoods companies exhibit at the Natural Foods Expo. in Anaheim, California. A new trade association named Soyfoods Association of America (SAA) is formed; it is basically a restructured version of the original Soyfoods Association of North America, which was founded in July 1978 and which now ceases to be active. SAA elects a new board of directors; Michael Austin is chosen new Executive Director and Gary Barat of Legume becomes new President. Fourteen companies pledge $12,000. Headquarters established in New York City.

Feb. 7. The First Great Tofu Burger, a dry mix, made in Oakland, introduced at Anaheim Natural Foods Expo.

Feb. 18. Wm. Shurtleff has idea for forming a Soy Sauce Council to help encourage soy sauce companies to join Soyfoods Association, develop soy sauce terminology and standards, and eliminate mislabeling.

Feb. Jack's Beanstalk, innovative tofu company in Salt Lake City, Utah, goes out of business.

March 10. *Soyfoods Industry and Market: Directory and Databook 1983* published by Soyfoods Center, accompanied by glossy flyer and catalog of professional publications and services.

March 10. *Tempeh Primer,* by Juel Andersen and Robin Clute, published.

March 14. Connecticut Agricultural Experiment Station, in Bulletin 810 "Quality of Tofu and Other Soy Products," reports high bacterial and coliform counts. A virtual expose, revealing the tofu industry's erratic quality control, it gets wide media coverage and hurts sales of New England and New York tofu companies.

March. Hinode Tofu Co. starts major tofu ad and coupon campaign, with full-page ads in four national magazines. Most extensive national publicity ever done for tofu. Triggers lawsuit from a rice company over the Hinode brand, with which Hinode Tofu Co. is subsequently forced to part.

April 27-30. Six soyfoods companies exhibit at Whole Life Expo in San Francisco, as part of Soyfoods Association's booth. Shurtleff presents a speech and color slide show.

April. Hartz Seed Co. is purchased by Monsanto.

May. *The Au Naturel Tofu Manual,* by Chloe & Abraham Fox self-published in Canada. Vol. 1 is *Tofu Recipes for Families.* Vol. 2 is *Modern Jewish Tofu Cooking.*

May 3. Michael Austin mails out Soyfoods Association Charter Member letter. By year's end $18,000 in membership fees had been raised.

May 4. Richard Leviton decides to move to California.

May 8-11. Hinode Tofu Co. exhibits five flavors of Tofu Parfait at the prestigious and influential Food Marketing Institute convention in Chicago, a major national supermarket convention, attended by 20,000.

May 9. Dr. Hwa L. Wang of USDA NRRC speaks on "Tofu and Tempeh as Potential Protein Sources in the Western Diet" at the American Oil Chemists' Society symposium on "Potential New Protein Sources" in Chicago.

May 16. Quong Hop & Co. introduces the first Soy Deli cooler display case to Raley's supermarkets in Reno (Nevada) and Sacramento (California). In July they introduce the idea to Safeway supermarkets in California. By August there are Soy Delis in ten Safeway supermarkets in the San Francisco Bay Area.

May 18. The New York Times article on "Bacteria in Soy Products" as a follow-up on the Connecticut tofu contamination report.

May 24. Wm. Shurtleff leaves for China for three weeks to study soyfoods, sponsored by Danish Turnkey Dairies; the first trip for this purpose since Dr. A.K. Smith of the USDA went there in 1949. Shurtleff writes 75-page report on *Soybeans and Soyfoods in China: 1949-83.* After China, Wm. and Akiko Shurtleff spend 3 weeks studying the soymilk industry and market in Japan.

May 31. Leviton and Wang speak on the soyfoods industry at Iowa State University conference on grains and legumes.

June. Worthington Foods introduces Tofu Garden Patties, developed for the health food market as part of a larger new line of natural food products, all sold under the Natural Touch brand. This is a new trend for the company and they commit money to promoting it. In 1984 they launch Okara Patties (which contain okara as the 4th ingredient).

June. *Quantity Tofu Recipes for Institutions & Restaurants,* by Gary Landgrebe published by Soyfoods magazine and Fresh Press.

June. *The Magic of Tofu,* by Jane O'Brien of Ireland published by Thorsons in the UK.

June. *Tofu: Not Just for the Health of It,* by Jana H. Crutchfield self-published.

June. *Handbook of Indigenous Fermented Foods,* edited by Keith H. Steinkraus, published by Marcel Dekker. Extensive original material on traditional soyfoods. It soon becomes a classic.

June. *Soyfoods* magazine No. 9 published, 7,000 copies. *Soyfoods Newsletter* published in new typeset, 4-page format with new design.

June. Torigoe Seifun, Japan's fifth-largest flour miller, starts production of tempeh. This is the earliest known commercial tempeh ever made in Japan.

July 1. Quong Hop & Co. purchases Pacific Tempeh Co.

July. INTSOY publishes *Proceedings of the First China/USA Soybean Symposium,* held July 1982 at the University of Illinois.

July 3-Aug. 22. Richard Leviton in England, lectures on soyfoods in London and Leicester, and does some soyfoods research.

July 25. Soyfoods Association meeting in Denver, Colorado. Tom Timmins, president of Tomsun Foods Inc. (one of the companies seriously affected by negative publicity on tofu quality) is asked to be head of the Soyfoods Association's Standards Committee, and to appoint people to work with him on the development of standards, especially tofu standards. In October he sends a 4-page survey letter concerning soyfoods standards to the 18-person Soyfoods Association Standards Committee that he has appointed.

July 28-Aug. 2. Second US/China Soybean Research Symposium, held in Jilin, China

July. NNFA show in Denver. Eden Foods surprises the natural foods industry by launching designed-for-America Edensoy in plain and carob flavors. Made in Japan by Marusan-Ai and exported by Muso, it is packed in a 6-ounce retort pouch. San-J's To-Neu brand soymilk is also debuted in Tetra Brik cartons.

Eden Foods is the first Caucasian-American company to import soymilk, and their gamble soon pays off; sales skyrocket, sparked by an extensive magazine advertising campaign. Between Sept. and Dec. 1983 over 1 million packs are sold. A host of competitors rush to follow Eden's lead... and many of them go to Muso. Eden objects.

July 31. Fifth Anniversary of the founding of the Soyfoods Association of North America.

Late July. Hot, dry summer weather heats up the price of soybeans from $6/bu to over $9.50/bu in August and September, falling back to $8 in December.

Aug. 15. *Time* magazine article on stylish ice creams has a paragraph on Tofutti soy ice cream.

Aug. 15. Delegation of four soyfoods experts from People's Republic of China spends 5 hours at The Soyfoods Center. First stop of the first Chinese soyfoods team to visit the USA.

Aug. 15. Soyfoods Center makes the first photocopy of the entire Log of the Dorsett-Morse Expedition to East Asia, 1929-31. 6,170 pages. The only original is owned by the American Soybean Assoc. in St. Louis, Missouri.

Aug. Farm Foods serves Ice Bean soymilk ice cream at the American Soybean Association convention in Nashville, Tennessee.

Sept. Legume in New Jersey, in their second public stock offering in 15 months, raises an additional $400,000 ($300,000 net).

Sept. Continental Soyfoods, run by Pat Aylward in Minneapolis, Minnesota, goes out of business.

Sept. 9. Richard Leviton leaves Massachusetts, moves Soyfoods magazine to Encinitas, California. But he decides to leave there a week later.

Sept. 21. New Ten Speed Press edition of *The Book of Miso,* by Shurtleff and Aoyagi published. Extensively revised. Shows miso consumption in U.S. has increased 300% since 1975.

Sept. 25. Open House at new headquarters of Soyfoods Center for 30 people, including Nancy Dailey, who is writing a major story on soybeans for *National Geographic* magazine, and for Richard Leviton, newly arrived in California. Shurtleff shows color slides of soyfoods in China.

Sept. 26–Oct. 1. Symposium on "Soybean in Tropical and Subtropical Cropping Systems" held at Tsukuba, Japan. About 200 people attended. Proceedings were published in 1985.

Sept. 28. Soyfoods Center buys its first computer and begins computerization, which soon leads to development of the world's three largest computerized databases focusing on soyfoods and the soybean industry–from which this chronology is compiled.

1251. Shurtleff, William; Aoyagi, Akiko. 1983. History of soybeans and soyfoods: Past, present and future. 4 vols. Lafayette, California: Soyfoods Center. 2,400 p. manuscript. Forthcoming. 28 cm. [27500+ ref]
• ***Summary:*** The most comprehensive book of its type ever written. Most chapters are now available in manuscript form. Those that are, are listed individually in this database. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

1252. University of Illinois (Urbana), College of Agriculture, Dean's Office, Subject Files, 1895-1983, Record Series No. 8/1/2 (Finding aid for archival collection). 1983. Urbana, Illinois: University of Illinois. 17 boxes relate to soybeans.
• ***Summary:*** Record Series No.: 81/2. Record Series Title: Subject Files, 1895-1983. Record group: Agriculture. Subgroup: Dean's Office. Arranged: By type of material and chronological thereunder. Date received: 1966-1967/02, 1971/11, 1993/03. Volume 270.3. Description: Subject

files including photographs, correspondence and programs, publications, clippings, scrapbooks, obituaries, etc. (p. 2-3).

The three most important boxes for soybeans are 134, 155, and 158. Box 134–Soybean Day, 1921-51. Soybean Exhibit Car, See: Committee Pennsylvania Railroad Soybean Exhibit Car (Box 26). Soybean Oil Meal Situation, 1932-43. Soybean Processors Conference, 1950-51. Soybean Publications (Illinois), 1940, (Other states), 1935-36. Soybean train, 1941. Soybeans, 1922-29, 1930-49, 1954-64.

Box 155–Regional Laboratories, Collaborators, 1940. New Uses for Farm Products, Committees, 1938. Northern Regional Laboratories, Collaborators, 1941-64. Peoria Conference: 1945-1964 (7 subfiles). Regional Soybean Laboratory: Collaborators Meeting, 1937-1940 (after 1940 See: USDA Regional Lab., Northern Region, Collaborators). Director, May, O.E., 1936-38. Knight, H.G., Miscellaneous, 1936. Memo of Understanding, Correspondence (Chem. & Soils Plant Ind. & University of Illinois, 1935-36, See: Project Cooperative Regional Illinois Soybean Laboratory). Projects and Subprojects, 1936-37. Publications in Illinois (See: Soybean Publications (Illinois)). Removal to Peoria, 1942. Report-Annual, 1936-42. Report (Geneva), Annual, 1947-53. Space in University Buildings and Land, 1936-49, 1960.

Box 156–USDA–Regional Laboratories, Soybean Laboratory, 1936-1953. See also: Project Coop Soybean Lab.

Box 158: Soybean Laboratory (General), Reports-Annual, 1955-1964. See also: Project Cooperative, Soybean Laboratory (Regional).

Other boxes related to soy: Box 4–Agricultural industrialization. Box 5–Agronomy: Agronomy Day 1958-1964. Burlison, W.L., 1948-1951. Hackleman, J.C., 1937-1956. Box 9–Armour and Company, 1929-1963. Baltimore and Ohio Railroad, 1921-1954. Box 15–Caterpillar Tractor Co., 1932-1964. Century of Progress, 1930-1935. Box 17–Commercial activities of Farm Advisers, 1927-1934. Box 18–Committee: Agronomy Department Headship, 1920-21 [Burlison], 1962-63. Century of Progress, 1931-1934. Box 26–Committee: National Soybean Producers Meeting, 1944. Pennsylvania Railroad Soybean Demonstration Car, 1937-38. Box 40–Farm Bureau, 1918-1940. Farm Chemurgic Council, 1936-1942. Farm Chemurgic Council, Meetings–Minutes and Reports, 1935-1937. Box 51: Funk Bros. Seed Co., 1927-1964. Eugene D. Funk, 1935-1958. Box 77–International Harvester, 1923-1951, 1955-1964. Box 88–Legislation, U.S. Appropriations, Agriculture, Foreign Field, 1928-1930 [Dorsett & Morse Expedition?]. Box 90–Lists of Farmers, Progressive and Successful, and leading farmers in each county, 1922-1932. Box 100–North Central States Directors, Plant Introduction Project, 1946-47. Box 101–Pennsylvania Railroad–Soybean Exhibit Car–See Box 26. Box 125–Reports, USDA, 1926-1931. Box 136–Speeches: Soybean banquet, 1941. Soybean oil meal, 1942. Soybeans, 1936. Box 137–Staley Manufacturing Company, 1923-1961. Box 166: Wallaces' Farmer.

Sent to Soyfoods Center by Jacob Jones of Purdue Univ., Aug. 1998. Address: Urbana, Illinois.

1253. Bernard, R.L. 1984. The past and the future in soybean breeding. *Soybean News* (*NSCIC*) 35(1):2, 6. Jan.

Table 1. A statistical history of soybean introductions

Period	Years	Number of soybean PI numbers	Rate/yr	Number in germplasm collection
1898-1923	26	1,053	40	132
1924-1928	5	1,878	375	303
1929-1932	4	4,773	1,193	1,051
1933-1944	12	169	14	35
1945-1974	30	2,556	85	2,095
1975-1980	6	5,001	834	5,635
Total or average	83	15,430	186	9,251

• ***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). 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, 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.

1254. Hartwig, Edgar E. 1984. Some thoughts after thirty years of soybean research in the South (Continued–

Document part II). *Soybean News* (*NSCIC*) 35(1):5, 4. Jan.
• ***Summary:*** Continued: Research usually does not remain static. In 1954, the soybean cyst nematode was identified in southeastern North Carolina. At that time, it was thought to be a pest recently introduced into the U.S. The soybean cyst nematode had previously been identified in parts of China and Japan. The area in southeastern North Carolina grew flower bulbs, and it was first thought that the nematode had been introduced with bulbs from Japan. Later, as it was recognized that the nematode was quite widely distributed in the U.S., it was assumed that it had been in the country much longer. This nematode also reproduces well on the annual lespedezas and the areas where it was most prevalent were areas that had been growing the annual lespedezas. Little attention was given to the lespedeza, so it could easily have been present in these fields for many years without being noticed, and thus was available to attack soybeans when they were grown. A search to identify sources of resistance to the soybean cyst nematode was begun in 1956 with some plantings of germplasm lines in the field in North Carolina where the nematode was first identified.

"At that time, we had a collection of about 3,00 soybean strains from eastern Asia maintained at Urbana Illinois, and at Stoneville. All of these lines were planted in the field in North Carolina in 1957. A few lines which were resistant to the nematode were identified, and crosses were made that year to initiate a breeding program to develop productive varieties with resistance. All of the lines identified as resistant were low in productivity and had black seed coats, another undesired quality. Breeding work was conducted cooperatively among workers at Raleigh, North Carolina, Stoneville, Jackson, Tennessee, and Portageville, Missouri. The first resistant variety developed from this program was 'Pickett' released in, 1967. Pickett had good resistance to the more common forms of the soybean cyst nematode, but yielded approximately 10% less than adapted material in the absence of the nematode. The next step was to develop material having the resistance and higher productivity. The variety 'Forrest,' released in 1973, had the cyst nematode resistance level of Pickett, a high level of resistance to several types of root-knot nematode, and was a top yielder on well-drained soils in the absence of nematodes.

"As the variety Pickett was being developed, breeding lines were screened against cyst nematodes from North Carolina, Tennessee, and Missouri. However, as Pickett was planted on farmers' fields, areas within these fields were identified as having cyst nematode injury. It was then recognized that there were variants of the nematode, and another search was necessary to find sources of resistance to what was later identified as race 4 which was present in many fields in west Tennessee, northeast Arkansas, and southeastern Missouri. A screening program to evaluate available germplasm was initiated at Jackson, Tennessee, and resistant material was identified in 1969. Resistant material was used immediately to initiate a breeding program. A resistant variety `Bedford' was released in the fall of 1977.

"The soybean research program in the 'South has been flexible, and has been modified to respond to problems as they were recognized. A close working relationship among state and Agricultural Research Service employees has made possible rapid evaluation and dissemination of improved material as it was developed. New problems continue to be recognized. To date, we have been able to identify sources of resistance from within the soybean germplasm collection to all the disease, nematode and insect problems we have identified. We now have approximately 10,000 germplasm lines being maintained at Urbana, Illinois, and at Stoneville. This collection will continue to provide genes for improving the soybeans we grow commercially. As soybean acreage and economic value have increased, the number of people, both public and private, conducting research with soybeans has increased markedly. It is now relatively easy to justify spending either public or private funds on soybean research. However, we must admire the courage and foresight of W.J. Morris [sic, Morse] for his leadership activity in getting a small soybean research program organized for the South in 1942."

A portrait photo shows Edgar E. Hartwig. Address: Research Agronomist, USDA, ARS, Stoneville, Mississippi.

1255. Ryerson, Knowles. 1984. Reflections on the USDA, Frank N. Meyer, and William Morse (Interview). *SoyaScan Notes.* Feb. 19. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ryerson entered the USDA Bureau of Plant Industry in about 1928. He never met Frank Meyer, but everyone he knew in the Bureau felt that Meyer had committed suicide. Meyer and Dr. Pieters in Forage Crops had an extensive correspondence, including metaphysical issues. Shortly before his death, Meyer was very depressed

since he was within sight of the mountains where he wanted to go exploring for plants but the Russians wouldn't let him go for about 6 months. He was boxed in and inactive.

Ryerson knew Morse well: "He was quite a shy person until you got to know him. He was outgoing but not forceful. He was a very thorough person in his studies and with a good sense of humor and very cooperative. He and Dorsett made a great pair." Concerning P.H. Dorsett: "They only made one like him. He was active and enthusiastic and a great photographer. He went day and night. Decidedly outgoing, very friendly, very enthusiastic about his work, very helpful, deeply concerned about the affairs of the Department. He was concerned there were not enough men as interested in the work as he was. Wilson Popenoe was like him in his strong interest."

The Dorsett-Morse expedition was a turning point for soybeans in America; before that expedition most of the soybeans here were used for fodder and green manure. He thinks the varieties they brought back became the basis of the new industry or their hybrids. [Note: See partially dissenting viewpoint by Ted Hymowitz, 1984, in *Economic Botany*]. They were certainly widely distributed.

David Fairchild wrote three books but he did not write a history of plant introduction to the USA. Ryerson wrote such a history for a symposium on plant introduction held at the school in Honduras of which Wilson Popenoe was the head. This document contains the only complete list of U.S. expeditions. It was published by that school using Rockefeller Foundation funds.

Note: In 1983, when Wm. Shurtleff visited his home at 15 Arlmont Dr., Kensington, California, Mr. Ryerson was 91 years old and very clear of mind. He loaned Shurtleff his copy of a typescript of each of Frank Meyer's letters with permission to photocopy them carefully, and gave him some lemons from a Meyer lemon tree growing in his back yard. Address: 15 Arlmont Dr., Kensington, California 94707. Phone: 415-526-0230.

1256. Hymowitz, Theodore. 1984. Re: Dorsett-Morse expedition. Letter to William Shurtleff at Soyfoods Center, March 26. 1 p. Typed, with signature on letterhead. [1 ref]
• ***Summary:*** "Thank you very much for sending me information about F.N. Meyer. I wonder if we can get the American Soybean Association to microfilm Meyer's letters and maintain the copy in their vault. Please send me Ryerson's address and then I'll write to Ken Bader of ASA."

"With the Dorsett-Morse manuscript out of the way [revised, and returned to *Economic Botany*] I will soon start collating the data collected on the soybean in Illinois. The tentative title of the manuscript is *The history of the soybean in Illinois to 1920."* Address: Prof., Plant Genetics, Dep. of Agronomy, 1102 S. Goodwin Ave., Turner Hall, Univ. of Illinois, Urbana, IL 61801.

1257. Howell, R.W. 1984. Contribution of soybeans to the agriculture of the USA. *Tropical Agriculture Research Series* No. 17. p. 127-32. March. International Symposium on Soybean in the Tropics and Subtropics.
• ***Summary:*** An excellent historical overview. "Perhaps the most important person in soybean history in the United States was William J. Morse, who was appointed in 1907 to be in charge of soybean research in the US Department of Agriculture." Morse "led the development of the cooperative research program of the USDA and the State Agricultural Experiment Stations until 1949. This cooperation, which Mr. Morse had encouraged for many years, was formalized by an agreement between USDA and several stations in 1936. The cooperative program continues in its essentials, but is vastly expanded at the present time. Mr. Morse died in 1959."

1920–Dr. Clyde Melvin Woodworth, a geneticist, joined the faculty of the University of Illinois at Urbana. He was the first breeder / geneticist with primary responsibility for soybeans at this university. He constructed the first chromosome map for soybeans [1933]. He developed the varieties Illini and Chief, and made the cross which led to the variety Lincoln. In 1943 Lincoln was released jointly by the University of Illinois, USDA, and several other universities. It "was the first variety to be developed from a purposeful hybridization and was the first to be cooperatively released under the agreement of 1936.

"A contemporary and colleague of Dr. Woodworth was Professor Jay Courtland Hackleman, a crops extension specialist at the University of Illinois. Professor Hackleman was an ardent promoter of soybeans. He and his extension colleagues in other states appreciated the potential of soybeans and strongly encouraged farmers to try them on their farms."

1921-1951–Professor William Leonidas Burlison was head of the department of Agronomy at the University of Illinois. Along with Woodworth and Hackleman, he was instrumental in the establishment of soybeans in Illinois agriculture.

"These people had counterparts in many states who were equally enthusiastic and effective in encouraging farmers to grow soybeans."

1928–J.L. Cartter, a graduate student at the University of Wisconsin, was hired by the USDA as a soybean agronomist, stationed at Holgate, Ohio. In 1936, when the US Regional Soybean Industrial Products Laboratory was established, Mr. Cartter moved to Urbana, Illinois, to lead the production research at the Laboratory. He continued at that position until his retirement in 1965.

"Plant breeders were employed by USDA and stationed at Iowa State and Purdue [West Lafayette, Indiana] Universities, at later at Stoneville, Mississippi, North Carolina State Univ., and the Universities of Florida, Missouri, and Minnesota, in addition to Illinois."

1949–After the retirement of W.J. Morse, Dr. Weiss

took over his position as leader of Soybean Investigations at USDA; he served in that position from 1949 to 1953. "Under Weiss' leadership the soybean germplasm collection was formalized and facilities established at Urbana, Illinois, and Stoneville, Mississippi, for preservation and management of the collection." Weiss was followed by Dr. Herbert W. Johnson (1954-1964), "who next to Morse probably had the greatest influence on the development of soybean research." During this period "the soybean cyst nematode was found for the first time in the United States, the first disease-resistant soybean varieties were developed, and a significant increase in the size and scope of soybean research staffs occurred, including the beginnings of the major increase in research on soybean physiology."

Before 1965, the only U.S. company "with a soybean development program was the Coker's Pedigreed Seed Co. of South Carolina, where Henry Webb was the soybean breeder. In 1965 a group of midwestern seed companies joined to form the Soybean Research Foundation, Inc. (S.R.F.), and employed A.L. Matson of Missouri as a soybean breeder. During the 1970s many companies established soybean variety development groups following enactment by Congress of the Plant Variety Protection Act of 1970. Consequently the number of varieties available to farmers has increased manyfold. In 1983 it is estimated that at least 300 different varieties were offered for sale in Illinois alone."

Also discusses protecting soybeans from diseases, insects, nematodes and weeds, as well as plant physiologists who worked on soybeans (he pioneering work being done by Garner and Allard on photoperiodism). The Northern Regional Research Center at Peoria, Illinois; since 1942 soybean utilization research as been based here. International programs including INTSOY. Growing interest in food uses of soybeans (tofu, soymilk) including the Soycrafters Association. Rise of the soybean processing industry. The American Soybean Association. Address: Emeritus Prof., Former Head, Dep. of Agronomy, Univ. of Illinois, Urbana, IL.

1258. Cunningham, Isabel S. 1984. Concerning Frank N. Meyer and his death (Interview). *SoyaScan Notes.* April 14. Conducted by William Shurtleff of Soyfoods Center. Followed by letter of June 18.

• ***Summary:*** Her book on the life and work of Frank N. Meyer will be published next month. She read the Counselor report on Meyer's death. His body was found 1 week after his death so it was badly decomposed. Could not tell what happened and Counselor did not want to find evidence of foul play, which could have sparked an international incident at a time when tensions ran high. Two USDA men who themselves were plant collectors and who read her manuscript insisted that Meyer could not have committed suicide before he delivered his collection.

The photo on the last page of her NAL article is probably at the National Agricultural Library (NAL) or maybe at the National Arboretum. Ask Alan Fusonie to send a negative.

At the National Archives. Record Group 54 = Bureau of Plant Industry. Division of Plant Exploration. Project Studies. Lots on Meyer and Dorsett there. Boxes and boxes. Meyer = Vol. 105-09. Three volumes of materials from Dorsett's China trip. Ask Richard Croford about this and if William Morses's files might be there. It was Irwin Smith who (she thinks mistakenly) said Meyer was a Buddhist, etc.

A good source of information on agricultural history is Dr. Vivian Wiser, Historian, Agricultural History Branch, Economic Division, Economics, Statistics, and Cooperatives Service, USDA, Washington, DC 20250 (Phone: 202-447-2474). Vivian has been with the Agricultural History Branch 40 years or so and is wonderfully kind and helpful.

The National Arboretum has many of Meyer's 1,741 photos. The Arboretum staff does not have time to search for negatives, a dusty and time-consuming job. Address: 212 Wardour Dr., Annapolis, Maryland 21401. Phone: 301-268-2384.

1259. Cunningham, Isabel S. 1984. Frank N. Meyer: Plant hunter in Asia. Ames, Iowa: Iowa State University Press. xviii + 317 p. Illust. (31 black-and-white photos). General index. Taxonomic index. 24 cm. [70 ref]

• ***Summary:*** An extremely well researched and well written book about America's greatest and most colorful plant explorer, who introduced many soybean varieties to the USA. These include: PI 19184 and PI 19186, both received by the USDA in Aug. 1906.

Contents: Maps (one for each of his 4 expeditions). Preface. Acknowledgments. Setting the stage: 1. The past is prologue. 2. In the beginning. 3. Rendezvous with destiny. The first expedition: 4. Stranger in China. 5. The first winter. 6. Journey to the north. 7. The journey continued. 8. Assignment to the Wu Tai Shan. 9. The riches of Shantung (Shandong). 10. A harvest for America. 11. A plant explorer at home. The second expedition: 12. Europe revisited. 13. Bridge to Asia. 14. Delay and frustration. 15. Privation and postponement. 16. The Tien Shan. 17. The Altai Mountains. 18. The alfalfa project. 19. The Volga to the Potomac. 20. Interlude in America. The third expedition: 21. Peking (Beijing) via Siberia. 22. A delayed journey. 23. The long march begins. 24. The border of Tibet (*Xizang*). 25. Lanchow (*Lanzhou*) and return. 26. Departure via Chekiang (*Zhejiang*). 27. Home by a southern route. The fourth expedition: 28. Peking (Beijing) via Japan. 29. *Terra sancta.* 30. The wild pears. 31. Impasse in Ichang (I-ch'ang or Yichang). Journey's end: 32. Aftermath. 33. His contemporaries speak. 34. Meyer's legacy today. 35. Envoi. Appendixes: A. Meyer's plant introductions. B. Meyer germplasm available today. C. Recipients of the Meyer

Medal. Notes. Bibliography.

"Ever since Marco Polo's return from fabled Cathay [in 1295] Westerners had longed for the horticultural treasures of China, where earth's richest flora had survived untouched by the Third Ice Age that had covered much of Europe and North America. The Chinese government, however, had limited foreigners for centuries to the open ports of Canton and Macao. After the Opium Wars of the 1840s resulted in greater privileges for Westerners, Robert Fortune, a Scottish plant hunter, spent nineteen years near the treaty ports, occasionally managing to travel two hundred miles into the interior disguised as a Chinese beggar with shaved head and pigtail. Later, amateurs like the French missionary-botanist Father Armand David and the Irish consular official Dr. Augustine Henry collected dried herbarium specimens of many new plants, revealing the richness and variety of China's flora" (p. 6).

At the beginning of the 20th century, a new window of opportunity opened for plant explorers in China. The crushing defeat of the Boxer uprising and the Chinese government in 1901 by the European powers, gave these powers a chance to extend their influence. Plant hunters could finally travel with a fair degree of safety into western China. In 1899 Veitch and Sons, a famous English nursery firm, sent a young collector named Ernest H. Wilson to find the ornamentals described by Father David. Wilson collected seeds of three hundred species, nine hundred pressed specimen, and thirty-five Wardian cases of living plants before he returned to England in 1902. Realizing that agricultural exploration would yield equally great rewards, David Fairchild, head of the infant Foreign Seed and Plant Introduction Section of the USDA, eagerly anticipated sending an explorer to China. But first he needed to find the right man to search vast areas, identify useful plants, and transport them to America.

"In 1889 Beverly T. Galloway, head of the Division of Plant Pathology of the USDA, had brought nineteen-year-old David Fairchild to Washington to join five plant pathologists who were working in attic rooms of the old red brick department building. Galloway's Wisconsin classmate, P. Howard Dorsett, soon joined the group. A little later, Fairchild's Kansas State classmate, shy and scholarly Walter T. Swingle, arrived with his growing library of agricultural references in five or six languages. Seeking an opportunity to learn about the flora of foreign countries, Fairchild accepted a Smithsonian fellowship to study in Europe. Aboard ship he met Barbour Lathrop, a well-to-do gentleman who later took him on an extended tour of the Pacific and showed him fruits, grains, and ornamental plants that could be valuable in America. Returning to Washington in 1897, David Fairchild knew exactly what he wanted to do with his life.

"With the help of W.T. Swingle, he conceived a plan to divert twenty thousand dollars of the funds appropriated for the wasteful Congressional Seed Distribution Service in order to finance a section for the specific purpose of introducing new and useful crops into the United States. He enthusiastically presented this idea to the secretary of agriculture, James Wilson, who approved the plan and asked him to organize the new section. Housed on the fifth floor under the eaves of the old Department of Agriculture building and staffed by one teenage secretary, the Foreign Seed and Plant Introduction Section became a reality when Congress passed the revised appropriation bill in July, 1898."

"Though David Fairchild traveled for the next several years as a special agent of the Foreign Seed and Plant Introduction Section, he never forgot his hope of sending a long-term plant explorer to China. In England he visited Augustine Henry to try to persuade that distinguished amateur botanist to return to Asia as a collector for the Department of Agriculture. Though Dr. Henry declined Fairchild's offer, his enthusiastic account of the unexplored fertile plains and useful plants of the western Chinese provinces made a deep impression on David Fairchild.

"He returned to Washington in 1903, determined to initiate agricultural exploration in the Orient. By this time the Foreign Seed and Plant Introduction Section had become a part of the Bureau of Plant Industry directed by Beverly T. Galloway. Galloway agreed that the collector Fairchild sought must be a good botanist who could recognize those plants that were both new and useful; a practical gardener who could gather and transport live material–scions and cuttings as well as seeds; and a man of great endurance who could tolerate all sorts of physical discomforts and walk thousands of miles where no roads existed. Choosing a plant hunter who combined these qualifications became Fairchild's chief concern" (p. 7-8).

In June 1904 Fairchild "began a series of visits to experiment stations and individual correspondents who were testing plants being introduced by the USDA. In Boston [Massachusetts], he called on Charles Sprague Sargent, the director of Harvard's world-famous Arnold Arboretum. Though these two men devoted their lives to related goals, their personalities offered a sharp contrast. Sargent, a Bostonian of ample means, assured social position, and established reputation, was strong-willed and often sarcastic, while the younger man from the Kansas prairies attracted friends everywhere because of his diplomacy and enthusiasm. Sargent mentioned that he was negotiating for the services of E.H. Wilson, who was making his second journey to the Orient for Veitch and Sons. Because of the rivalry that was developing between these two leaders in American plant exploration, this information spurred Fairchild's desire to send a collector to China" (p. 8).

When Fairchild returned to Washington, DC, in October 1904, he had still not met or even heard of Frank N. Meyer. Meyer had arrived in Washington, DC, on 20 Aug. 1901 with a letter of introduction from Hugo de Vries to Erwin F. Smith. Smith found Meyer a modest job as a gardener in the

USDA greenhouses in Washington, DC.; here Meyer worked for about 10 months–from 23 Oct. 1901 to 31 Aug. 1902. Then resigned, left Washington, DC, and for the next 4 years he traveled to Mexico and across the USA, stopping to work for the USDA in various places.

For some time, Adrian J. Pieters, who had befriended Meyer and was also of Dutch extraction, and who had directed the Foreign Seed and Plant introduction office during the last months of Fairchild's travels abroad, had been thinking of recommending Meyer to Fairchild as the man Fairchild sought. Eventually Pieters made his recommendation. Similar strong recommendations came to Fairchild from Erwin Smith, Galloway, and George Oliver, Meyer's supervisor in the greenhouses. "In March [1905] Fairchild asked Pieters to wire Frank Meyer to ask whether he would be interested in going to China as an agricultural explorer. At last Fairchild had made his decision; time would test the wisdom of his choice" (p. 9).

In Sept. 1905: "En route by sea to Tientsin [Tianjin], at Chefoo (Yantai) Meyer called on Dr. Yamei Kin and Mrs. John L. Nevius, the widow of a medical missionary who had introduced Western fruit trees there. These ladies, friends of David Fairchild, shared their considerable knowledge of the flora of northern China and showed Meyer several fine gardens. They also invited him 'to take many a cup of tea' and to eat a typical Chinese dinner" (p. 32).

"Fairchild (p. 108) requested twelve more tins of the roasted soybean coffee. He had served it to Mrs. Fairchild and Mrs. Bell without their realizing that it was not 'the ordinary coffee used by our family.'"

Talk with Isabel Cunningham. 1998. Aug. 1. Much of the story of how Fairchild and Meyer met is told in Fairchild's superb book, *The World Was My Garden* (1938). See p. 315 etc. Address: 212 Wardour Dr., Annapolis, Maryland 21401. Phone: 301-268-2384.

1260. 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.

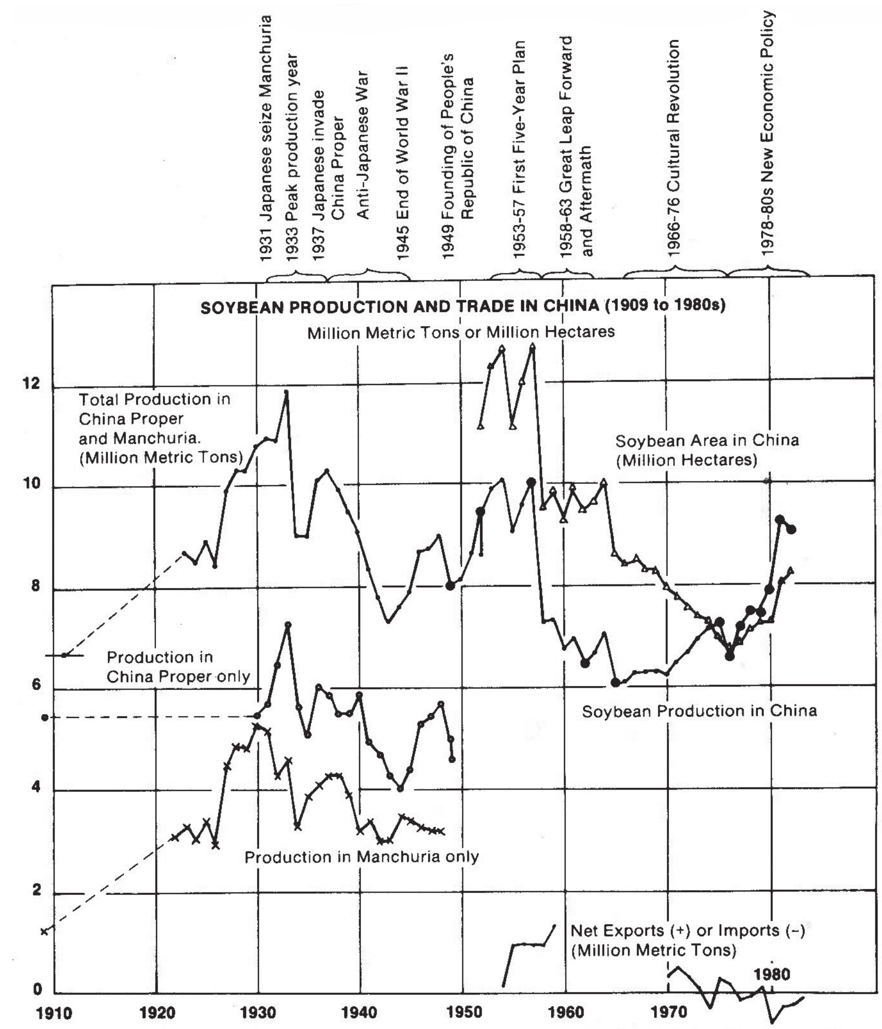
"From ancient times to well into the twentieth century, China was by far the world's leading producer of soybeans. In 1910 China proper produced an estimated 71% of the world's soybeans, and Manchuria, then an independent nation, produced another 16%. As late as 1929 the two nations produced 87% of the 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, 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



Source: Statistical Yearbook of China

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.

"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 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.

1261. Shurtleff, William; Aoyagi, Akiko. 1984. History of soybeans in North Carolina. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 16 p. Oct. 20. Unpublished typescript. Available online at www.soyinfocenter.com.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction: First state to grow soybeans and crush them on a commercial scale, leading producer from early 1900's until 1924, geography of state. The early years: (1880's-1899): Legendary early introductions (Williams 1870, Hollowell 1880), earliest documented introduction (Dabney 1881), not first in U.S. to grow soybeans, earliest publication (Dabney 1882), comparison with cowpeas, McCarthy's 1890 article, first food uses, recipe for soy, different names used for soybeans, widely grown by mid-1890's, 3 earliest varieties. 1900-1909: Start of soybeans' importance, some research in 1903, Tokyo and Haberlandt varieties introduced in 1907, first production statistics in 1909 showed 12,000 acres of soybeans. 1910-1919: very active period due to crushing, Fred P. Latham of Belhaven, North Carolina, growing soybeans by about 1910, work with William Morse, Morse a NC soybean pioneer even though he worked in Washington, DC, and Beltsville, Maryland, summary of crushing, life of C.B. Williams (important figure in promoting the growing and crushing of soybeans), publications, first USDA soybean statistics in 1917 showed NC by far the top U.S. producer, effect of boll weevil, pioneering pathology work, early insect research. 1920-1929: Continuation of pathology work, publications, 54.6% of U.S. production in 1920, lead retained until passed by Illinois in 1924, reasons for decline. 1930 to 1980's: Acreage and production grew rapidly from early 1930's, soybean breeding program initiated in 1942, interest in history of its soybean crop, soybean festivals held in 1982 and 1983. Address: Lafayette, California. Phone: 415-283-2991.

1262. 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 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.

1263. Boyer, Robert A. 1985. Reminiscences: Automotive design–Oral history project. Dearborn, Michigan: Henry Ford Museum and Greenfield Village. 130 p. Accession #1673.

• ***Summary:*** This is the transcript of an interviews conducted

by Dave Crippen of the Henry Ford Museum on 7 Feb. 1985 at Mr. Boyer's home in Dunedin, Florida. It covers all aspects of Boyer's work with soybeans at the Ford Motor Co., including: Growing up in Royal Oak, Michigan; his father worked in the accounting department of the Ford Motor Co. at Highland Park, Michigan (p. 1). Boyer's first meeting with Frank Campsall (p. 2). Growing up at the Wayside Inn (the oldest hotel in America, in South Sudbury, Massachusetts, p. 1-6). Attending high school in Framingham, Massachusetts (p. 6). First meeting with Henry Ford when the two ice skated together on the mill pond behind the Wayside Inn (p. 7). Moving to Dearborn in Sept. 1927 to attend Ford's Trade School (p. 7-11). Early work at the chemical plant (quarter-size model of Iron Mountain plant) in Greenfield Village (p. 12-13). Ford's trip to Germany [Peace Ship to Europe, in 1915 during World War I?] crystallized a lot of his thinking. The Great Depression and the origins of his chemurgic thinking. In 1934 the first National Chemurgic Conference was held at Dearborn Inn; Boyer was in charge of the program. Mr. Irenee DuPont attended and Mr. Ford spent a lot of time with him. Before that, the DuPonts and the big banks did not trust Ford. (p. 14). Opening of Greenfield Village in late 1929 on the 50th anniversary of Edison's first successful light bulb (p. 15). Chemical experiments on truckloads of farm crops using a retort; Frank Calvert (p. 16-19).

Experiments starting in about 1933 using hexane as a solvent to extract the oil from soybeans; the Ford Extractor (p. 20-23). Boyer's group wanted to get pure protein from soybeans. So "in the lab we developed our own process for extracting the oil... We used hexane solvent, like dry cleaning. We'd flake the beans and run them through a pipe that was full of hexane on an angle with a screw in it." Hexane solvent is "distilled out of petroleum. It has a very narrow boiling point–66º centigrade. The Ford extractor... got quite a lot of attention. We built it across the street from the chemical plant. It was about 150 feet away. Mounted it all by itself because everybody was afraid of fire." A roof was built over it but no walls. It was probably built in about 1933.

In 1933 at the World's Fair [sic, the Ford Exposition of Progress] in New York City, Boyer's group had a glass model (on a table) of this extractor that used hexane solvent.

Note: Ford boycotted Chicago's A Century of Progress Exposition which opened in 1933, in part to call attention to the company's 30th anniversary; he held his own "industrial fair," first in Detroit and then in New York, in late 1933. *Business Week* described it as "the greatest industrial show ever held." Some 2.3 million people attended the two-week show in New York.

A working model of the Ford extractor, using hexane solvent, was at the Chicago World's Fair, starting in mid-1934, in the Ford Industrial Barn. "They would never let you do that today. Too dangerous."

Research on purified soy protein and soy plastics with formaldehyde; Bakelite (p. 24-25). Use of soy oil for foundry core binders for casting the Ford V-8 engine block; thus, the soy experiments are now commercialized. Building a 50 ton/day extractor (p. 26-27). Spinning soy protein fiber like rayon, based on spinning milk protein in Italy. Using the fibers to make wrinkle resistant synthetic wool, a suit of clothes for Henry Ford and others, overcoats, neckties, felt hats. "We also found that these fibers blended in very well with rabbit fur for making men's felt hats. So the Hat Corporation of America took all the fiber we could make. It wasn't very much and they would blend it in with rabbit fur. And they actually had them [the men's felt hats] on the market." Rabbit fur is very expensive (p. 29-36). Ford's suit of clothes contained 65% wool and 35% soy fiber. Boyer leaves Ford Motor Co. in 1943. Problem with fiber was tensile strength, especially wet strength. Ford's interest in this fiber work, and his fitness at age 75 (p. 37-38). Ford "was not a true vegetarian but he was pretty close" (p. 38). Edsel Ruddiman's work with foods (p. 39-47). Boyer and Ruddiman attend American Soybean Assoc. soybean conference in Washington, DC [in Sept. 1932] where they saw "leather-like products that the Chinese make" [yuba]. Boyer tried unsuccessfully to use the idea to make "synthetic leather." USDA's experimental farm in Holgate, Ohio, where many soybeans sent back by W.J. Morse were tested (p. 40-42). Work with soybean milk (p. 43-46). The executive dining room in the Engineering Laboratory. Henry Ford invited Boyer to lunch there about 6 times (p. 45). Development of soy ice cream; lipoxidase enzyme inactivation (p. 45-46).

Visits to Battle Creek, Michigan and Dr. John Harvey Kellogg (p. 47). Boyer's work was with industrial products; the plastic car and structural plastics with hemp, flax, and phenol formaldehyde (soya protein Bakelite resin) (p. 47-64, 70). Making trunk lids using a hydraulic press (p. 50). Ford's famous axe demonstration on a trunk lid (p. 50-52). Lowell Overly and Joe Stewart (p. 53-56, 61, 78-79). Boyer drives the plastic car home (p. 63). Ford's aim with the plastic car: to provide industrial markets for farmers (p. 65). World War II stops plastic car development (p. 65-66). Contract to build an airplane wing of plastic (p. 66-70). The plastic lid and car contain little or no soy (p. 70). Fiberglass and the Chevrolet Corvette (p. 71). Plexiglas and the B-24 bomber made at Willow Run (p. 72). Edsel Ford's death of stomach cancer in the spring of 1943 and its effect on his father, Henry (p. 73-74). Ending work with soy fiber (p. 74).

Boyer leaves Ford in 1943 and goes to work for Drackett Co. in Cincinnati, Ohio. Wife needs to leave Detroit. After 1943 Boyer's career really takes off. Dr. Gangloff (p. 75-77). Use of soy fiber by Drackett in felt hats. "We sold them a lot of fiber and we decided to build a bigger plant." Building a protein plant and a fiber plant in Cincinnati big enough to supply the hat company's demands and larger "than we

needed just to supply our fiber operation." They also had a big operation in Cincinnati for high-impact (not structural) plastic (p. 78-80). Drackett's marketing people knew how to market Windex and Drano "but they had no feeling for the soybean operation. So when Mr. Drackett died, they sold the whole soybean plant to Archer-Daniels-Midland (ADM, p. 81-83). Before Mr. Drackett died, Boyer's division had developed commercial soy products, and Drackett was making money on the plastic (phenol formaldehyde plus hemp) and the fiber (p. 81). Use of soy protein as a paper coating (p. 83). ADM finally closes the old Drackett protein plant and sells it to Central Soya, which used the million bushel elevator capacity for storage (p. 83-84).

Shortly after Mr. Drackett died, Boyer left Drackett to work on his edible soy fiber, where he owned patents. "If we can make a fiber from soy protein that resembles the outside of a sheep, why not make a fiber that will resemble the inside (p. 84-86). Idea of building an edible soy protein plant is in Cincinnati, with Mr. Drackett's approval (p. 87). Boyer tries to find companies to license rights to his landmark patent: Virginia Carolina Chemical (Taftville, Connecticut, p. 88); Swift & Co. (p. 89-92); Unilever, which was interested in peanut protein in Africa and at Port Sunlight near Liverpool (p. 92-94, 112-13); General Foods and Nabisco (Fairmont, New Jersey research lab) (p. 94, 99). Unilever and Swift pay licensing fees of $20,000 a year plus consulting fees. General Mills and Ralston Purina (p. 94-95). Why Swift dropped its interest (p. 95-96). General Mills and Bacos (p. 96). Patent expires in 1971 after 17 years (p. 96). Worthington Foods (p. 97). Ralston Purina was getting into protein. In about 1956-58 they "had bought Procter & Gamble's protein plant in Louisville [Kentucky], which was making industrial protein for paper coating" (p. 98). Worthington Foods was too small to make their own soy protein fibers, so Ralston Purina made it for them (p. 78-80). Ralston Purina's great success with edible soy protein and their small conflict: pet food vs. human food (p. 100-01). From 1961 to 1971 Boyer was receiving licensing fees / patent royalties from Ralston Purina, Worthington, and General Mills (p. 102). General Mills and Bacos (p. 103-04). Ralston Purina's patent lawsuit against Far-Mar-Co. Ralston won $8 million. Boyer testified as an expert witness (p. 104-05).

Boyer remarries and retires in 1971 (p. 102, 105, 107). Subsequent work with Miles and Worthington; the Morningstar Farms line (p. 105-08). Companies now spinning soy protein fiber (two in the Netherlands, one in Japan, one in Australia). Ford Foundation was not interested in his work with soy protein for Third World nations (p. 110). Central Soya bought the ADM plant that was located in Chicago (p. 113-14). Kellogg's Corn Soya breakfast cereal (p. 114-15). Worthington's Soyloin Steaks; all early Kellogg and Worthington vegetarian products based on wheat gluten (p. 119). When Worthington bought Battle Creek they got their lady research director; she worked at Worthington until she was quite elderly. Boyer visited her in her lab at Battle Creek several times (p. 119-20. Note: Josephine F. Williams was in charge of the lab and product development at Battle Creek, where she worked closely with Dr. John H. Kellogg. She kept similar positions at Worthington Foods, according to Ron McDermott). Henry Ford as a soybean pioneer and visionary. The soybean is now America's No. 2 cash crop and also our second largest earner of foreign exchange. "That really started from Ford. When we first started in 1931, hardly anybody ever heard of the soybean, and Henry Ford's penchant for publicity publicized the soybean... He certainly made it popular and made people become aware of it. Today it's darned important." He should be remembered as the "Father of the Soybean." "I always thought it would be nice if they would rebuild the [Soybean] laboratory [in Greenfield Village] or restore it like it was when we were doing the soybean work and give it the real credit that it deserves..." (p. 120). After Henry Ford died in 1947 his family wanted no part of any of his pet projects. They completely eradicated the old Ford company (p. 121). Henry Ford was deeply interested in the welfare of American farmers. His tractors and Model T were of great use to them (p. 121). Origins of Ford's interest in chemurgy; William Hale and Dow Chemical Co. in Midland, Michigan; the first three chemurgic conferences in Dearborn, Michigan, in May 1935, 1936, and 1937 (p. 122-27). Ford and Ruddiman establish a complete canning line for good-tasting green soybeans on the outskirts of the Ford estate. The equipment was quite expensive. When World War II threatened, Ford gave it to Michigan State University to teach canning to students. (p. 129-30). Boyer's personal impressions of Henry Ford (p. 128-30). Address: 632 Edgewater Dr. #731, Dunedin, Florida 33528.

1264. Kahn, E.J., Jr. 1985. Profiles (soybeans). The staffs of life. V. The future of the planet. *New Yorker* 61:50-56, 60-66, 68-85. March 11.

• ***Summary:*** This wide-ranging overview of the soybean, from earliest times to the present, is well written though a little patchy and scattered. Among the topics it discusses: Soybeans as a relief food. Ted Hymowitz, Benjamin Franklin, and tofu. The Shah of Iran switching to soybean oil. The attempt by the Hunt Brothers of Texas to corner the soybean market. The Nixon soybean shock. Soybeans in Brazil and Manchuria. The origin of the soybean in China and Japan. Soymilk and Dr. Harry Miller. The dissemination of the soybean to Europe and America. How the soybean became popular in America; William Morse and the USDA. Henry Ford's work with soybeans and William Atkinson. Dwayne Andreas and ADM. "There is no question in my mind but that the soybean is the fundamental future of the planet," Dwayne Andreas says.

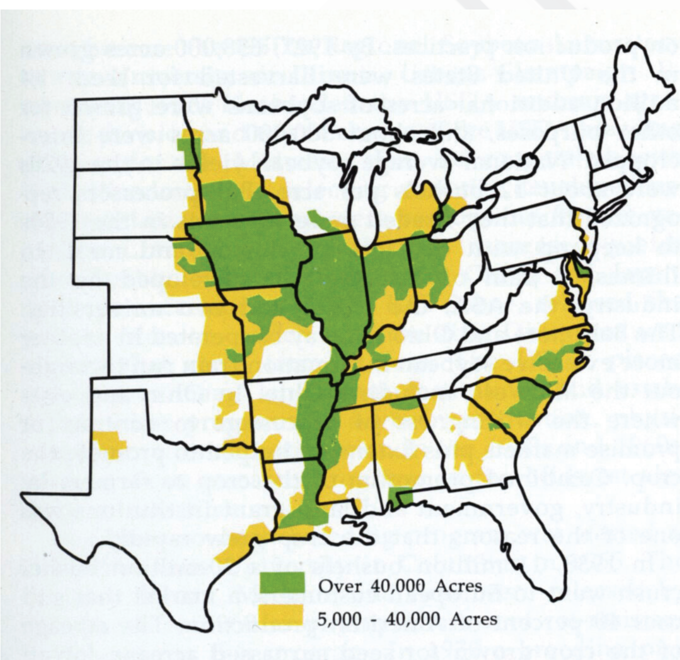
Also discusses amaranth, the winged bean, IBPGR, loss of genetic diversity, and water shortages. The article

closes with a quotation from Monkombu Sambasivan Swaminathan, the director general of the International Rice Research Institute in the Philippines: "We live in this world as guests of green plants."

1265. McBlain, Brian. 1987. Origin and history of Ohio soybean industry. *Ohio Extension Bulletin* No. 741. p. 1-7. May. Beuerlein et al. eds. The Soybean in Ohio. iv + 128 p.
• ***Summary:*** Contents: Domestication and dispersal of the soybean in the Orient. Introduction of the soybean to Europe and North America. Development of soybeans in the United States and Ohio. The soybean as food. Industrial uses. The future.

A.H. Ernst said that the soybean "had come to Illinois and Ohio from San Francisco in [actually after] 1850... In 1882 the first annual report of the Ohio Agricultural Experiment Station (OAES) reported that the species was grown that spring and had potential as a soiling crop (greenchop) and for green manure. The 1893 OAES Annual Report included a positive report on the adaptation of the crop to Ohio. Soybeans were grown annually by the OAES from 1892 and by 1904 were being grown on 14 acres... In 1900 OAES Report No. 206 recommended solid seeding the crop for forage and use of the crop as a replacement for clover..."

"The USDA played a key role in the development of this crop in the United States in cooperation with the state agricultural experiment stations. In 1907 the crop was one of the responsibilities of C.V. Piper, who was head of the USDA's Office of Forage Crops. Piper was called "the Prophet" by his colleagues; he felt that soybeans were a neglected crop that needed promotion. That year he hired W.J. Morse as the first full-time soybean researcher in the United States and possibly in the world. He was to evaluate soybean introductions for potential cultivation in the United States."



Note: We can find no evidence that Morse was hired by Piper as a "full-time soybean researcher." The soybean is not even mentioned in the correspondence leading up to Morse's hiring. Morse was told that he would be working with various forage crops. During his first two years on the job, he focused on comparing cowpeas and soybeans, but as late as 1928 he was still working with and writing articles about kudzu, velvet beans, and pigeon peas. Before long, however, his interest increasingly shifted toward soybeans and by 1909 he may well have been devoting at least half of his time to them; by 1921 he was considered USDA's "soybean expert" and in March 1931 a document first stated that he was "in charge of soybean investigations" at USDA's Bureau of Plant Industry.

"In 1908 the OAES received two dozen strains for evaluation from William Morse."

"In 1916 there were 4,921 acres of soybeans in Ohio, and by 1923 some 128,000 acres were grown as a hay crop."

"The first soybean varietal releases from OAES were four unspecified selections from varieties available before 1898. They were released as small seed lots in 1916. The variety Hamilton was first selected at OAES in 1909 from Medium Brown. Hamilton was named by 1922, but it was likely one of the four lines released in 1916. It was a late-maturing, brown-seeded hay type. John Wing, a seedsman from Irwin, Ohio, apparently sold the first private soybean variety in the state by 1925 and possible before 1912. The variety was called Wing Jet and was a black-seeded hay type."

Note: Wing Seed Co. started selling soybeans in its 1909 catalog–with high praise for the relatively new crop. Four varieties were offered: Medium Early Yellow, Ito San, Ogemaw, and Brownie. By 1910 the company was offering three soybean varieties it had developed by itself, through selection: Wing's Mikado, Mongol, and Sable. In its 1911 catalog Wing first offered a soybean variety named Jet.

"The USDA and state agricultural experiment stations had evaluated more than 800 accessions from various countries by 1925. Morse, as head of the USDA Office of Soybean Investigations, directed development of soybean varieties for the Midwest and selected many of the first ones. Varieties were evaluated and other USDA agronomic research on soybeans continued mostly at the Arlington Experimental Station [in Virginia] through 1927.

"Most varieties grown in Ohio up to the present are descendants of six selections from the original 800. These six were yellow-seeded varieties, a necessary trait for the production of light-colored soybean oil. Two of these varieties, Manchu and Manchuria, and selections from them began to supplant the pre-1890's variety, Ito San, in Ohio by 1923. Scioto and Mingo, selected in the mid-1920s from Manchu, were yellow-seeded and released in the mid-

1930s by OAES. Two varieties selected from Manchuria in 1913 and 1920 and called Manchuria 13177 and Manchuria 20173, respectively, may have been informally released by OAES in the 1930s."

Note: In a letter to Soyfoods Center dated 23 Aug. 1989, McBlain acknowledged that the first sentence above should have read "from San Francisco after 1850..."

A color map shows the location of soybean production in the United States in 1975; it was prepared from county yield data. Address: Asst. Prof. of Agronomy, Ohio State Univ.

1266. 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) 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.

1267. Blank, Eugene W. 1987. Fats and oils chronology. *J. of the American Oil Chemists' Society* 64(11):1479-82, 1484, 1486, 1488-92. Nov. Revised. Originally published in Oil and Soap. June 1942. [20 ref]

• ***Summary:*** A fascinating overview of historical highlights from 259 B.C. to 1964.

1876–Oleomargarine production begins in Germany.

1897–Sabatier and co-workers start research on catalysis, thus laying the foundation for fat hardening by hydrogenation.

1902–Normann applies the Sabatier process of catalytic hydrogenation to liquid oils permitting preparation of fats of any desired hardness.

1910–Procter & Gamble introduces the Sabatier-Normann-Kaiser process for hydrogenation of vegetable oils.

1911–Soybeans are first processed in the U.S. by Herman Meyer in Seattle, Washington, using a hydraulic press; the plant later is known as Pacific Oil Mills.

1911- Procter & Gamble offers Crisco [shortening] for retail sale.

1911–The Duren disease first appears in Scotland, killing large numbers of cattle that have been fed soybean oil meal extracted with trichloroethylene.

1915–Domestically grown soybeans are processed by the Elizabeth City Oil and Fertilizer Co., Elizabeth City, North Carolina.

1917–Soybeans are crushed by expeller press at the Chicago Heights Oil Manufacturing Co., a linseed mill.

1919–German patents are issued to Hermann Bollmann for continuous solvent extraction of fats, as well as British patents for a continuous oilseed extractor.

1922–Large-scale soybean processing [crushing] is undertaken by A.E. Staley Manufacturing Co. at Decatur, Illinois, marking the real beginning of the soybean processing industry in the USA.

1923–Funk Bros. Seed Company at Bloomington, Illinois, begins permanent soybean processing operations, using equipment from Chicago Heights Oil Manufacturing Co.

1923–The first processing of soybeans by batch solvent extraction is undertaken by Piatt County Soybean Cooperative Co. at Monticello, Illinois, a short-lived operation.

1923–The first "bible" of the soybean industry, *The Soybean,* is published by McGraw Hill Book Co. of New York. The authors are William J. Morse (who had [sic, who later] studied soybeans in Manchuria and brought samples of varieties to the U.S.) and Charles V. Piper.

1924–Eastern Cotton Oil Co. in Norfolk, Virginia, begins solvent extraction of soybeans in a continuous Bollmann extractor obtained from Germany.

1924–AOCS begins publishing the *Journal of the Oil and Fat Industries.*

1927–The AOCS' publication is renamed *Oil and Fat Industries.*

1932–The AOCS' publication is renamed *Oil and Soap.*

1947–The AOCS journal *Oil and Soap* is officially renamed the *Journal of the American Oil Chemists' Society.*

1268. Smith, Robert Archer. 1988. Work with Henry Ford, soymilk, and soy ice cream (Interview). *SoyaScan Notes.* May 15. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** In 1931 Bob Smith began his work with Henry Ford when he was placed in charge of the Greenfield Village Experimental Greenhouse, trying to find out how waste materials from farms could be used as plant fertilizers. He grew soybeans at that time. Smith's boss was Robert Boyer, who was in charge of the Chemical Plant, later better known as the Soybean Lab. One night in about late 1931 or 1932, Henry Ford went into the library at the Chemical plant all by himself and read a book titled *The Soybean,* by Piper and Morse. The next day he met Bob Smith at the greenhouse, "Clean out everything, get rid of all the tests. I'll be back this

afternoon. I want everything out of here. Serious research on the soybean started at this time.

Later William Morse of the USDA, one of the authors of the above-mentioned book, sent Bob Smith about 500 varieties of soybeans, which Smith grew out and tested on a 25 acre experimental farm.

In early 1937 Henry Ford drove Smith over to Moir House (pronounced like "More House") and on the way told Smith about how he would like to get rid of cows. Ford asked Smith to work at Moir House to develop a milk that made no use of cows. In July 1937 Bob Smith and his wife had moved into the Square House at Henry Ford's invitation. In 1938 Bob began his work on soymilk at Moir House in Dearborn. Henry Ford had lived in Moir House when he built his honeymoon house named the Square House in 1888. Ford's father had given him 40 acres of land that had timber on it. He set up a sawmill near where Moir House and lived there while he was building the Square House. Ford had the Moir House made into a laboratory in 1937.

Bob knew Dr. Edsel Ruddiman and was aware of his work with soyfoods and soymilk; several other people were working on soymilk too. Dr. Ruddiman had a modern lab with fancy equipment and electricity. But the problem at Moir House was that there was no electricity (except for a little generated by a windmill), and therefore no grinder to grind the soybeans. So Bob decided that instead of using a mill, he would extract the protein from defatted soybean meal that had been produced using a low-temperature extraction unit at Ford's Chemical Plant in Greenfield Village. He immersed the meal in a weak solution of sodium hydroxide to extract the protein, then precipitated the protein with a mixture of hydrochloric and citric acids to make a soy protein isolate. Finally he let the solution settle and decanted off the liquid leaving the isolate solution containing about 4% protein. [Note: The soy fiber must have been removed, probably by filtration.] He neutralized the protein solution with sodium potassium phosphate (which also added key minerals found in milk), bringing the pH up to about 6.7. Then he homogenized in lightly hydrogenated soybean oil (purchased from A.E. Staley Mfg. Co. and others), plus some cane and corn sugars, and vitamins. Within several months in 1938 or 1939, using this new technique based on soy protein isolate, Smith had a soymilk that Henry Ford thought was pretty good. One day after tasting a satisfactory batch, Ford got out the little notebook he carried with him and wrote: "First good milk. No cow." He showed the note to Smith. The Ford Hospital ran nutrition tests on this soymilk using white rats.

For the next 4 years, Bob Smith made soymilk at Moir House using a small-scale batch process that produced only about 1-3 quarts (in 1-quart batches) at a time. He made a small scale soybean dryer (the size of an oil drum) at Moir House. It took a half a day to make several ounces. It was never done on a large scale.

Bob worked in the Moir House until 1942 when Henry Ford asked him to move into the new Carver Laboratory, which was formerly the Dearborn Waterworks, and to set up a continuous-process soymilk plant. It could produce about 150 gallons a day. This soymilk was served mostly at the Ford Motor Co. cafeterias and at the Henry Ford Hospital in Detroit. Most of it was served in the form of ice cream, which was called something like "Frozen Soy Custard" since they were not allowed to call it ice cream.

This ice cream was first produced after the Carver Lab was in operation. They used a typical ice cream formula except that soy cream, made at the Carver Lab by homogenizing about 15% soy oil into the soymilk, replaced the typical dairy cream. So it was a completely non-dairy product. This chilled soy cream was shipped in 10 gallon cans to an outside facility, not a commercial ice cream plant, that made the soy ice cream in batches of about 10 gallons at a time. They made various flavors of soy ice cream, including strawberry, chocolate, and vanilla. It was very popular at the Ford cafeterias and the Henry Ford Hospital.

Smith remembers: "I thought the ice cream was very good. One night in about 1944 or 1945 Henry Ford II had a dinner at the old rotunda and had the press over. Everything was made from soybeans. It was sort of a recreation of the original 1934 World's Fair meal. We had soybean ice cream, soybean coffee, soybean croquettes. Mr. Ford's chef, Paul Foster, used to prepare all these dishes. He worked at our Laboratory when he wasn't traveling with Mr. Ford. Henry Ford II was interested in the soybean. He surprised me by the depth of his knowledge on the subject."

Some soymilk was also used in cooking, as to make soy bread. Virtually none was served as a beverage. Smith recalls, "As far as I know, the only ones who drank it were Henry Ford and his friends. Ford drank it almost every day. We either delivered it to his house, or he stopped by Moir House of the Carver Lab and picked it up. Every day we also baked him two loaves of soybean bread, which contained about 75% wheat flour and 25% soybean flour, plus some soymilk."

Ford also liked soybean sandwiches, which were made using soybean bread and locally picked weeds, such as curly dock. Clem Glotzhober, a botanist who graduated from Michigan State College, collected the weeds for Mr. Ford. He is still in Dearborn and would remember the details of soybean sandwiches.

The production of soymilk and soy ice cream stopped after Mr. Ford had a stroke. Bob Smith left the company in August 1945. Clem Glotzhober took over the soymilk production from Bob Smith and may have continued it for 6-12 months until the Carver Lab closed at the end of 1945. Address: 26351 Hollywood Ave., Roseville, Michigan 48066. Phone: 313-777-5394.

1269. Lockeretz, William. 1988. Agricultural diversification

by crop introduction: The US experience with the soybean. *Food Policy.* May. p. 154-66. Also available as a 39-page unpublished manuscript titled "Soybeans." (Nov. 1984). [29 ref]

• ***Summary:*** A superb analysis of the factors leading to "the spectacular rise of the soybean" in U.S. agriculture. He concludes that one indispensable factor is dedicated pioneers willing to work and persevere to introduce a new crop. Excellent historical overview. Address: School of Nutrition, Tufts Univ., Medford, Massachusetts 02155.

1270. Hymowitz, Theodore. 1988. Soybeans: The success story. In: Jules Janick and James E. Simon, eds. 1988. Advances in New Crops: Proceedings of the First National Symposium New Crops: Research, Development, Economics. Portland, Oregon: Timber Press. xxii + 560 p. See p. 159-63. Held 23-26 Oct. 1988 at Indianapolis, Indiana. [10 ref]

• ***Summary:*** Perhaps the best brief history seen on the origin and dissemination of the soybean, its introduction to America, and the reasons for its success. Contents: Introduction. Paths of dissemination–Old World.

Paths of dissemination North America (Early Period [1765-1859]; James Mease {1804}, Samuel Bowen aided by Henry Yonge {1765}, Bowen makes soy sauce, Benjamin Franklin {1770}, Thomas Nuttall {1829}, introduction of soybeans to Illinois {1851} via Japanese in the barque *Auckland* and Dr. Benjamin Franklin Edwards, John H. Lea in Alton, Illinois {1851}, J.J. Jackson in Davenport, Iowa {1852}, A.H. Ernst in Cincinnati, Ohio {1852}, Commissioner of Patents, Commodore Matthew Perry's Expedition to Japan {1854}).

Paths of dissemination North America (Middle Period [1878-1898]; George H. Cook and James Nielsen of New Jersey, McBryde of Tennessee, Sturtevant of Cornell Univ., Brooks of Hatch, Massachusetts, Georgeson of Kansas, Hellriegel & Wilfarth in Germany, W.P. Brooks' experiments with nodulation, USDA's Office of Foreign Seed and Plant Introduction).

Paths of dissemination North America (Late Period [1907-1920]; William J. Morse, Dr. Charles V. Piper, Frank N. Meyer, Osborne & Mendel, Garner & Allard, today's 13 maturity groups). Success [due to the development of new cultivars and the rise of a processing industry]. Summation.

This paper notes that in 1804 soybeans were planted near Dubrovnik, Yugoslavia [Note: Dubrovnic has been in Croatia since 1991]. They were "harvested, cooked, mixed with cereal grain and then fed to chickens for increased egg production."

"In 1878, while in Europe, Dr. George H. Cook and James Neilson of the New Jersey Agricultural Experiment Station obtained soybean seed at the Bavarian Agricultural Experiment Station and at the Vienna Exposition. The seeds were planted at the College Farm in May 1879 and harvested in October. The results were encouraging. This is the first report of soybeans having been tested at a land grant institution in the United States. Within a short time, soybean seeds were introduced from Japan by McBryde (Tennessee), Sturtevant (Cornell Univ., New York), Brooks, (Hatch, Massachusetts), and Georgeson (Kansas)."

Tables: (1) USDA soybean germplasm collection and number of strains in each group, 1988. The groups and number of strains are:

Public cultivars 454
FC and PI strains 11,133
Genetic types (T-lines) 113
Genetic isolines 457
Wild soybeans (*G. soja*) 678
Perennial *Glycine* species 522

The article is dedicated to the memory of the author's friend and colleague Prof. dr. Bogdan Belic [pronounced BEL-itch], Novi Sad, Yugoslavia.

Note: Dr. Hymowitz, in a letter to William Shurtleff of Soyfoods Center dated 22 Dec. 1984, states: "A colleague of mine [Belic], while meandering through a library in a monastery in Yugoslavia, came across an early 1800s citation of soybeans in that area. Apparently the beans were brought to the Zagreb area by a ship captain from China."

Talk with Ted Hymowitz. 1993. April 25. Ted has a copy of the 1804 document by Buconjic that mentions soybeans being planted near Dubrovnik. It was sent to him by his friend and colleague Prof. Dr. Bogdan Belic of Novi Sad, Croatia, Yugoslavia. Dr. Belic, who knew that Ted was interested in the early history of the soybean, photocopied the document and translated that portion which dealt with the soybean. Ted does not have an 1826 article by Simic that cites the 1804 document by Buconjic. Address: Dep. of Agronomy, Univ. of Illinois, Urbana, Illinois.

1271. American Soybean Assoc.; Archer Daniels Midland Co. 1990. One in a billion: The world of soybeans (Color videotape). P.O. Box 27300, St. Louis, MO 63141; 4666 Faries Parkway, Decatur, IL 62525. 14:13 minutes.

• ***Summary:*** Contents: 1. History: Photos show William Morse and Henry Ford. 2. Production: It grew from 9 million bushels in 1929, to 91 million in 1939, to 2,000 million today. 61% of today's crop is crushed to yield soy oil and soybean meal, 34% is exported as whole soybeans, and 5% is used for planting, animal food, and other uses. 3. Processing: Shows the ADM crushing plant at Decatur, Illinois, which can convert 170 truckloads/day of soybeans into oil and meal. The crushing process is shown. "Oil is drawn from the crushed beans by using a special solvent." Crushing yields oil and meal.

4. Health and economic benefits: States that "clearly the most important source of energy known to man is protein, the energy that fuels basic human existence. Soybeans are the most efficient and abundant source of protein in the world."

This soy protein is used mainly to produce animal products, but it can also be used directly in foods. "Soy flours are also popular in developing countries because pound for pound they contain twice as much protein as cheese, three times the protein of meat and fish, and four times the protein of eggs. Soybeans are also the highest natural source of dietary fiber." John W. Erdman discusses the health benefits of soy protein isolate. "Soybeans are good for the environment and help preserve precious natural resources. No other food produces more edible protein per acre than soybeans. As a comparison, cattle, which graze on land unsuitable for soybean production, can produce 58 lb of edible protein per acre, while soybeans furnish 584 lb of edible protein from a single acre. Emphasis is placed on the health benefits of soy oil and the problems of cholesterol and saturated fats; the rest of the video is basically a promotion for soy oil. 5. The Soy Mark: Used to identify "SoyOil" to an increasingly health conscious public. 6. Industrial uses: Soy oil has been used in printing inks since 1987, and is also used to control grain dust. It can also make feed more palatable, digestible, and nutritious for the animals they feed, In fact, research shows, as a dietary supplement, each percent of soybean oil added to a hog's diet will result in a 1% improvement in daily gain and a 2% improvement in feed efficiency." 7. Environmental benefits: Especially from replacing the volatile organic petroleum compounds in printing inks with soy oil. 8. The Soy Seal: Used to identify industrial products containing soy oil.

This video is directed at teachers, community groups, and consumers who may not be familiar with the soybean industry. Address: St. Louis, Missouri; Decatur, Illinois. Phone: 314-576-1770.

1272. Hymowitz, Ted. 1994. New developments related to soybeans (Interview). *SoyaScan Notes.* March 31. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ted now has a word processor and has started to write his book on the history of the soybean, which he is thinking of giving the title *Soybean Saga.* He now has funding for his various university research projects during the next year, so he is planning to take off a year to write the book. He is not sure where he will go to write it. He is planning to cite his sources, so the book will have a substantial bibliography. He now has about 300 references on wild perennial soybeans and he has recently found many more very old documents on the soybean and many more documents related to Samuel Bowen. He may write a detailed article about Bowen and soybeans for the Georgia Historical Society Quarterly; this summer he has been invited to give an after-dinner speech about Bowen before the society's members.

Ken Bader, former CEO of the American Soybean Association (ASA), had an interest in soybean history. While cleaning out an attic in one of the old USDA buildings in Beltsville, Maryland, someone found a box containing 30-35 original field notebooks kept by William Morse and Charles V. Piper, describing their experimental work with soybeans at Arlington Farm [Virginia]. The box was sent to Ted. The notebooks, which covered the years from about 1908-1953, weren't very interesting (they told which variety was grown on which plot, etc.), so Ted gave them to the American Soybean Association (ASA), which put them in its archival vault.

Note: As of July 2003 Ted says these notebooks may be in the University of Illinois archives. Address: Prof. of Plant Genetics, Urbana, Illinois.

1273. United Soybean Board. 1995. Soybeans: How a little bean becomes an ingredient in thousands of products from margarine to tofu to chicken feed (Brochure). Chesterfield, Missouri: USB. 12 panels + poster. Each panel: 23 x 10 cm.
• ***Summary:*** This attractive color publication is folded so that the first 12 panels are a brochure. However when fully unfolded, a large color poster appears. The brochure notes: In 1992/93 the USA produced 51% of the world's soybeans. An early history of the soybean in the USA [full of errors]. America livestock (including poultry) consume about 22.5 million tons of soybean meal a year. How soybeans are grown. Composition of the soybean. Foods made from soybeans: Edamame, miso, natto, soy milk, soy sauce, tempeh, tofu or soybean curd, full fat flour. Photos (each incorrect) in the brochure show: "1904: The famous American chemist George Washington Carver discovers that soybeans are a valuable source of protein and oil. 1920s: Combines first used to harvest soybeans. 1922: First U.S. soybean processing plant opens. 1929: Soybean pioneer William J. Morse spends two years in China, gathering more than 10,000 soybean varieties for U.S. researchers to study. 1940: Henry Ford takes an ax to a Ford car body to demonstrate the strength of the soybean plastic he has developed."

The color poster (16 by 27 inches) is a cartoon showing how soybeans are processed into various products, including full fat flakes, crude and degummed soybean oil, soy concentrates, soy isolates, soy flours, and defatted soy flakes. A soybean utilization/processing diagram at the bottom of the poster shows 137 different products that can be made from the soybean, including 33 whole soybean products ("Traditional soyfoods" incl. tofu, soymilk, miso, tempeh, soy sauce, natto), 33 soybean meal products (26 edible uses + 7 feed uses), and 71 soy oil products (13 edible uses, 19 industrial uses, and 18 applications for lecithin). The seven types of lecithin applications are: Emulsifying agent (4 applications), nutritional (medical use, dietary use), anti-spattering agent (in margarine manufacture), stabilizing agent (in shortening), anti-foam agent (yeast manufacture, alcohol manufacture), dispersing agent (in paint, ink, and rubber manufacture, and in insecticides), and wetting agent

(in cosmetics, paint pigments, and calf milk replacers).

Accompanying the brochure/poster is a note pad with the same slogan across the top of each sheet: "Soybeans–Designed for life." Across the bottom is written: "United Soybean Board–Investing check-off dollars." Address: P.O. Box 419200, St. Louis, Missouri 63141-9200.

1274. Kuss, Kurt. 1996. B.T. Galloway and the Bureau of Plant Industry. *ALIN–Agricultural Libraries Information Notes* (*Beltsville, Maryland*) 22(6-8):18-23. June/Aug.
• ***Summary:*** Contains a biography of Galloway, 12 excellent old photos, and ten biographical sketches including P. Howard Dorsett, David Fairchild, Walter T. Swingle, and Frank N. Meyer. "Meyer led four plant expeditions into Asia between 1905 and 1918. He was responsible for 2,500 plant introductions to the U.S." Photos show: Fairchild and Meyer talking at Fairchild's desk in about 1905. The first workers in the Bureau of Plant Industry incl. Swingle, Fairchild, Dorsett, Galloway, and Erwin Smith.

"The exhibit was developed around a photograph album which was donated to the National Agricultural Library by Robert Galloway, grandson of B.T. Galloway. The album was originally presented to Galloway in 1914 when he left the Department to become Dean of the Agricultural College at Cornell University [Ithaca, New York]. Galloway returned to the Department of Agriculture in 1917, and continued his research until he retired in 1933." Address: Reference librarian, NAL.

1275. *SoyaScan Notes.* 1996. Black soybean varieties in North America: A brief early history (Overview). Nov. 3. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Since the late 1970s, almost all of the soybeans in the USA have had yellow seed coats. Most Americans, including soybean farmers, have never heard of soybeans that were black, green, brown, white, red, bicolored, or mottled. But have yellow soybeans always predominated in America?

"Previous to the numerous introductions by the United States Department of Agriculture beginning in 1898, not more than eight varieties of soy beans were grown in the United States, namely, Ito San, Mammoth, and Butterball, with yellow seeds; Buckshot and Kingston, with black seeds; Guelph or Medium Green, with green seeds; and Eda and Ogemaw, with brown seeds." Thus of these eight pre-1898 varieties, 3 varieties (37.5%) had yellow seeds, 2 varieties (25%) had black seeds, 2 varieties (25%) had brown seeds, and 1 variety (12.5%) had green seeds (Source: Piper & Morse 1910, "The soy bean: History, varieties, and field studies," p. 27).

In this same important 84-page report, the authors describe in great detail the 285 soybean varieties that have been introduced into the United States as of 1909. Of these 285 varieties, 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 (p. 37-39).

Thus, as late as 1910, only about half of all soybean varieties in the United States had yellow seeds. But yellow soybeans were already coming to be preferred. Why? "Yellow or green seeds are preferable to darker colors, as the shattered seeds are more easily found by hogs pasturing the field or stubble" (p. 36).

The first black-seeded soybean was probably introduced to the USA from Japan in 1889 by Prof. W.P. Brooks of the Massachusetts Agricultural Experiment Station, who traveled to Japan to collect seeds. He had named this variety "Medium Black" by 1895 and in 1893 it was grown at the Rhode Island Agricultural Experiment Station, from which the U.S. Department of Agriculture received it in 1903 under the name "Japanese No. 15." By 1910 it had been officially named "Kingston" (p. 31).

In 1910 the following named, black-seeded (or partly black) soybeans (listed alphabetically) were being grown in the USA: Arlington, Auburn, Black Beauty, Brindle (brown and black), Buckshot, Chernie, Cloud, Early Black, Ebony, Extra Early Black, Fairchild, Flat King, Hankow (brown banded with black), Hongkong, Jet, Kingston, Large Black, Medium Black, Medium Early Black, Meyer (black and brown), Nigra, Nuttall, Peking, Pingsu, Riceland, Shanghai, Taha (black with olive saddle), Wilson, Wisconsin Black (p. 39-74).

In 1899 Walter Blasdale, Instructor in Chemistry at the University of California, studied the vegetables sold at Chinese markets in San Francisco. He reported that year in USDA OES Bulletin No. 68 that two varieties of soy beans were found, a yellow and a black. "The black is known as 'hak tau,' and is designated by the characters 'black' + 'bean.' Both varieties obtained from the Chinese market in San Francisco grew readily in Berkeley, attaining a height of about 3 feet, and in spite of a very dry season produced an abundant crop of seeds." In this bulletin, Blasdale included a good, full-page photo of "The upper portion of a plant of the black soy bean." He then analyzed the nutritional composition of both the original Chinese soy beans and their progeny grown in Berkeley, and presented his results in tabular form. On a dry-weight basis, the original black soy beans contained, on average, 0.35% more protein (39.62% vs. 39.27%) and 0.72% less fat (18.77% vs. 19.49%) than the yellow soy beans.

On 28 August 1906 the USDA, as part of its major seed and plant introduction, received the first black soybean [SPI #19184] noted for its food use. It came from Newchwang, Manchuria, from Plant Explorer Frank N. Meyer, who wrote: "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."

The first American recipe for using black soybeans was

published in May 1917, during World War I, in the *Wisconsin Agricultural College, Extension Circular* No. 79, titled "How to Cook Soy Beans," by the University of Wisconsin Home Economics Department. The one recipe titled "Black soy bean soup" called for "1 pint black soy beans." This same recipe appeared the next month, in the June issue of the *Journal of Home Economics* in an article titled "Soy Bean Cookery," by Nell Beaubien, of the University of Wisconsin Home Economics Department.

In 1960 the first recipe for black soybeans [called "black beans" after the Japanese term *kuro mamé* which means "black soybeans"] appeared in America in a cookbook, *Zen Macrobiotics,* by George Ohsawa. It was recipe No. 118 for Boiled soy beans. But the "black beans" were used only as an alternative ingredient. Most of the recipes for black soybeans in American cookbooks after 1960 were in macrobiotic cookbooks, where they were consistently called "black beans" rather than black soybeans–and one can only wonder if the authors realized that their recipes were really calling for black soybeans. The first macrobiotic recipe calling for "Black soy beans" was published in 1973 by Chico-San in a product catalog which contained many recipes. The first real macrobiotic cookbook to use the term "black soybeans" in a recipe title was *Aveline Kushi's Complete Guide to Macrobiotic Cooking,* published in 1985 by Warner Books (see p. 257-58).

The first packaged black soybeans sold in America for food use appeared in 1959 in New York City. They were imported from Japan by the Oriental Food Shop, and received a write-up in the May 1959 issue of *House Beautiful* magazine.

In 1962 Chico-San Inc., in Chico, California, one of America's first macrobiotic- and natural foods companies, began selling "Black Soybeans," imported from Japan. By January 1970, Erewhon Trading Co. in Boston had followed with a similar product named "Kuromame, a black soy bean import."

In August 1996 Eden Foods introduced America's first canned black soybeans–which were also organically grown in Michigan.

The following is a list of 65+ black soybean varieties introduced before about 1940 to North America, arranged alphabetically by name, with the earliest known date of introduction given in parentheses: Arlington (1910), Auburn (1910), Avoyelles (1931), Black (1900), Black Beauty (1910), Black Ebony (1918), Black Eyebrow (1915), Black Ontario (1927), Black Round (1902), Black Sable (1927), Bopp (1927), Buckshot (1907), Cayuga (1933), Chernie (1910), Claud (1914), Cloud (1909), Coker 31-15 (1934), Coker's Black Beauty (1931), Early Black (1902), Early Wilson (1927), Early Wisconsin Black (1927), Ebony (1907), Edna (1914), Essex (1927), Extra Early Black (1902), Extra Early Black Eyebrow (1927), Extra Select Sable (1927), Fairchild (1910), Flat Black (1904), Flat King (1907), Hiro (1936), Honkong / Hong Kong (1909), Jet (1909), Kingston (1907), Kingwa (1935), Kura (1936), Laredo (1920), Large Black (1907), Mammoth Black (1927), Medium Black (1894), Medium Early Black (1897), Medium Late Black (1897), Meyer (1907), Nigra (1910), Norredo (1935), Nuttall (1907), Oloxi (1937), Otootan / O-too-tan (1914), Pee Dee (1937), Peking / Pekin / Peking S (1910), Pekwa (1932), Pine Dell Perfection (1937?), Pingsu (1909), Red Sable (1927), Riceland (1907), Royal (Morse 1918), Sable (1914), Sato (1936), Shanghai (1910), Sooty (1912), Taha (1909), Tarheel / Tar-Heel / Tar Heel (1914), Tarheel Black (1915), Watson Black (1936), Wilson (1909), Wilson-Five (1918), Wing's Extra Select Sable (1911), Wing's Pedigree Sable (1916), Wing's Sable (1910), Wisconsin Early Black (1927), Wisconsin Black (1903), Wisconsin Pedigreed Black (1927).

1276. 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. 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.

1277. Jones, Jacob. 1998. Three archival collections of David Fairchild's papers (Interview). *SoyaScan Notes.* Feb. 4. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** David Fairchild was a remarkable and very influential man. In 1898 he founded the Section of Foreign Seed and Plant Introduction within the U.S. Department of Agriculture in order to centralize introduction activities. A visionary and a leader, he conducted many plant exploration trips and wrote extensively and lucidly, with an excellent historical sense. The biggest repository of his papers is in the Fairchild Tropical Garden in Coral Gables (southwest of southern Miami, just a few miles inland from Biscayne Bay), Florida, where there is a good archivist. Contact: Fairchild Tropical Garden, Research Center, Attn: Bertram Zuckerman (part-time volunteer historian), 11935 Old Cutler Road, Miami, Florida 33156. Phone: (305) 665-2844. Fairchild's papers are stored in five file cabinets, each 4-5 drawers. They have no inventory. About 4 miles away is Fairchild's former home, named The Kampong, in Coconut Grove. It is now a private residence but fully preserved, with a regular staff and a horticulturist. The original plant collections are still growing there. It is part of the National Tropical Botanical Garden Society headquartered in Kauai, Hawaii, and can be visited by special appointment.

Talk with Bertram Zuckerman. 1998. Feb. 24. In one thin file is a short letter to Fairchild from Dr. A.A. Horvath, dated 1939. Horvath was a chemist at the Delaware Agricultural Experiment Station in Newark. He wrote that he was sending Fairchild a copy of his book, he had read Fairchild's book, and he was a friend of P.H. Dorsett.

The second biggest Fairchild collection is in Nova Scotia at Alexander Graham Bell's summer home. Fairchild married Bell's daughter. Contact: Aynsley McFarlane, Site Manager, Alexander Graham Bell National Historic Site, P.O. Box 159, Baddeck, Nova Scotia, Canada B0E 1B0. Phone: (902) 295-2069.

The third major repository is in the records of the Bureau of Plant Industry, recently relocated to the National Agricultural Library in Beltsville, Maryland.

Jacob adds: Fairchild started as a plant pathologist, which meant that he also had to study plant physiology. He studied in Europe, then later went to Java. In the late 1800s, the Americans were the leaders in plant pathology, while the Germans were the leaders in plant physiology. Address: Graduate student, Purdue Univ., P.O. Box 132, Lafayette, Indiana. Phone: 765-742-8530.

1278. Jones, Jacob. 1998. Thoughts on seed and plant introduction (Interview). *SoyaScan Notes.* Feb. 11. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The archival records of the Bureau of Plant Industry (Record Group 54) are now located at the second National Archives building in College Park, Maryland; they were moved there recently from the National Archives main building in Washington, DC.

During the late 1800s and early 1900s, when plant explorers scoured the globe for new or valuable species, it is quite remarkable that they were generally given whatever they asked for. One of Russia's biggest crops was durum wheat, used to make pasta. Yet Russia gave away these precious varieties to American explorers, enabling America to eventually pass Russia as the world leader in hard wheats.

Why were the Manchurians and Japanese so willing to give Dorsett and Morse all the soybeans they asked for? Were they short-sighted? Were they not afraid that the Americans would take over their soybean export business? In fact, they sometimes asked Dorsett and Morse about this. They key is to remember that at that time in the USA soybeans were grown largely as a forage crop–not for their seeds. It was not until 1941 that the acreage of soybeans harvested for beans (seeds; 5.889 million acres) surpassed the total of that harvested for hay (forage; 3.546 million acres) or grazed or plowed under (for green manure; 1.910 million acres). Moreover, since the Americans were not collecting germplasm in their own colonies, they cannot fairly be accused of imperialistic plant collecting. Nor were they involved in germplasm theft, since they were given what they requested.

The Division of Foreign Seed and Plant Introduction sent out something like fifty plant exploration expeditions, but they did not start keeping official trip reports until fairly late in the process. Jacob is not sure why. Maybe a politician demanded to know how the taxpayers' funds were being spent. Or maybe it took a long time for leaders of the Division to fully understand the importance of what they were doing and the need to document it fully.

David Fairchild continued to be a student of Barbour Lathrop's throughout their relationship. At the Fairchild archives in Miami, Florida, Jacob found several pocket notebooks that Fairchild kept for 60 years. One whole notebook is filled with detailed instructions that he wrote for himself, based on Lathrop's teachings, of how he should act under different circumstances in various countries around the world. For example: If you (Fairchild) are with a South American gentleman who is superior to you in age and rank, you should stand up, bow slightly when he is ready to leave, pick up his gloves and cane, present them graciously to him,... etc. Address: Graduate student, Purdue Univ., P.O. Box 132, Lafayette, Indiana. Phone: 765-742-8530.

1279. *SoyaScan Notes.* 1998. The key role of U.S. federal and state government programs in starting and developing the soybean industry in America (Overview). April 11. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Since about 1980 it has been fashionable in American politics to say that the government is the cause of many of America's problems, and that the solution is to have less government. We must not forget the key role that the U.S. state and federal governments have played in introducing the soybean to America and building it into the nation's second largest farm crop. The sequence, in very brief scope, is: (1) The first soybean seeds were collected and widely disseminated to farmers across America by the Agricultural Division of the U.S. Patent Office. (2) State agricultural experiment stations played the leading role in testing and improving the new crop, and in publishing scientific information about how to grow it. Most of the soybean varietal development up to the 1970s was done at agricultural experiment stations. (3) Extension workers at these stations and Land Grant colleges educated the farmers and showed them how to grow the crop. (4) The U.S. Department of Agriculture assigned may specialists to focus on soybean research, starting with Charles V. Piper and William Morse. The vision and hard work of these men was essential to the crop's early success. (5) Starting in 1898, the Section of Foreign Seed and Plant Introduction, within the U.S. Department of Agriculture, starting bringing in new soybean varieties from East Asia. This work has continued to the present day. (6) During World War I, the U.S. Office of Home Economics did extensive research on the nutritional value and food uses of soybeans. (7) In 1923 *The Soybean,* by Piper and Morse, was published by McGraw-Hill (New York, xv + 329 p.); it was the first major book about this relatively new crop published in the United States, and it remained the most important English-language publication on the soybean for many decades. (8) Government tariffs in the early years, especially the Smoot-Hawley Tariff of 1930, were crucial in protecting the fledgling soybean industry. (9) The Dorsett-Morse Expedition to East Asia was the source of many new soybean varieties and much new knowledge about soybeans and soybean industries. (10) The U.S. Regional Soybean Laboratory (Urbana, Illinois) and the USDA Northern Regional Research Lab in Peoria, Illinois, have found important new ways to use soybeans, creating new jobs, products, and industries. (11) When World War II started, major government programs encouraged the expansion of soybean production in America. (12) Right after World War II, government programs were essential in promoting soybean exports.

1280. Hymowitz, Ted. 1998. The hundredth anniversary of USDA plant introduction to the USA, and the fiftieth anniversary of the first U.S. germplasm collection station (Interview). *SoyaScan Notes.* Aug. 9. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** One hundred years ago, in 1898, the USDA Section of Foreign Seed and Plant Introduction began to introduce seeds and plants to the United States. The key figure behind this work was David Fairchild.

This was also the fiftieth anniversary of the first U.S. germplasm collection and preservation station–which was established in 1948 at Iowa State University, Ames, Iowa (the north central region). One could argue that there were small germplasm collections at various locations in the USA before this time, but this was the first one that was systematic, government sponsored, based on modern principles, and included a broad spectrum of crops. The federal law establishing four Regional Plant Introduction Stations was passed in 1946. Other similar germplasm collection stations for seed crops were started that year or a few years later in Geneva, New York (eastern); Experiment, Georgia (southeastern; later became Griffin, Georgia), and Pullman, Washington (western). They collected all types of germplasm. Specialized collections (as for soybeans) did not start until 4-5 years later. In 1949, Martin G. Weiss of the USDA and Jackson L. Cartter of the U.S. Regional Soybean Laboratory at Urbana, Illinois, initiated the development of America's first comprehensive soybean germplasm collection. In 1951 Edgar E. Hartwig became curator of the southern soybean germplasm collection located at Stoneville, Mississippi. Richard Bernard became curator of the Urbana collection in 1954. It was the lack of such germplasm collection stations that explains why most of the soybeans collected by Dorsett and Morse no longer exists. There was no purposeful national collection of germplasm in the USA until 1948.

Earlier this year, Ted attended a celebration of both the 100th and 50th anniversaries at Ames, Iowa–which is the headquarters of the north central region of the USA. He represents Illinois in the North Central Plant Introduction Technical Group–which meets every year at Ames. There are four such groups in the USA, one for each of the four regions. The meeting this year was informal, with no proceedings or anything else published, but there were many interesting discussions and much fun.

Modern soybean varieties are built on the narrow genetic base of a relatively small number of varieties. But this base is somewhat protected, since most soybeans are sensitive to latitude and daylength, and different varieties do best at different latitudes. This is not the case, for example, with corn. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

1281. *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 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.

1282. *SoyaScan Notes.* 1998. Chronology of David Fairchild (1869-1954), organizer and head of the USDA Section of Foreign Seed and Plant Introduction (FSPI). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1869 April 7–David Fairchild is born at Michigan State College, one of five children, in a family deeply interested in ideas. 1879–When David was age 10, his father, George T. Fairchild, accepts the presidency of fledgling Kansas State College of Agriculture–a position he held until 1897. Thus David grew up on agricultural college campuses. He later attended that college and took a strong interest in the new science of plant pathology. 1888–Graduated from Kansas State College of Agriculture. 1889–Goes to Washington, DC, to work for the USDA in Dr. Beverly Galloway's new "Section of Vegetable Pathology.

1893–Resigns his position at the USDA to continue his studies in Europe. On this trip he meets Mr. Barbour Lathrop. Lathrop offers to pay Fairchild's way to Java to continue his studies. Later, the two men discussed a broad plan for systematic plant introduction under the auspices of the USDA.

1897 fall–The Section of Foreign Seed and Plant Introduction (FSPI) is organized within the Seed Division of USDA in Washington, DC, with Fairchild in charge. Fairchild detests the inclusion of the superfluous words "Seed and" in the name of the organization.

1898 March 22–Congress allocates $20,000 for the collection, purchase, testing, and preparation of foreign seeds, plants, bulbs, shrubs, and trees. Fairchild serves as "Explorer in Charge" for the next 27 years. He spends much of his time from 1898 to 1903 travelling in search of new plants. He temporarily resigned from Oct. 1898–Aug. 1900, and in the position of "Special Agent" plant explorer he made a "quick reconnaissance of the world."

1900–Bureau of Plant Industry is organized within the USDA. 1901 July 1–The Bureau of Plant Industry is formally established; it includes the former Division of Seed and Plant Introduction. It was the first official agricultural organization of its kind devoted exclusively to plant introduction. 1901 March 1–The Section of FSPI is placed under the Bureau of Plant Industry; it was referred to successively as the Office of Foreign Seed and Plant Introduction and then the Office of Foreign Plant Introduction. 1904 June to Oct.–Grand tour of the USA visiting experiment stations and people testing plants being introduced by the USDA, including Charles Sprague Sargent, director of Harvard's famous Arnold Arboretum [Cambridge, Massachusetts], and P.H. Dorsett at the new USDA plant introduction garden in Chico, California. Adrian J. Pieters directed the Foreign Seed and Plant Introduction Office during the last months of Fairchild's travels. 1904 Nov.–Fairchild meets Marian Bell, daughter of Alexander Graham Bell, whose sister had married into the Grosvenor family of *National Geographic* fame. He quickly falls in love. 1905 March–Fairchild learns of Frank N. Meyer from fellow Dutchman Adrian Pieters and coworker Erwin F. Smith. Soon thereafter, on March 10 Fairchild asks Pieters to telegram Meyer in St. Louis, Missouri, 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 would pass before Meyer left St. Louis for Washington, DC.

1905 April 25–Fairchild and Marion Bell are married at Twin Oaks in Maryland. Grosvenor becomes Fairchild's brother-in-law. Wanting to live as far out in the country as possible, they bought (that summer) a 40-acre tract of land in the woods near Kensington, Maryland, through which Rock Creek flowed. Beyond the suburbs of Maryland, it was 10 miles northwest Washington, DC, and a mile beyond the end of the Chevy Chase. They soon build a home and plant many Japanese cherry trees and a garden; Barbour Lathrop named the place "In the Woods."

1905 July–Fairchild and Meyer first meet in Washington, DC, and instantly become mutual friends.

1916–David and Marian Fairchild purchase a piece of property located in Coconut Grove on Biscayne Bay, Florida;

they name it The Kampong. On the property were many fine old tropical trees.

1934 Feb. 9–The Division of Plant Exploration and Introduction is established by the merging of the former Division of Foreign Plant Introduction and the former Division of Botany. 1935–Fairchild retires from active service, and spends and increasing amount of time at The Kampong in Florida. 1954 Aug. 5–Fairchild dies of a cerebral hemorrhage in Miami, Florida.

1283. Stanton, Josh. 1998. Brief history of Coker Pedigreed Seed Co. of Hartsville, South Carolina (Interview). *SoyaScan Notes.* Oct. 8. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Josh was a soybean breeder for Coker Pedigreed Seed Co. from 1966 to about 1991. He owns a number of early Coker seed catalogs. In the 60th anniversary catalog, there is a nice history of the company. This seed company was founded by David R. Coker in about 1902 in Hartsville, South Carolina, primarily for cottonseed–which remained the company's mainstay over the years. By the 1960s Coker was breeding cotton, tobacco, soybeans, wheat, and corn. In 1978 Coker was sold to KWS, a German company, which kept it for about 10 years then, in 1988, sold it to Northrup King. Northrup King closed it down in phases, so there is nothing left of the company in Hartsville, except a Northrup King (Novartis) sales office. The wheat program was moved to Arkansas in about 1989, and the soybean program was also moved to Arkansas in early 1991. Northrup King already had a soybean breeding program in the small town of Bay (near Jonesboro), Arkansas, led by Howard Gabe. Josh was not the first soybean breeder at Coker, but he probably had a longer tenure than anyone else. It is hard to say who Coker's first soybean breeder was. [Note: It was probably G.J. Wilds.] One early variety, Yelredo, was a selection from natural crosses. Varieties were pretty mixed up back then, so many varieties came out of selections from other varieties. Coker didn't have an organized soybean crossing program until the 1940s. One of the Coker girls, Mary Coker Joslin, did a little work on soybeans in the 1940s, but the company didn't start to do it intensively until the early 1950s, under Jim W. Neely–who was hired as vice-president of research. Neely was already a cotton breeder, so he ran a dual breeding program. The soybean breeding was a small program that was combined with the cotton program. There were not many private soybean breeders back in those days; Coker may have been the first. Another early company was McNair Seed Co. in Laurinburg, North Carolina. In the late 1950s (between 1955-1958) Henry Webb took over the cotton and soybean breeding programs from Neely–who continued to serve as vice-president of research. Josh went to work for Coker in 1959 as assistant breeder of small grains (oats and wheat). Then in 1966 Josh went to work in the soybean breeding program, still under Henry Webb. In 1972 they thought they saw a chance to make a profit on their soybeans, so they split off the soybean breeding program, and made it into a separate division, just after the Plant Variety Protection Act was passed in 1971.

Josh thinks that Coker was one of the earliest, if not *the* earliest, private companies that bred soybeans. Other companies did selection, but Coker did real breeding, which means crossing or hybridization. Nevertheless in the early days, many people called themselves "breeders" even though they were only doing selection. Wilds was crossing soybeans by 1937, according the *Yearbook of Agriculture* published that year. Wilds died before Josh arrived at Coker. Wilds did not have a PhD; his doctorate was honorary. Although one can learn the mechanics of crossing soybeans by watching a skilled person for 15-20 minutes, getting good at it takes much longer.

William Morse communicated quite closely with the Coker family and he visited them in South Carolina. Dr. Hartwig said that he once chauffeured Mr. Morse to the Coker's home–probably in the 1940s, when Hartwig was at Raleigh, North Carolina. His letters might be in the David R. Coker papers in his archival collection at the University of South Carolina at Columbia.

John E. Wannamaker (pron. WAN-uh-may-kur) was a farmer who "diddled in plant breeding" (he was mainly a selector) and also owned a small seed business in St. Matthews, South Carolina–which is about 65 miles southwest of Hartsville. John was heavy into cotton breeding and in about the 1940s he also did a little work with soybeans. He developed some soybean varieties he called J.E.W., after his initials. They had numbers, such as J.E.W.-45, etc. For more information on this company, call Luther Wannamaker in St. Matthews. He sort of inherited that program then got out of the soybean work, and donated the whole thing to Clemson University. Wannamaker probably had some seed catalogs.

Note: The following are some of the soybean varieties developed by Coker preceded by the earliest year seen for them in the literature:

1931–Coker's Black Beauty, 1936–Coker's 31-15 [Pee Dee], Coker's 31-9, 1939–Yelredo (Coker's 31-9).

1948–Oloxi (Coker's Black Beauty), Pee Dee (Coker's 31-15), Yelnando (Coker's 433), Yelredo (Coker's 319).

1973–Coker-102, Coker 240, Coker-Stuart (all three are vegetable-type soybeans). Address: 222 Holly Dr., Hartsville, SC 29550. Phone: 843-332-0135.

1284. Anderson, Jane. 1999. Re: Who was E.C. Johnson of Stryker, Williams County, Ohio? Letter to William Shurtleff at Soyfoods Center, Jan. 14–in reply to inquiry. 3 p. Plus 12 p. of enclosed documents. [7 ref]

• ***Summary:*** The name E.C. Johnson of Stryker, Ohio, appears at least six times in published documents in connection with soybeans. He is first mentioned by USDA

soybean expert William Morse in a letter dated 15 Oct. 1921; Morse lists the names of 19 men in 11 states who he believes are qualified and would be interested in serving on a committee to standardize soybean nomenclature. One of these men is E.C. Johnson of Stryker, Ohio. Since Morse probably knew these men personally, it seems unlikely that he would have misspelled any of their names. Charles E. Meharry, Secretary of the American Soybean Association, wrote an article titled "Fourth annual business meeting: Chicago, Illinois–1923." Published in the *Proceedings of the American Soybean Assoc.* (Sept. 1925, p. 24) it stated that at this 1923 meeting, E.C. Johnson was elected one of two vice-presidents of the Association. One year later, at the "Fifth annual business meeting: Chicago, Illinois–1924," E.C. Johnson was again elected a vice-president of the Association. In 1928 William Morse compiled a list of "Officers of the American Soybean Association (1920-28)," which was published in the *Proceedings of the American Soybean Assoc.* in 1928. E.C. Johnson is shown as having been vice-president in 1924 and 1925. Note that Morse was president of the association in 1924 and 1925 so it is highly unlikely that he would have spelled the name of his vice-president incorrectly twice. Then in May 1944 and in Aug. 1970 E.C. Johnson appears in lists of officers of the American Soybean Association published in *Soybean Digest.*

Yet a Johnson family genealogist in Stryker (Rod Miller) had never heard of E.C. Johnson and was unable to get any details about his life, birth, marriage, or death. So Soyfoods Center hired Jane Anderson of Stryker, who has experience doing genealogical research, to try to find out more about this man. She came up with nothing–as follows.

Birth records: She found a birth record for an Elmer C. Johnson, born on 9 Feb. 1875 in Northwest township, Williams County, Ohio. His father was Milton G. Johnson and his mother Violet A. Brown. She could find no birth record for an E.C. Johnson in Springfield township from 1878 to 1900. Note: Elmer S. Johnson (a soybean pioneer from Stryker) was born on 28 Feb. 1879 at Springfield township (south of Stryker), Williams County, Ohio and died on 22 Feb. 1920 in Columbus, Ohio, at the home of his brother, E.F. Johnson; his parents were Simon Johnson and Lucinda Wieland Johnson.

Marriage records: Jane could find no marriage record for E.C. Johnson from 1881 to 1903.

Death records: A search of the Ohio Death Certificate Index 1913-1937 on the Internet (www.ohiohistory.org/dindex) found one Edward C. Johnson who died on 16 April 1936 in Trumbull County and six Edward Johnsons. Of these six, three have no date of death given; two died in Franklin County and one in Cuyahoga Co. The other three died as follows: Cuyahoga Co. 2 Sept. 1934, Hamilton Co. 3 Sept. 1935, and Hamilton Co. 12 March 1933. A county map of Ohio shows that none of the counties in which these Johnsons died is near Williams Country, which is in the northwest corner of Ohio; it borders Michigan on the north and Indiana on the west.

Census records: No E.C. Johnson was found in the 1900, 1910 or 1920 U.S. Census of Springfield Township, Williams County, Ohio. In the 1880 census for Bridgewater Township, Williams Co. we find a Johnson family (family No. 117). Father: Milton G. Johnson age 27, laborer. Wife: Violet A. [Brown] Johnson, age 30. Son: Elmer C. Johnson, age 5. Note: This must be the Elmer C who was born in 1875 (see above).

Farm Journal Illustrated Directory of Williams County, Ohio: Published in 1918, this directory (p. 116) has entries for Elmer S. Johnson and Solomon Johnson, but none for E.C. Johnson.

Plat book of 1918: A book titled *Standard Atlas of Williams County, Ohio, including a Plat Book of the Villages, Cities, and Townships of the County* was compiled and published in 1918 by George A. Ogle & Co. The map of Springfield township shows five farms, all located southeast of Stryker, that belong to people surnamed Johnson. Three (including "The Johnson Seed Farm"–235 acres) belong to Simon Johnson; total acreage: 235 + 80 + 40 = 255 acres. The Walnut Ridge Farm of 200 acres belongs to Solomon Johnson and contains the residence of Frank Johnson. A farm of 160 acres belongs to E.S. [Elmer S.] Johnson. Photos show: (1) "One of the barns on the Johnson Seed Farms, growers of soy beans, seed oats, seed wheat and other farm grains, Stryker, Ohio." (2) Mr. and Mrs. Frank Johnson and family [4 children], Stryker, Ohio.

Probate records: The index to Probate Records 1925–1972 (Wills and Administration of Estates) was searched and no E.C. Johnson was found.

Dec. 1934 soy bean meeting: The *Brian Press* and the *Bryan Democrat* Dec. 1934 issues were searched for any record of the annual meeting of the American Soybean Association in Chicago; nothing.

So who was E.C. Johnson. Let us consider four theories: (1) He was one and the same person as Elmer S. Johnson, who also lived in Stryker, Ohio. But this is impossible. Although Elmer was a soybean pioneer, he died in Feb. 1920, whereas E.C. Johnson was elected vice-president of the American Soybean Association in 1923 and 1924. (2) He was one and the same person as E.F. "Soybean" Johnson. This now (Jan. 1999) seems the most likely theory. For details see "Chronology of E.F. 'Soybean' Johnson" at SoyaScan Notes, Jan. 1999. (3) He was a different person who lived in Stryker, Ohio. This seems quite unlikely. The search described above can find no evidence of this. (4) He was a different person who lived in Ohio but not in Stryker. Address: P.O. Box 528, Stryker, OH 43557-0528.

1285. Bernard, Richard L. 1999. Re: Information on large-seeded soybeans. Letter to William Shurtleff at Soyfoods Center, July 27–in reply to inquiry of Aug. 30. 2 p.

Handwritten on letterhead.

• ***Summary:*** He encloses a list of some additional soybean varieties that Shurtleff may wish to consider for inclusion in his "large-seeded" list. He also encloses a report he made at this year's soybean breeder's conference that includes a table for food-type US and Canadian public varieties and their year of release.

He includes key pages from several RSLM [Regional Soybean Laboratory Mimeograph] documents showing when the term "Maturity Group" was first used. "If you consider 'Maturity Group I' and 'Group I Maturity' to be roughly equivalent, then the 1953 report RSLM 168 is the first, since it was the first germplasm report ('Maturity Group' was used for the Uniform Tests much earlier).

Page 2, titled "Additional varieties to consider."

Hahto released in 1918 by USDA. Copy of publication enclosed.

Agate released in 1937 by USDA.

Morse & Cartter 1937.

Tortoise Egg released in 1938 by Illinois AES [Agricultural Experiment Station], listed in Woodruff & Klaas.

Kabott released in 1939 by Ag Canada (new name), Ottawa, in 1949 Bulletin 1520.

Also listed in Bulletin 1520 and in most cases in Morse's 1948 list of "Soybean varietal names used to date" (RSLM 148, 9 p.):

Etum, released by 1941 by USDA, 23 gm per 100 seeds.

Green & Black, released in 1941 by private, Tennessee, 24 gm per 100 seeds.

Hidatsa, released in 1941 by private, North Dakota, 18 gm per 100 seeds.

Jefferson, released in 1941 by private, Tennessee, 33 gm per 100 seeds.

Kanum, released by 1941 by USDA, 19 gm per 100 seeds.

Sac, released in 1941 by Iowa AES, 26 gm per 100 seeds.

Sanga, released in 1945 by private, Illinois, 28 gm per 100 seeds.

Tastee, released by 1941 by USDA, 22 gm per 100 seeds.

Wolverine, released in 1941 by USDA, 26 gm per 100 seeds.

"I've used a secondary source of info, so you'd better check the original publication in each case. Hope this is useful. Dick B." Address: Prof. of Plant Genetics (Retired), Dep. of Crop Sciences, AW-101 Turner Hall, Univ. of Illinois, Urbana, IL 61801-4798.

1286. *SoyaScan Notes.* 2000. Chronology of soy sprouts worldwide. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 100 A.D.–Soy sprouts are first mentioned in China in the *Shen-nung Pen-tsao Ching* [Classical pharmacopoeia of Shen Nung, the Heavenly Husbandman]. Four Chinese characters [yellow + curls + big + bean] are used to refer to soy sprouts, whose use is mentioned only as a medicine, not as a food. The use of soy sprouts as a food in China did not become popular until the Sung dynasty (A.D. 960-1127). This pharmacopoeia was compiled starting in the Early/Western Han Dynasty [206 B.C. to A.D. 8] from material that had existed long before. Today it is considered by Chinese authorities as a genuine work.

1767–Soy sprouts are first mentioned in an English-language publication or in the American colonies by Henry Yonge of Savannah, Georgia. Yonge got his 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 in *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 Philipp 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.

1905-06–Soy sprouts are first produced commercially in the United States by two Chinese food companies in California: Wing Chung Long in Los Angeles, and Quong Hop & Co. in San Francisco.

1911–Soy sprouts 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, France.

1914–D. Bois in France publishes the earliest illustration seen of a soy bean sprout.

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.

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" in 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."

1941-45–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) 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 pork 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 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 mean substitutes. Soy sprouts were in two of the dishes served to the 67 media representatives.

1960s-2000–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-Americans.

1287. Hymowitz, Ted. 2000. One mistake that William Morse made with soybeans. William Morse's field notebooks (Interview). *SoyaScan Notes.* Oct. 11. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** During his early years, William Morse worked at USDA's Arlington Farm, Virginia, which is now beneath the parking lot of the Pentagon. Morse hurt the development of the soybean in the sense that when early soybean varieties or collections of varieties were tested, if they didn't perform well, they were thrown out–discarded. We now realize that they may have contained valuable traits unrecognized and unrecognizable at the time.

A secretary at USDA was going to discard the 40-50 field notebooks that Morse and Piper used to record information about soybeans and other forage crops. They go back to about 1912. Ted saved them and donated them to the University of Illinois archives. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

1288. *SoyaScan Notes.* 2001. Early sources of funding for the American Soybean Association (ASA) (Overview). March 11. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1920-1925. From Sept. 1920, when the forerunner of the ASA (named the National Soybean Growers' Association) was founded on the Fouts Brothers' farm in Indiana, until Sept. 1925 when the Association was reorganized and renamed, the ASA has no source of income. Its only activities were to organize an annual summer field meeting and a winter business meeting. At the fifth annual business meeting in Chicago, Illinois: "The matter of a membership fee was discussed by W.A. Ostrander and C.L. Meharry. It was moved that a committee be appointed by Mr. Morse to consider the feasibility of a regular membership with a fee attached and report at the next field meeting."

1925 Dec.–The first constitution and by-laws are drafted and approved at the sixth annual business meeting in Chicago. The provision for dues states that membership is $1.00 a year. This remains ASA's main source of income for more that 15 years–during the Great Depression.

1930–In volume II of the *Proceedings of the American Soybean Association* (published in 1930 for the years 1928 and 1929) the first advertisements appear. The 10 pages of ads (from soybean crushers, and sellers of soybean seed, inoculant, farm equipment, bags, etc.) help pay the cost of publishing and mailing the 110-page proceedings.

1940 Nov.–George Strayer begins publishing *Soybean Digest,* an excellent monthly magazine, in his hometown of Hudson, Iowa. "The coupon on the rear cover and your check for $1.50 will entitle you to a membership in the American Soybean Association and to a year's subscription

to 'The Soybean Digest' if mailed immediately." So dues are up by 50% but with them comes a major new benefit of membership. Advertisements in *Soybean Digest* help to pay for the costs of editing, publishing, printing, and mailing the magazine.

1939 Sept. "Resolutions" in *Proceedings of the American Soybean Association.* "7. The financing of the activities of the Association on behalf of soybean producers can only be met by an equitably distributed cost to all soybean producers. The directors and officers of the Association are hereby given authority to consider plans for the collection of .1 cent per bushel on all soybeans processed, and to carry out such plans as may be entered into to make such collection possible."

1941 Jan.–The "Seed Directory" section in *Soybean Digest* enables ASA members, for $1.00, to list up to three soybean varieties that they sell.

1956 April–The ASA signs an agreement with USDA's Foreign Agricultural Service for a market development project for soybeans in Japan. Up to $75,000 in Japanese yen may be used for the project. For ASA, this is a huge amount of money.

1956 May–The Soybean Council of America, Inc. is organized by the American Soybean Association and the National Soybean Processors Association. Its basic purpose is to expand the market for soybeans in the USA and abroad. "The program will be financed by voluntary contributions of 10¢ per 100 bushels ($1.50 per carlot) at the point of sale. Collections start Sept. 1 on all 1956-crop soybeans sold on or after July 15."

1966 Sept. 9–The landmark date in the history of ASA funding! North Carolina soybean producers vote to pay a half cent per bushel checkoff on all soybeans sold, starting with the 1966 crop. This is the first statewide checkoff ever put into effect on soybeans. About 75% of the 11,000 soybean producers voting favored the checkoff.

1968 Sept.–"Phase 1, ASA's plan of contribution by growers and agribusiness to launch a program of worldwide market development, begins.

1969 Nov. Phase II, ASA's voluntary ½ cent per bushel checkoff on soybeans at the first point of sale, begins in several states. Funds collected from this program will go for market development in Japan, Germany, and Iran.

1289. *Journal and Republican* (*Lowville, Lewis County, New York*). 2001. Remember when. May 2.
• ***Summary:*** "Remember when the LACS [Lowville Academy] football team of 99 years ago was the best in the North Country by virtue of its beating of Gouvernor High School for the championship? Back row, from left: Willy Morse [William J. Morse], Lee Brahmer, Roy Dextater,..."

1290. *SoyaScan Notes.* 2001. On the English-language etymology of "green vegetable soybeans," "edamamé," "vegetable-type soybeans," and "food-grade soybeans": A chronology of terminology (Overview). July 6. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** No other soyfood has had so much difficulty in finding a single, standardized name. To this day, soybeans picked when still fresh and green in the pods, boiled or steamed, and served like a vegetable, are called by a bewildering variety of names: *edamamé* (pronounced ay-duh-MAH-may, the Japanese name), fresh green soybeans, vegetable soybeans, green soybeans, edible green soybeans, green vegetable soybeans, immature green soybeans, green immature soybeans, immature soybeans, garden soybeans, garden-type soybeans, garden soys, branch-beans, etc. The short names are all ambiguous and the precise names are all too long. Fortunately, since the late 1990s, the media have increasingly used one name: edamamé.

The first attempt to describe green vegetable soybeans appeared on 12 April 1855 when T.V.P. [T.V. Peticolas] of Mount Carmel, Ohio, writing in the *Country Gentleman* said: "They are inconvenient to use green, being so difficult to hull." For the next few decades other writers followed this pattern of describing rather than naming the tender green beans.

In Dec. 1890 C.C. Georgeson, writing in the *Kansas Agric. Exp. Station Bulletin* first used the term "Edamamé" in an English-language publication to describe his seeds imported from Japan; but he was using the word as the name of a soybean variety, rather than as the name of a food type.

It wasn't until Jan. 1915 that a real name for these tender fresh beans first appeared–in the *USDA Bureau of Plant Industry, Inventory* No. 33. Referring to Plant Introduction No. 34702, from Shantung Province, China, Dr. William R. Faries of Coachella, California, wrote that he had received the seeds in December 1912. They "grow well here. They are fine for green shelled beans."

On 19 May 1917 Anna R. Van Meter, writing in the *Ohio Farmer,* called them "Green Soybeans." The only problem was that dry soybeans with green seed-coats are called by the same name.

In July 1918 William J. Morse, wrote in the *USDA Farmers' Bulletin* No. 973 about this "green-vegetable bean."

The name we prefer was coined by William Morse while studying soybeans in Japan. In July 1929 he first called them "Vegetable soybeans," then in Jan. 1931 he started using the term "Green vegetable soybean," and finally in March 1932 "green vegetable soybeans" (our preference). Morse made a major effort to introduce both the new varieties and the new way of eating them to America.

During the 1930s, six new terms were introduced: "green shelled soybeans" (USDA Bureau of Home Economics, 1933), "fresh green soybeans" (Carey Miller of Hawaii, 1933), "green immature soybeans" (Carey Miller and Ruth Robbins, 1934), "shell soy beans" (Dr. John

Harvey Kellogg, letter of 9 Dec. 1935 to William Morse), "immature green soybeans" (Dr. A.A. Horvath 1938), and "immature garden soy beans" (Helen Parsons, Abby Marlatt, and George M. Briggs, 1939).

The name "Green vegetable soybeans" first appeared in the title of a publication in 1935; it was an article by Morse in the *Proceedings of the American Soybean Association* (p. 44-45). In the same article he began to search for terms to describe the new *type* of large-seeded Japanese soybeans from which the best edamamé are grown: Being unaware of the word edamamé, he coined the terms "vegetable types" and "green vegetable types." In 1938 he began to call them "edible soybeans."

But the name that stuck was first appeared in March 1939 in a famous bulletin titled "Eighteen varieties of edible soybeans," by J.W. Lloyd and W.L. Burlison of the Illinois Agricultural Experiment Station. They called them "vegetable-type soybeans" and distinguished then from typical "field-type soybeans."

Other terms used to refer to regular soybeans include "grain type" (Deodhar et al., 1973), "oil beans" (Liu et al., 1995), and "commodity soybeans" (Poysa, 1999).

During the 1930s and 1940s William Morse did more than any other person to try to introduce green vegetable soybeans and "edible- or vegetable-type" soybeans to America as a new food and to popularize their use. He wrote and lectured widely about them, and therefore he thought a great deal about what name would best describe them. He was in a unique position to see the big picture in terms of soybean terminology, and by the 1940s he had clearly settled on the terms "green vegetable soybeans" and "edible types" as those he preferred.

After 1940 only a few new names appeared: "Garden soys" (Edward Dies, 1942), "garden-type soybeans" (Allan K. Smith, 1959), and "branch-beans" (a literal English translation of the Japanese name *edamamé*) (*Organic Gardening and Farming,* July 1977).

Then in the late 1990s a new name burst upon the scene: "edamamé," the Japanese word for green vegetable soybeans cooked and served in the pods. This name was first used in an English-language document, as far as we can tell, in 1991, by the Jameson-Williams Co. of Fairmont, Michigan. The company issued a 2-page leaflet titled "What is edamamé?" By the late 1990s and early 21st century, food writers and manufacturers were using the word "edamamé" for all kinds of green vegetable soybeans, including shelled ones that would never be called "edamamé" in Japan.

Today, most people using the term "edamamé" don't realize that they are using it to mean "green vegetable soybeans" and that the word "edamamé" has long been used to refer to a subcategory of green vegetable soybeans–namely those that are cooked and served in the pods. Moreover, many do not understand the important connection between "vegetable-type soybeans" and "green vegetable soybeans." This is unfortunate.

After studying these terminology questions for more than 25 years, Soyfoods Center would like to see the following terms adopted: (1) Green vegetable soybeans: Vegetable-type soybeans picked green and cooked until tender. They may be served either in the pods (as edamamé) or shelled. This term has a 50-year history of use in the professional literature. (2) Edamamé: Green vegetable soybeans sold, cooked, and served in the pods. For shelled green vegetable soybeans we favor the term "shelled edamamé." In Japan, the latter are just starting to become available in the produce section of grocery stores, sold refrigerated (not frozen), typically in rigid containers with clear plastic tops and called either *mukimi edamamé* or *edamamé no mukimi* or *mukimamé. Mukimi* means "shelled" and *mukimamé* means "shelled beans." (3) Vegetable-type soybeans: Certain varieties of large-seeded soybeans (most with Japanese pedigrees and clear hilums) recognized for their good flavor and texture when used as food–either as green vegetable soybeans or tofu, soymilk, etc. This term has a 50-year history of use in the professional literature. In Japan, such seeds are called *edamamé no tane* ("edamamé seeds"). They are widely available in Japan in the spring in typical paper seed packets at grocery stores next to the produce department or the cut-flower department.

An alternative, simpler approach (now used by the American media) would be to call both (1) and (2) above "edamamé" then to call the shelled ones "shelled edamamé."

Unfortunately each of these three approaches and terms has its disadvantages. (1) Green vegetable soybeans is a very descriptive term, but it is quite long and unfamiliar to most Americans. Since "shelled green vegetable soybeans" is much too long, "shelled edamamé" (a term now starting to be used in Japan) or "green shelled soybeans" might be better. (2) Edamamé is nice and short, and widely used in the American press since the late 1990s. But it is difficult for English speakers pronounce correctly if there is no accent on the last letter, yet no English words have accents, and the keyboard character (é) only exists in special foreign-language character sets, which are a nuisance to use frequently. (3) The term "vegetable-type soybeans" is easy to confuse with "green vegetable soybeans." Moreover, the term sounds strange when used to describe large-seeded (often clear hilum) soybean varieties preferred for making tofu or soymilk. In addition, most American's have never heard of "vegetable-type soybeans." The term "food-grade soybeans," widely used in Canada since the 1980s, has its own problems. First, it is often used to refer to all soybean varieties utilized to make foods, including small-seed varieties used to make natto and soy sprouts. Second, all soybeans can be considered "food grade."

1291. *SoyaScan Notes.* 2002. Growth habit of the soybean: Viny vs. erect, the wild annual soybean, and its wild

perennial ancestors (Overview). Nov. 18. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** The ancestors of the cultivated soybean (all wild perennial *Glycine* species) were all very viny, twining, and procumbent in growth habit (having stems that trail along the ground), with very small black seeds. The wild soybean (*Glycine soja*), which is an annual, is also viny, twining and procumbent with small black seeds that shatter terribly; it is intermediate between the wild perennial soybeans and the domesticated soybean (*Glycine max*). Because of this ancestry, most of the world's early domesticated soybeans were of viny growth habit and had black seeds. Thus, it would not be surprising to find a viny soybean in a farmer's garden in Ming dynasty, China. If it were a wild soybean (*Glycine soja*), it would probably reseed itself each year; the farmer would simply tend it. If it were a domesticated soybean (*Glycine max*), it would probably have larger seeds than its wild relative and might be erect, since farmers over many generations selected for large seed size and erectness; however, the growth habit might still be viny.

A small percentage of the early soybean varieties grown in the United States were viny–like cowpeas. The vines were either cut and used as forage for livestock, or left uncut and used as pasture (including hogging off). These viny soybeans, when interplanted with corn, would often climb up the corn plant to the top. Soybean varieties adapted to Southern U.S. daylengths but grown in the north, would continue to grow–in a viny way–until they were killed by the cold.

In 1910 Piper & Morse (in "The soy bean: History, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 197) classified all 285 soybean varieties introduced to the USA to date. The major grouping (p. 37-39) was by habit of growth: (1) Plants bushy, the branches without tendency to twine, the terminals rarely elongated: 202 introductions or 71% of the total. (2) Plants more or less twining, especially the long slender terminals: 83 introductions or 29% of the total. Of this latter twining group there were two subgroups: (2a) Plants erect or suberect, slender, the internodes long; pods medium to small: 76 or 26.7% of the total. (2b) Plants procumbent, rather coarse; pods small; very late: 7 varieties or 2.4% of the total. Of these 7 varieties, none had a name. Four were from India, and one each from Soochow (southeast China), Taihoku (Formosa), and Tokyo (Japan; a wild soybean from the Botanical Garden).

Thus by 1910 Asian farmers had been quite successful in selecting for erect habit of growth (and large seed size).

In 1923 Piper and Morse (in their classic book *The Soybean,* p. 162-70) described the main characteristics of the 43 varieties "that have been found agriculturally the most valuable under American conditions up to 1922." A tabulation of the growth habit of the plants shows the following: Erect and stout (and usually bushy): 34

Erect and slender: 7 (Laredo, Minsoy, Otootan, Peking, Virginia, Wilson, and Wilson-Five).

Semi-erect with twining terminals: 1 (Chiquita). Rather inclined to lodge (fall over) in rich soil: 1 (Barchet).

In summary: 80% were bushy and stout (like most modern varieties), and 95% were erect. None were described as "viny," "vining," "twining," or "procumbent."

The advent of the use of the combine (combined harvester-thresher) to harvest soybean seeds in about 1924 created a new incentive for breeders to develop plants with upright, stout, and bushy growth habit.

However in the USA most soybeans continued to be used as forage, until 1941 when the number of acres planted for seed first surpassed the number of acres planted for forage. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

1292. 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.

1293. Mescher, Kelly. 2003. The history of soybeans in the U.S.: From 1890 to 2001. *Iowa Soybean Review* (*Iowa Soybean Association, Urbandale, Iowa*) 15(2):22-23. Nov.
• ***Summary:*** This brief history focuses on soybean breeding and variety development. Soybean research in the U.S. was initiated in the 1890s by the USDA and some state universities. The Dorsett-Morse expedition to East Asia in the late 1920s and 1930s brought back over 5,000 soybean varieties. About 1,700 varieties considered to have value as breeding material were kept and became the foundation of the USDA Germplasm Collection in 1949. The remaining 2,300 varieties were discarded or lost. Also discusses: Effects of World War II. The 1950s and 1960s–mechanization, computerization, and the use of winter nurseries to grow multiple generations each year in a breeding program. The 1970s–major changes in soybean research. The Plant Variety Protection Act (PVPA) was signed into law in 1970 and later amended in 1994. This encouraged soybean breeders in the private sector to develop better varieties by giving them patent-like rights; the result was a major increase in private breeding and a decline in the importance of breeding public varieties at agricultural universities. The rest of the article discusses genetically engineered (GE) soybeans, and mentions the resistance of consumers around the world to these soybeans.

The cover photo, which goes with this article, shows a rear view of a farmer with two horses harrowing a field of soybeans.

1294. Singer, Richard. 2004. The descendants of Jacob Morse: Five family group records, with extensive notes and photographs. Minneapolis, Minnesota. 26 p. 28 cm.
• ***Summary:*** These records were printed by Richard from his genealogical database. Chart 1 is a family tree titled "Descendants of the Jacob Morse" (7 p.). An asterisk (*) following a person's name indicates a missing portrait photo in the family tree. Jacob Morse (1821-1864) was married first to Kreszentia Heinzler * (1827-1858) and 2nd to Johann Ott (1819-1904). By this second marriage he had 3 children: William Morse (1861-1941), Charles Morse (1863-), and John Baptist Morse (1863-1942).

John Baptist Morse married Lena B. Kirschner (1863-1943). They had two children: William Joseph Morse (1884-1959–of soybean fame) and Gladys Helen Morse (1887-1969). William Joseph Morse married Edna Blanche Siggers (1884-1958). They had one child: Margaret Catherine Morse (1921); she married Walter Alfred Thalman * (1920-2001).

Chart 2 is a family group sheet (6 p.) for Jacob Morse (Mors) and his first wife Kreszentia Heinzler. He was born on 21 Aug. 1821 in Ablach, Principality of Hohenzollern, Singmaringen District Court of the Kingdom of Prussia (in today's Germany). They were married on 31 July 1845 (Catholic) in Ablach. During the Civil War, in 1863, while living in Grieg, New York, he enlisted in the NY 5th Heavy Artillery (his name is "Moss" in the military records). He was wounded in a battle at Piedmont, Virginia, and died on 2 or 5 Nov. 1864 in a prisoner of war (POW) camp in Lynchburg, Virginia. He is buried at Lowville (pronounced LAU-ville), New York–where his gravestone gives his death date as Nov. 5.

Chart 3 is a family group sheet (6 p.) for Jacob Morse (Mors) and his second wife, Johanna Ott. She was born in June 1819 in Germany. They were married on 11 April 1859 in New York State. They had 3 children: (1) William Morse born 7 May 1861 in Greig, New York. Married 1st about 1880 to Hanora Cannon. Married 2nd on 8 April 1915 to Magdalena Zimmer in St. Mary's Church, Constableville, Lewis Co., New York. William died on 25 Dec. 1941. (2) Charles Morse, born March 1863 in Lewis Co., New York. (3) John Baptist Morse, born between Dec. 1862 and 27 Dec. 1863 in either Lewis Co., New York or Greig, New York. He married Lena B. Kirschner on 9 May 1883 [sic, 8 May 1883] in Lowville, New York. John B. Morse died between 1939 and 1943 in Washington, DC. Johanna died on 20 or 21 July 1904 in Lowville, New York.

Chart 4 is a family group record (4 p.) for John Baptist Morse and Lena B. Kirschner. He was born on 27 Dec. 1863 in Lewis Co., New York. They were married on 9 May 1883 in Lowville, New York. She was born on 14 April 1863, perhaps in Kirschnerville, New York, the daughter of

Nicholas and Theresa Kirschner. They had two children, the first being William J. Morse of soybean fame. John was a butcher and owned a meat market [the Union market, which he purchased with a partner, James Coffey, in March 1893] in Lowville, which he eventually sold to Thomas Clyde [or Thomas Clyne] who took possession on 1 Nov. 1886. John died on 3 Nov. 1942 in Washington, DC. Lena died on 27 Sept. 1943 in Washington, DC. John and Lena were both buried in Fort Lincoln Cemetery, Brentwood, Maryland–a Catholic cemetery near Washington, DC. His will was probated in 1942 and hers in 1943.

Note: Talk with Joyce Garrison, Wm. Morse's granddaughter. 2004. July 5. She has recently discovered new information about the parents of Lena B. Kirschner. Lena's father, Nicholas, was born on 12 Dec. 1829 at Gros Rederching, Alsace Loraine. His father, George Kirschner, was born on 26 Nov. 1795 (place unknown) and died on 13 March 1886 in Kirschnerville, New York. George married Madeleine Wetzel, who was born on 5 June 1803 in Gros Rederching (Alsace) and died on 7 May 1889 in Kirschnerville. Nicholas and Theresa were also probably married in St. Peter's Church (Catholic) in Lowville, New York. His Civil War record (from New York state) shows that he enlisted on 23 Dec. 1863 in the Union army, joining the 18th cavalry. Born in France. Occupation: Farmer. Blue eyes, light hair, light complexion. Height: 5 feet, 10 inches. Died on 10 Dec. 1864 in New Orleans, Louisiana, of diarrhea. Buried there in a war cemetery.

William Joseph Morse was born on 10 May 1884 in Lowville, New York, and baptized on 20 July 1884 at St. Peter's Church (Catholic), Lowville, New York. He married Edna Blanche Siggers on 20 Sept. 1911 in Washington, DC, at the Church of the Advent. They had one child, Margaret Catherine Morse, born in 1921. In 1933 Wm. Morse, his wife and daughter lived at 4220 38th St. NW [Takoma Park], Washington, DC. William Morse died on 30 July 1959 in Eastchester, New York, and was buried at Mt. Hope Cemetery, Hastings-on-Hudson, New York. Note: This cemetery plot was started by Alfred John Thalman, the father of Wm. Morse's daughter's husband.

Chart 5 is a family group record (1 p.) for William Joseph Morse and Edna Blanche Siggers. Edna was born on 27 Feb. 1884 in Washington, DC. Her parents were George Siggers and Marcella Simpson. Edna died on 23 Dec. 1958 in Eastchester, New York, and was buried at Mt. Hope Cemetery, the same cemetery as her husband.

Chart 6 is for Walter Alfred Thalman and Margaret Catherine Morse (Wm. Morse's only child). Alfred was born on 19 July 1920 in New York, NY. His parents were Alfred John Thalman and Anette Koonverk. Alfred married Margaret Catherine Morse on 23 Jan. 1943 in Ithaca, New York. Catherine was born on 8 Aug. 1921 in Washington, DC. Alfred and Margaret had 3 children: (1) Joyce Margaret Thalman, born 7 April 1946 in Columbus, Ohio. She married Richard Hiles Garrison on 23 May 1970 in Eastchester, New York. (2) William Alfred Thalman, born 2 June 1949 in Bronxville, New York. He married Linda Marie Fusco on 15 Sept. 1973 in White Plains, New York. (3) Robert Walter Thalman was born on 18 Feb. 1953 in Bronxville, New York. He married Lorene Hass on 9 July 1977 in Eastchester, New York. He died on 22 Aug. 1991 in Eastchester, New York, and was buried at Mt. Hope Cemetery. Alfred died on 1 June 2001 in White Plains, New York and was buried at Mt. Hope Cemetery.

Two large (5 by 7 inches) photos show: (1) Jacob Morse standing in his Civil War uniform ca. 1863. (2) Two of Jacob's sons by his 2nd marriage, taken in about 1864 when they were children–William Morse (1861-1941), and John Baptist Morse (1863-1939).

Note: Talk with Margaret Thalman, daughter of William Morse. 2004. April 14. William Morse was raised in a Catholic family. But his wife, Edna Siggers, was Protestant (Episcopalian). After the wedding, he stopped going to church and was not much interested in Catholicism. However his wife continued to go to church, and she took their two children with her. Margaret has two living children, Joyce and William. Joyce is now doing genealogical research on her family. Margaret has a book that was given to her father (Wm. Morse) when he retired from the USDA. It is a sort of scrapbook (oversized), which includes many letters from co-workers and companies making soyfoods and soybean products. Address: 8329 Hollow Wharf Drive, Las Vegas, Nevada 89128. Phone: 702-254-0380.

1295. 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.

1296. William Morse: Photographs and scrapbook (Archival collection on compact disc). 2004.
• ***Summary:*** This archival collection consists of two parts: 15 large photos and 214 pages of clippings and photos from a scrapbook kept by Morse. Each of the photos has a date (some firm, some approximate), but only three have other information (where, what doing, etc.). Many of the articles and photos in the scrapbook are dated, but the source and page number of many articles is missing.

These were scanned and sent on CD-ROM to Soyfoods Center by Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut. Soyfoods Center made full-page black and white prints of all and .JPG images of many photos and a few documents.

1297. *SoyaScan Notes.* 2004. How Rowyn McDonald helped Soyfoods Center make the transition from being publisher of printed and bound books to being a web-based digital publisher with Google Books (Overview). Sept. 3. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** 2000 Nov. 13–Paul and Gail King start publishing *The Soy Daily* as an e-zine from their website.

2002 May–Talk with Paul King about content that we could provide free of charge to their website. We discuss posting my unpublished book *History of Soyfoods and Soybeans* (HSS) on their website. I say OK if they will agree to sign a contract concerning my rights, ownership, etc. They also sell our books on their website.

2004 June 15–Rowyn McDonald starts to work for Soyfoods Center (SC) as an intern. July 8. Rowyn finishes HSP (History of Soybean Pioneers) project. Reformatting each chapter in WinWord (Microsoft Word), writing finename, authors, and copyright, printing out each chapter for SC files, and sending copy on diskette to Paul and Gail King at The Soy Daily. They soon have every chapter posted on the Web at The Soy Daily website.

2004 July 15. Rowyn finishes HSS project–Histories of countries and foods. Same format and results as HSP. So now the book, History of Soybeans and Soyfoods, which I spent many years in writing before buying my first computer, has been "published" on the Web and available worldwide free of charge.

2004 July–Joyce Garrison sends a disk of JPG images related to her grandfather, William Morse. Rowyn knows all about what to do; I know almost nothing. She copies all good images to SOIM (a soy images directory created by Tony Cooper in May 1999) and makes a two-volume bound book of William Morse prints–one for citeable documents and one for unciteable.

2004 Sept. 3. Rowyn's last day of work for the summer. She has been a Godsend. The effects of her fine work will be felt at Soyfoods Center for many years to come.

1298. Hymowitz, Theodore; Shurtleff, William R. 2005. Debunking soybean myths and legends in the historical and popular literature. *Crop Science* 45(2):473-76. March/April. [39 ref]
• ***Summary:*** States and carefully refutes each of the following seven myths: (1) "The first mention of soybean in American literature was by James Mease in 1804 (Piper & Morse, 1916)." No, it was by Samuel Bowen in 1765 (Yonge, 1767).

(2) "The soybean was introduced into the USA in 1804 by a Yankee clipper ship." No, the clipper ship lies in the realm of fantasy. The soybean was introduced into the USA by Samuel Bowen in 1765.

(3) Benjamin Franklin brought the first soybean to the USA from France. Franklin did send soybeans to the USA from Europe in Jan. 1770, however Bowen introduced them 5 years earlier.

(4) "George Washington Carver played an important role in introducing the soybean to America." No, Dr. Carver had only two research publications about soybeans.

(5) "The annals of old China set forth the fact that the soybean was an important food fully 5000 yr ago (Morse, 1918a)." No, Professor Ping-ti Ho and other authorities now place the domestication of the soybean around 3100 years ago, and not 5000 years as suggested by Morse. Perhaps future archaeological research in China will push back this date.

(6) "Soybean was perhaps one of the earliest crops grown by man (Morse and Cartter, 1937)." No. Modern archaeological and radiocarbon dating research show that at least 30 crops were domesticated long before the soybean.

(7) "The first written record of the plant (soybean) is contained in the *Pen Ts'ao Kong Mu,* which is a description of the plants of China by Emperor Shennong in 2838 BCE (Morse, 1950)." "Alas, the enchanting myths about Emperor Shennong must be dispelled because they appear to be the fabrications of ethnocentric Han historians, as is the Emperor himself." Address: 1. Dep. of Crop Sciences, Univ. of Illinois at Urbana-Champaign, Illinois; 2. Founder, Soyfoods Center, Lafayette, California.

1299. 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.

"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.

1300. Hymowitz, Ted. 2010. The growth habit of soybeans related to maturity group of origin, maturity group where grown, distance between seeds when planted, etc. Growth habit, determinate / indeterminate, and use as forage (Interview). *SoyaScan Notes.* Oct. 22. Conducted by William Shurtleff of Soyinfo Center.
• ***Summary:*** If a soybean is planted outside the maturity group to which it belongs, it will usually have a procumbent (viny) growth habit rather than an erect one. The plant just keeps growing, but never flowers. It depends also upon whether the plant has been moved to the south of the maturity group to which it belongs, or to the north. If you move it out to the south, it just keeps growing because it never receives the number of hours of darkness necessary for flowering. The soybean needs, in its zone of adaptation, a certain number of hours of darkness before it will start flowering (before floral induction). For example, a soybean in Minnesota starts flowering when it gets, say, 17-18 hours of sunlight, but a soybean in Florida starts flowering when it receives, say, 13-14 hours of sunlight.

This is phenology, completely different from indeterminate / determinate, which is a genetic trait.

Note: The way that photoperiod applied to soybeans was not understood until the work of Garner and Allard in 1920. The term "maturity group" was not understood clearly until about 1936.

In 1907 Ball (an agronomist at the USDA) wrote "Soy Bean Varieties" in which he gave a detailed description of each of the named soybean varieties imported to the USA up to that time. This description included such things as seed color, seed shape, stem diameter, height of plant (range and average), etc. Remember that the height and growth habit was dependent on the place where it was introduced from and where it was planted when he described it.

The early soybean varieties were used mostly for forage, so they were mostly procumbent (viny, trailing along the ground), not erect, as most are today. Soybeans had to be bred for erectness, especially after the advent of the combine in 1924. They were also bred to synchronize their flowering and their maturity.

When Dorsett and Morse collected soybeans in East Asia (1929-1931) most of the soybeans they saw growing there were not erect–with the exception, perhaps, of those in Manchuria and northern Japan, which have a short growing season so they stopped growing.

There are some plants, such as the cowpea and the peanut, which are always procumbent; its part of their basic nature. Address: Prof. of Plant Genetics (retired), Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

1301. Garrison, Joyce Thalman. 2011. Ancestors of William Joseph Morse (Genealogical record).
• ***Summary:*** Contains genealogical information about William Joseph Morse, his parents, and his two paternal grandparents (Jacob Morse and Johanna Ott).

Generation 1: William Morse, son of John Baptist Morse and Lena Kirschner was born on 10 May 1884 in Lowville, NY. He died on 30 Jul 1959 in Eastchester. NY. He married Edna Blanche Siggers on 20 Sept. 1911 in Washington, DC (Church of the Advent), daughter of George William Siggers and Marcella Blanche Simpson. She was born on 27 Feb. 1884 in Washington, DC. She died on 23 Dec. 1958 in Eastchester. NY.

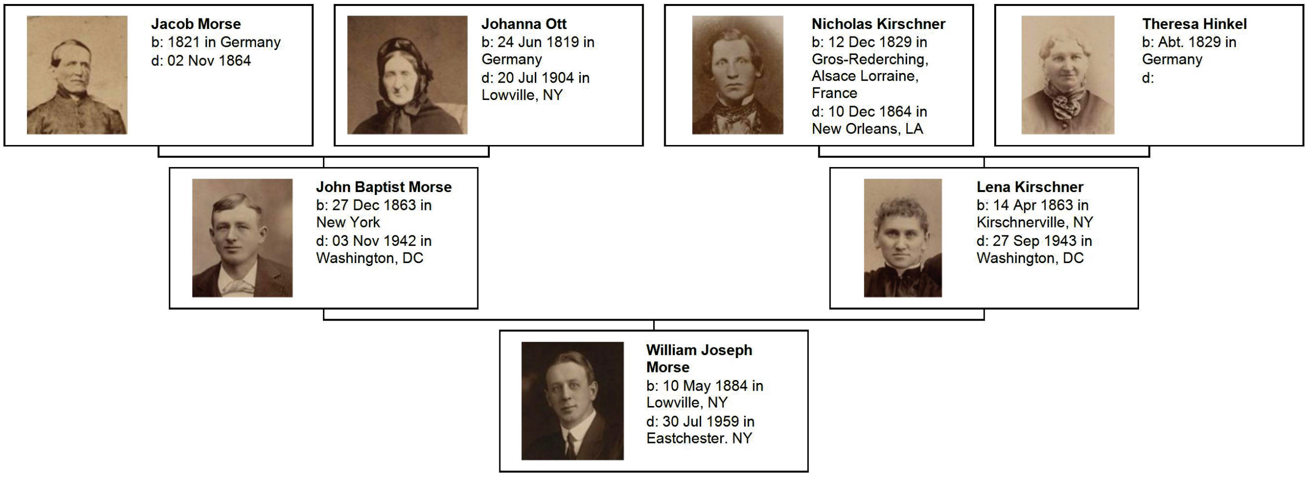
More About William Joseph Morse: Baptism: 20 July 1884 in Lowville, NY; St. Peter's Church. Education (high school): Lowville Academy, Lowville, New York. Degree: 20 June 1907; BS in Agriculture, Cornell University, Ithaca, New York. The paternal side of his family came from Alsace-Loraine. Both of his grandfathers died in the Civil War (U.S.). Burial: 1 Aug. 1959 in Hastings-on-Hudson, New York. William Morse had a younger sister: Gladys Helen Morse was born on 9 Jan. 1887 in Lowville, NY. She died on 15 Oct. 1969 in Lowville, NY.

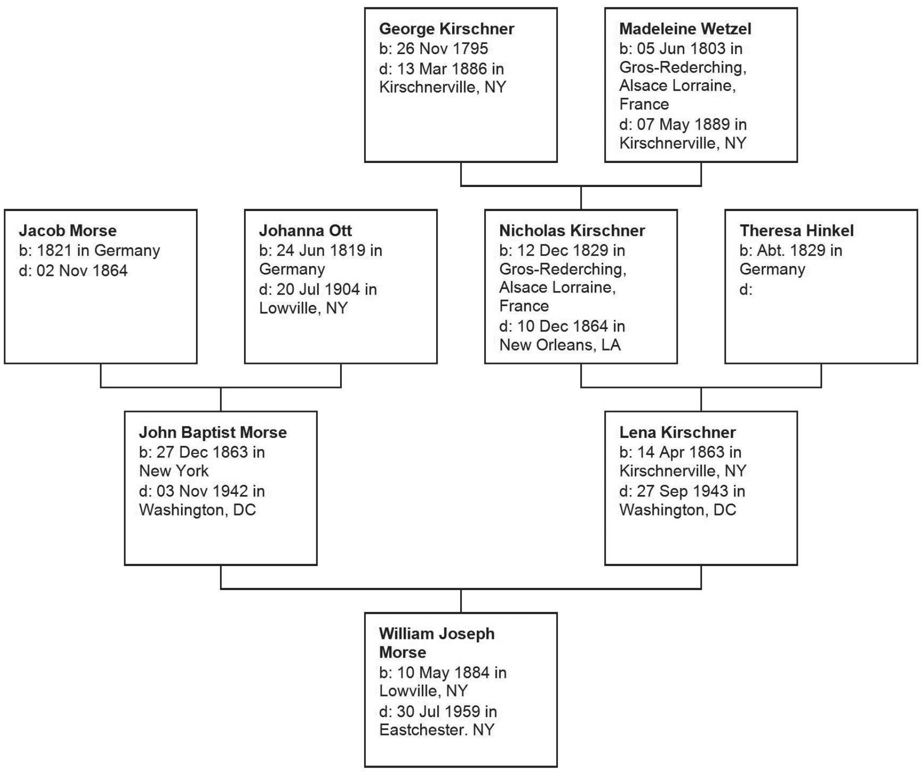
Generation 2: John Baptist Morse, son of Jacob Morse and Johanna Ott was born on 27 Dec. 1863 in New York. He died on 3 Nov. 1942 in Washington, DC. He married Lena Kirschner on 8 May 1883 in Lowville, NY.

Lena Kirschner, daughter of Nicholas Kirschner and Theresa Hinkel was born on 14 April 1863 in Kirschnerville, NY. She died on 27 Sept. 1943 in Washington, DC.

Generation 3: Jacob Morse was born in 1821 in Germany. He died on 2 Nov. 1864 (Lynchburg, Virginia; Confederate POW Camp). He married Johanna Ott before Sept. 1860. Johanna Ott was born on 24 June 1819 in Germany. She died on 20 Jul 1904 in Lowville, New York.

This genealogy was compiled and sent to Soyinfo





Center Joyce Garrison (William Morse's granddaughter) of West Hartford, Connecticut.

1302. 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.

1303. Roth, Matthew. 2012. Re: Morse correspondence at the National Archives. Letter (e-mail) to William Shurtleff at Soyfoods Center, March 9. 1 p.

• ***Summary:*** "I've had a chance to do an inventory of the Morse correspondence I took digital snapshots of at the National Archives. They are from the Morse folders from Box 92 of the General Correspondence file, which is organized chronologically, and not from the correspondence folders for the various state agricultural experiment stations.

"The Morse folders form Box 92 contained 485 letters, 395 of which dealt with named crops; 171 of these mention soybeans. You have 19 of these in your Morse book. This folder is apparently where the leftover letters went, the ones that didn't make it into any other folder. As such, many of them are short and procedural, but there are a number of longer letters from Morse's inspection tours. And some of the short ones directing Morse to send seeds to so-and-so are interesting. There's one from 1911 directing him to send soybeans to George Washington Carver, who apparently

planted them in 1912. There's also a letter from 1919 mentioning a visit to Madison College.

"I've attached an Excel spreadsheet listing the letters;..."

Matt would like to look through the state folders such as North Carolina, South Carolina, and other southern states that Jacob Jones did not look through–but he may not have the opportunity to return to the National Archives.

If you look at the tabs at the bottom (of the Excel spreadsheet he sent), you'll notice one I labeled Summary Data. This has tables that attempt to draw some conclusions from the "sample" of letters–but I fear that the sample might be too small (compared to Morse's total correspondence) and arbitrary to permit any firm deductions. But I think it's safe to say that through World War I, Morse's focus was on the South, in particular as the most likely place for a crushing industry to develop; and also that, though his and Piper's enthusiasm seems to have rapidly centered on the soybean, they remained highly active in testing and advocating other forage and manure crops.

Note: The tab "summary data" has two parts: One is organized by year from 1907 to 1926, with line 1 being a summary of "all." The second is organized by state, in descending order of the number of letters total and the number of letters concerning soy for two time periods: 1907-1926 and 1907-1918. The four most important states for soy during the period 1907-1926 were North Carolina (17 letters) followed by Illinois (8), Georgia (7), South Carolina (6), New York (6), Maryland (5), Alabama (5) etc. Address: Philadelphia, Pennsylvania 19123.

1304. Roth, Matthew. 2012. Re: William Morse. Letter (e-mail) to William Shurtleff at Soyfoods Center, April 20. 1 p.

• ***Summary:*** "I'm still trying to figure out when I might return to the National Archives. Possibly in May. I'll keep you apprised... I do feel satisfied, in a general sense, that soybeans were not Morse's only concern. When he went on his inspection tours, he noted how the Sudan grass, etc, was doing. And I have the impression that, in the teens at least, he was the 'soybean and cowpeas' guy, not just the soybean guy. In fact, I think the breeding work he did on cowpeas may have been more exciting qua breeding work: there was actual crossing and hybridizing going on. The soybean work was much more a matter of sorting and selecting and noting the occasional sport or natural cross.

"When I get the chance, I'll organize and send some other docs I've found, mostly online. On ProQuest and another newspaper site, I've found some articles on John B. Morse; I also found the Morses on census forms on Ancestry.com. It seems that Morse's dad was not simply a butcher, but was the sole proprietor of the meat market in Lowville. Then the whole family packed up and moved to DC in 1909; Morse was living with his parents in 1910. I'm not sure if his father practiced a trade in DC–the income from the Lowville market may have sufficed–but Morse's parents lived in the same house as him, or in a nearby house, it seems until their deaths. His sister, also in government service, lived with them as well. In any event, I wasn't able to find what I was actually searching for: some sort of indication of what Morse's boyhood was like–there doesn't seem to have been any profile that included his reminiscences of childhood, etc.

"I'm also waiting for some George Washington Carver letters from Tuskegee University–they have to look them up on microfilm, and I think I'm pretty far down in their queue. McMurry, in her book on Carver, mentions that he planted soybeans in 1912 (from Morse's letters, we know where he got them from) and received an encouraging visit from a "northern agriculturalist"–no name given. Carver was also put in touch with a New Jersey paint company–but ultimately decided not to promote soybeans. I suspect Morse was the intermediary, but can't know for sure without the letters. It's another thing to investigate at the Archives. In any case, I feel its emblematic of how soybean crushing did not become as widespread in the South as Piper & Morse thought it would.

"Another discovery: If you search for 'Chicago Bean Bread' on Google Books, three entries in trade journals come up, indicating that the company incorporated in Chicago's Chinatown in February or March, 1918. Still no definitive link with the booth at the Patriotic Food Show, but a connection seems likely." Address: Philadelphia, Pennsylvania 19123.

1305. Shurtleff, William. 2012. Thoughts on H.T. Nielsen and W.J. Morse (Editorial). *SoyaScan Notes.* June 20.

• ***Summary:*** Matthew Roth has just finished working through the last 20 pages of the H.T. Nielsen file at the National Archives.

His full formal name was Harold Theodore Nielsen. Born in 1879 in Kansas, he married Hope S. Nielsen, who was born in 1886 in West Virginia (see 1915 and 1930 Kansas state census). They had quite a few children, one by the name of Harold T. also. He died on 15 Feb. 1959 in Santa Barbara County, California, and was interred (on 30 Dec. 1960) next to his wife (who died on 27 Dec. 1960) in Oak Hill Cemetery, Ballard, Santa Barbara County, California.

While at Kansas State Agricultural College, in 1900-01, he held the rank of third sergeant in Company "A."

In 1903, he wrote a thesis titled "Soil-Moisture Studies." Located at Denmark, Lincoln County, Kansas, he was awarded the degree of bachelor of science and graduated with the class of 1903 from Kansas State Agricultural College (the alma mater of David Fairchild and Walter Swingle). Later in 1903 he went to Iowa State College, where he did graduate work toward a Master's degree, after which he resumed work at USDA's Bureau of Plant Industry (Washington, DC) (see *The Industrialist,* Vol. 31, 1904-05, Manhattan, Kansas).

Identifying precisely when H.T. Nielsen started his employment with the USDA (U.S. Department of Agriculture) is very difficult. But he had resigned by 17 Feb. 1909. The National Agricultural Library (NAL) does not have the administrative records of former USDA employees. So far as we can tell from his publications: It looks like H.T. Nielsen may have started in the Bureau of Plant Industry (BPI), Grass and Forage Plant Investigations (GFPI) section, in 1904.

I believe that Nielsen left USDA and Washington, DC, in early 1909–at about age 30.

The last publication that I could find where H.T. Nielsen was listed as being in the Forage Crop Investigations part of the BPI was *Farmers' Bulletin* No. 372–Soybeans–issued October 7, 1909 [letter of transmittal to the SecAg dated June 30, 1909].

The first bulletin where W.J. Morse was listed as an assistant in Forage Crop Investigations was BPI Bulletin No. 169, issued February 3, 1910 (Letter of transmittal to the SecAg dated was dated October 9, 1909). H.T. Nielsen was not listed.

It certainly does appear that Morse was working as an assistant in Forage Crop Investigations in 1909 and that H.T. Nielsen was not working in Forage Crop Investigations in 1910 and 1911.

When Nielsen left USDA, he and his wife, Hope, moved to Abeline, Kansas, where he wanted to be a farmer.

He seems to have left USDA on good terms with his co-workers and to have remained that way. until the end, so far as we know. Piper invited him to work together on forage crops in the Philippines in 1910.

W.J. Morse arrived at USDA on 2 June 1907. It is not clear why he was hired by C.V. Piper or if Piper knew by then that Nielsen planned to leave. But Morse and Nielsen must have worked quite closely together for about 18 months.

I believe that Morse was given Nielsen's portfolio when Nielsen left, and because Nielsen left.

I think Piper hired Morse because he felt Morse was well educated, intelligent, and qualified to work with forage crops at USDA. I do not know if he had soybeans in mind when he hired Morse, but he may well have. I think by 1907 Piper believed that the soybean had a very bright future in the USA and he wanted to find a man who would be effective in researching and promoting it. In hindsight, Morse was surely the right man for the job.

Compare Morse's letters and reports with Nielsen's. Morse writes much better and seems to be more effective in building long-term relationships with farmers who are interested in soybeans and other forage crops. I think Morse was better organized than Nielsen and a better scientist and observer.

Morse was very good in working with people of all types, classes, etc. People liked him.

USDA Bureau of Plant Industry, Bulletin No. 92 (by T.H. Kearney, about dates) lists employees of the Bureau of Plant Industry. Under "Seed and Plant Introduction and Distribution: Scientific Staff" are included: "Harold T. Nielsen, Scientific Assistant in Agronomy."

An article in the *Iola Daily Register* titled "A Kansan to the Islands" (11 Sept. 1911) states that Nielsen will soon be traveling to the Philippines to teach the people how to grow hay during the sunny months–on government land near San Miguel, a few miles from Manila. "He has just been appointed by the War Department to have charge of this work. After his graduation at this college [Kansas State Agricultural College (Manhattan, Kansas)] Mr. Nielsen took a postgraduate course at Ames, Iowa, and then until April 1 [1911] was in the service of the Department of Agriculture in Washington. Upon that date he became a lecturer and assistant in cooperative work in the Kansas Agricultural college. He is to leave here [Manhattan, Kansas] Sept. 23 for San Francisco."

On 1 Feb. 1914 H.T. Nielsen became the district agricultural agent for Northeast Kansas, Norton. In the *Biennial Report of the State Board of Agriculture to the Legislature of the state...* (No. 19, 1915) he wrote an article titled "A practical combination of grain and livestock farming for northwestern Kansas" (p. 287-95). In it he discusses the importance of pasture and forage crops, such as alfalfa. Address: Founder and owner, Soyfoods Center, Lafayette, California. Phone: 925-283-2991.

1306. Garrison, Joyce. 2012. The ancestors of William Morse: Four individual genealogical reports, with extensive notes and photographs. West Hartford, Connecticut. 4 p. 28 cm.

• ***Summary:*** Joyce is William Morse's granddaughter. These records were printed by Joyce from her genealogical database in Family Tree Maker.

(1) William Morse's parents. His father, John Baptist Morse, was born on 27 Dec. 1863 in Lewis Co., New York, the son of Jacob Morse and Johanna Ott. John married Lena Kirschner on 8 May 1883 in Lowville, Lewis Co., New York. Lena was born on 14 April 1863 in Kirschnerville, Lewis Co., New York, the daughter of Nicholas Kirschner and Theresa Hinkel. Lena was baptized on 14 May 1863 at St. Stephen Church, Croghan, Lewis Co., New York. Address: From 1933 to 1943 John and Lena resided at 4220 38th St., NW, Washington, DC. Occupation: John was a butcher at meat markets in Lowville, New York and Washington, DC. John died first, on 3 Nov. 1942 in Washington, DC–of coronary thrombosis. He was buried on 5 Nov. 1942 in Fort Lincoln Cemetery, Brentwood, Prince George's Co., Maryland. Lena died less than a year later, on 27 Sept. 1943 in Washington, DC–of coronary occlusion. She was buried beside her husband.

William Joseph Morse was born on 10 May 1884 in

Lowville, New York. He was baptized on 20 July 1884 in St. Peter's Church, Lowville, New York: Education: In 1903 he graduated from Lowville Academy (high school). In 1907 he graduated from Cornell University, Ithaca, New York–with a bachelor degree only. That year, immediately after graduation, he was invited by Charles V. Piper to go to work for the U.S. Department of Agriculture in the Division of Forage Crops, Bureau of Plant Industry.

William Morse married Edna Blanche Siggers on 20 Sept. 1911 at the Church of the Advent in Washington, DC. She was born on 27 Feb. 1884 in Washington, DC, the daughter of George William Siggers and Marcella Blanche Simpson. They were married on 20 Sept. 1911 in Washington, DC, at the Church of the Advent. They had two children. Margaret Catherine Morse, born on 8 Aug. 1921 in Washington, DC. The second, a son, was stillborn in Jan. 1926 in Washington, DC. In 1933 Wm. Morse, his wife and daughter lived at 4220 38th St. NW [Takoma Park], Washington, DC. Occupation: William Morse worked his entire life for the U.S. Department of Agriculture; he soon became the department's expert on soybeans. Edna died first, on 23 Dec. 1958 in Eastchester, New York–where she and her husband had lived after his retirement from USDA. She was buried Mt. Hope Cemetery, Hastings-on-Hudson, New York.

Note: This cemetery plot was started by Alfred John Thalman, the father of Wm. Morse's daughter's husband. William Morse died only 7 months later, on 30 July 1959 in Eastchester, New York, and was buried at Mt. Hope Cemetery, Hastings-on-Hudson, New York. Address: West Hartford, Connecticut.

1307. Garrison, Joyce. 2012. Re: William and Edna Morse's residences and addresses. Letter (e-mail) to William Shurtleff at Soyinfo Center, Dec. 22 and 23. 2 p. 28 cm.
• ***Summary:*** Joyce, William Morse's granddaughter, writes: After William Morse and Edna Siggers were married, they lived in an apartment at 158 U St., NW, Washington, DC.

There is no way William and Edna would have lived with either set of parents–even though those two sets of parents lived next door to each other on V Street in Washington, DC–the John B. Morses at 121 V. Street and the George W. Siggers at 123 V Street. William Morse "was raised in a devout Catholic family and Edna Siggers in an Episcopalian one. After they married (a ceremony that neither set of parents attended), W.J. Morse gave up the Catholic religion (he may not have had a choice). I don't know exactly what the Catholic church's prohibitions were at the time (and there were some), but I know his wife, Edna, would never have converted or agreed to raise any children as Catholics.

"His family was particularly upset by the marriage, and whenever my grandmother, Edna, went to visit her family next door to the John B. Morses, the latter would close all the shades on the side of the house that faced the Siggers' house. It wasn't until my mother, Margaret, was born that the relationship thawed somewhat, but it was never great. The two pieces of advice I remember my grandmother, Edna, giving me when I was growing up were: (1) Don't run with scissors and (2) Never marry a Catholic.

"A clarification–W.J. Morse did get along with his wife's parents and they with him. The Siggers may not have been totally in favor of the marriage, but there weren't any bad feelings.

The Catholic church didn't recognize my grandparent's marriage and, as a devout Catholic and daily churchgoer, Lena Morse, William's wife, was very unhappy with the situation (interestingly, John Morse, William's father, apparently didn't attend church). Lena [William's mother] and Gladys [William's sister] snubbed my grandmother Morse [William's wife] for several years and my grandfather's first loyalty was to his wife. By the time my mother was born, I think the Morse family had resigned themselves to the marriage and there would be family visits. However, the Morse women [Lena and Gladys] were never very friendly towards my grandmother, Edna, which is probably what led to her telling me to 'never marry a Catholic.'

"Gladys lived with her parents until they died in the early 1940s when she moved back to Lowville.

"In 1917 William and Edna moved from their apartment at 158 U St. into a new home at 6809 5th St., Washington, DC. By Googling–6809 5th St., Washington, DC–we learn that this house was built in 1917. I think it's safe to assume my grandparents bought this house as a new house, in 1917–but it was not custom built for them. When the Morse family traveled to East Asia (1928-1931), the house was rented out to another family. They stayed in this same house until Morse retired from USDA (on 30 Nov. 1949, after 42 years of public service) and moved to Eastchester, New York, in mid-1951 to be with their daughter, Margaret, and her husband (Mr. Thalman) and their young daughter (Joyce).

"My father [Mr. Thalman] bought three contiguous lots on Interlaken Drive in Eastchester and had two houses built, with an empty lot between them.

"William Morse and his wife moved there because my family did. My father and his father had a business together in the Bronx, and Eastchester was an easy commute.

The houses were designed by the same architect and were similar, but different. For example, my grandparents [the Morses] wanted a big screened-in porch, and two bedrooms (one was an office for my grandfather) on the first floor. Since he was in the construction business, my father was the general contractor; my grandparents paid for their house.

"We all moved there sometime during the late spring / summer of 1951. Our family moved in first–from an apartment in Yonkers, New York (before I started

kindergarten)–then my grandparents.

"We lived at 22 Interlaken and my grandparents [William Morse and his wife, Edna] lived at 26 Interlaken; the empty lot was where my grandfather had a small vegetable garden and we kids had plenty of room to play.

"You can see 26 Interlaken on Google street view. Except for the room added above the garage, and the view of the fence from the house next door (my parents sold the empty lot 15-20 years ago), the front of the house hasn't changed. In the real world, 22 Interlaken isn't the same–the people who bought it from my mother in 2010 have since torn it down and built a new home." Address: West Hartford, Connecticut.

1308. Garrison, Joyce. 2013. Re: Who was Katie Morse and how was she related to William J. Morse of soybean fame? Letter (e-mail) to William Shurtleff at Soyinfo Center, Jan. 21. 2 p. 28 cm.

• ***Summary:*** Quick answer (which is what my mother and I thought): Katie Morse was William Morse's cousin–daughter of his uncle William.

William Morse (7 May 1861 to 25 Dec. 1941) married (1)–Katherine Cannon; children:

John Morse (1880? to before 1980)–apparently never married.

Katherine / Catherine / Katie Morse (12 May 1884 to 13 July 1980)–never married.

William Morse (1886 to 1961)–married Mae Cecelia (last name not found); their children:

Honora Morse (1913-1940)–never married.

Lewis / Louis Morse (1914-2008).

Robert D. Morse (1916–).

John H. Morse (9/28/1917–9/29/2010)–married Eva (last name not found)–four children.

Note: The three Morse brothers operated Morse Jewelers in Mount Holly, New Jersey, for many years (my mother remembers sending a watch to them to repair). I couldn't find any detailed information about Lewis, but check out this article about Robert–as of last December still going strong at 96:

http://articles.philly.com/2012-12-21/news /35935926_1_solar-panels-moorestown-resident-card-games

Or you can google 'Robert Morse' Moorestown–and the article should come up near the top of the results.

It appears that William (my grandfather's uncle, as opposed to his cousin) married a 2nd time to Lena Zimmer on 15 April 1915.

John B. Morse, William J. Morse's father.

"Other new facts I discovered in my searches:

"In his freshman year at Cornell, William J. Morse (my grandfather) was a member of the Cornell University Chess Club. He was not, however, a member of the Chess Team.

"In the alphabetical list of patents published by the United States Patent Office in 1891, I found this listing (but I have no further information): Name, residence and invention: Morse, John B., Lowville, N.Y. Attachment for stove-legs. No: 449,819. Date: April 7. Monthly Volume: Spec. 269, Dr'g. 69. Official Gazette: Vol 55, Page 53." Address: West Hartford, Connecticut.

1309. Garrison, Joyce. 2013. Re: Where did William Morse live as a young man? Letter (e-mail) to William Shurtleff at Soyinfo Center, Feb. 5–in reply to questions. 2 p.

• ***Summary:*** Q1. Do you (or your mother) know the address of the house in which William J. Morse lived from his infancy until he left for school? Did the family live at only one address this whole time?

Ans: "My mother thinks that the family lived at one address, but doesn't know for sure. According to the 1900 census, they lived on Shady Ave. (houses not numbered) in Lowville."

Q2. When did W.J. Morse first leave home to go to school? Was it when he went to college at Cornell? Or was it before that when he went to high school?

Ans: "He left home when he went to Cornell."

Q3. Do you know where he lived during his first year at Cornell? Was it somewhere in Ithaca, New York? Was it in a freshman dorm or a fraternity or an eating club on campus, or was it off campus, etc?

Ans: "As far as my mother knows, he lived in boarding houses in Collegetown (an area of Ithaca adjacent to campus). He also waited tables in Collegetown (in boarding houses; possibly the one where he lived). During the summers he waited tables in the Adirondacks to pay for college expenses." Address: West Hartford, Connecticut.

1310. Roth, Matthew D. 2013. Magic bean: The quests that brought soy into American farming, diet and culture. PhD thesis, Rutgers, The State University of New Jersey. iii + 530 p. Oct. 28 cm. [1002 + 1208 footnotes + 45 endnotes]

• ***Summary:*** This book is a series of carefully researched, well written and well documented biographies of various men, women and institutions that were important in introducing soybeans and soyfoods to the United States. Some of the men and women whose detailed biographies are presented here (such as William Morse, Henry Ford or Harry Miller) are well known to those interested in the history of soybeans and soyfoods in the USA; yet in each case many important and interesting new details are added to the life story of each person. Other men and women discussed here (such as Harry Harrison, William Poage, Tsuru Yamauchi or Yamei Kin) are largely unknown to soybean historians, and their inclusion in this thesis will help to ensure that they are given the place they deserve in future histories of soybeans and soyfoods in the United States.

The footnotes and bibliography are a treasure. The bibliography, containing 1,002 references, is divided into two sections: (1) Archival sources. (2) Books, chapters, articles,

and webpages. Each of the seven chapters has its own series of footnotes, whose numbering starts over again with one at the beginning of each chapter, for a total of 1,208 footnotes. In addition, at the end of the bibliography is a section titled "Notes" which contains 45 numbered notes.

Why so many new bibliographic references? First, because the author did extensive archival research, much of it in archives that have not been previously examined for material on soy. Second, because in recent years many books and periodicals (including newspapers) have been scanned, digitized and made available to researchers and the general public. A search, for example, on "Yamei Kin" will produce a wealth of results in unexpected places.

Containing much new and interesting information, this thesis is not, however, a history of soybeans or soyfoods in the United States. Rather, it presents various important sections and subsections of that larger history.

Contents: Introduction: A century of soybeans. 1. Crossings: The picture bride–Tsuru Yamauchi, The missionary–Harry Miller. The plant explorer–Frank N. Meyer.

2. Footholds: The agronomist–William J. Morse, The emissary–Yamei Kin, The missionary [Harry W. Miller].

3. Field days: The extension specialist–J.C. Hackleman, The salesman–A.E. Staley, The agronomist [William Morse].

4. Manifold Uses: The industrialist–Henry Ford, The chemist–Percy Lavon Julian, The board–Chicago Board of Trade, The missionary [Harry Miller].

5. Wartime substitute: The picture bride [Tsuru Yamauchi], The nutritionists–Clive and Jeanette McCay, The investigator–Warren Goss.

6. Hidden Ingredient: The congressman–William Poage, The breeder–Edgar E. Hartwig, The middleman–Dwayne Andreas, The chemist [Percy L. Julian].

7. Soytopia: The writer–Harry Harrison, The guru–Stephen Gaskin, The artisans–William Shurtleff and Akiko Aoyagi, The picture bride [Tsuru Yamauchi].

Bibliography.

When asked about the unusual structure of the table of contents and the thesis, the author replied (7 Dec. 2015): "The short answer is that the way I structured the dissertation was probably too complicated by half. The idea was to anchor each chapter section to a person, each of whom was either important in their own right and/or was a stand-in for a larger group. Morse, of course, was both: a key figure and a representative USDA 'agronomist.' The titling convention was to have the specific person named the first time they appeared, but have only the generic name, such as Agronomist, appear in subsequent chapter-section names. Yamauchi, while not central in her own right, was a way to anchor sections about the Japanese-American community; hence her appearance in three chapters." Address: Philadelphia, Pennsylvania 19123.

1311. Vincent, Paul. 2016. Elizabeth City led NC in crushing soybeans for commercial use. *Daily Advance* (*The*) (*Elizabeth City, North Carolina*). Nov. 20.
• ***Summary:*** "In the Biennial Report of the N.C. Department of Agriculture, 1914-1916, chief agronomist Charles B. Williams congratulated the Old North State, 'upon the fact that the first commercial crushing of domestic [soy]beans was by the oil mill located at Elizabeth City on December 13, 1915.' The red-letter day that Williams, a Camden County native, lauded in the biennial report vindicated numerous experiments by North Carolina's cottonseed mills, especially the ones in Elizabeth City, to commercially produce soybean oil. A Dec. 10, 1915 article in the Elizabeth City Advance claimed that the plant, 'had already conducted some experiments in... extracting the oil.'

"As early as the spring of 1914, the town's mills performed tests very similar to the 1915 trials that received such fanfare. On April 10, 1914, the Williamston Enterprise, Marshall News-Record, and Tryon Polk-County News all published a report on the successful extraction of oil and meal from five bushels of soybeans at the Elizabeth City Oil and Fertilizer Company. The article argued that this experiment was, 'especially gratifying, as a similar one was made about two years ago by another oil mill and it was attended with failure.'

William Morse "himself provides additional evidence of ongoing oil extracting experiments in Elizabeth City before 1915. In a letter dated Dec. 4, 1914, he informs his mentor, Dr. C.V. Piper, 'that the Southern Cotton Oil Mill, of Elizabeth City... conducted experiments in the fall of 1913 with soy beans as an oil proposition.' Morse further relates in his letter that those experiments, too, were successful.

"Hard economic times propelled these experiments. The boll weevil and low cotton prices threatened the livelihoods of millions of cotton farmers across North Carolina, and the entire South. By proving that cottonseed mills could also produce soybean oil, the Elizabeth City experiments gave farmers and mill owners a desperately sought lifeline.

"On Dec. 16, 1915 the Elizabeth City mill, under the management of W.T. Culpepper, held a public demonstration of the oil extraction process. Both Williams and Morse were in attendance on that muddy winter day. Together they witnessed the beginning of a budding agricultural industry that contributes $800 million to North Carolina's economy. All made possible by early experiments right here in Elizabeth City." Address: Collections Assistant, Museum of the Albemarle.

1312. Roth, Matthew. 2016. Re: Sent one group of files (correspondence) about soybeans from the National Archives (Beltsville, Maryland). Letter (e-mail) to William Shurtleff at Soyinfo Center, Dec. 28.
• ***Summary:*** Matt drove to the National Archives, ordered specific files (largely at Shurtleff's request), took digital

photos of the cover and the relevant letters, then e-mailed the files to Shurtleff as the attachment to an email. The files were:

North Carolina: 105 pages from Nov. 1907

He sent them using Microsoft OneDrive. Address: Philadelphia, Pennsylvania 19123.

1313. Shurtleff, William; Aoyagi, Akiko. comps. 2017. History of U.S. federal and state governments' work with soybeans (1862-2017). Lafayette, California: Soyinfo Center. 3583 p. Subject/geographical index. Printed 6 April 2017. 28 cm. [662 ref]

• ***Summary:*** This is the most comprehensive book ever published on the History of U.S. Federal and State Governments' Work with Soybeans (1862-2017): It has been compiled, one record at a time over a period of 36 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 the Regional Soybean Laboratory. About this book. Abbreviations used in this book. How to make best use of this digital book–Three keys. Contains 362 photographs and illustrations. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

1314. Wikipedia, the free encyclopedia. 2017. Charles Piper (Web article). http://en.wikipedia.org/wiki/Charles_Piper. 1 p. Printed April 11.

• ***Summary:*** "Charles Vancouver Piper (16 June 1867–11 February 1926) was an American botanist and agriculturalist.[1] Born in Victoria, British Columbia, Canada, he spent his youth in Seattle, Washington Territory and graduated from the University of Washington Territory in 1885. He taught botany and zoology in 1892 at the Washington Agricultural College (now Washington State University) in Pullman. He earned a master's degree in botany in 1900 from Harvard University.

"Piper compiled the first authoritative guides to flora in the northwestern United States. With his collaborator, R. Kent Beattie, he surveyed the Palouse area of southeastern Washington, and expanded the study to the entire state in 1906. That year, The Smithsonian Institution published his catalog Flora of the State of Washington. He also published Flora of Southeast Washington and Adjacent Idaho (1914) and Flora of the Northwest Coast (1915). These works established him as an authority on the plants of the northwestern U.S.

"In 1903, Piper began a career at the U.S. Department of Agriculture in Washington, D.C., which lasted until his death there. He worked on the domestication and introduction of grasses. On a trip to Africa, he found Sudan grass and introduced it to North America as a forage plant (vegetable matter eaten by livestock). Piper noted that much less study had been made of forage crops as compared to cotton, cereals, and other crops. He attributed this to the lack of economic incentive in studying forage plants.

"The soybean was another subject of Piper's studies. In 1923, he wrote, with William J. Morse, *The Soybean,* a thorough and now classic monograph of the species. The botanist was instrumental in establishing this plant as a successful crop in the U.S.[2][3] It became a fundamental part of U.S. agriculture. Since the 1970s, it has been the second largest and most valuable crop in the United States after corn–and ahead of wheat. He was a founding member of the American Society of Agronomy in 1907 and served later as its president. Piper's knowledge of grasses led him to become Chairman of the United States Golf Association's Green Section from 1920 until his death."

Note: This organization's periodical titled *Bulletin of the Green Section of the U.S. Golf Association* was published from 1921 to 1926. It is owned by a small number of U.S. Libraries, including USDA's National Agricultural Library in Beltsville, Maryland (Call# 60.18 UN3, has all but the first issue).

"The orchid genus Piperia, containing eight species (e.g., Piperia yadonii), is named after him.

"The standard author abbreviation Piper is used to indicate this individual as the author when citing a botanical name.[4]

References:

1. Piper, Charles Vancouver. The International Who's Who in the World. 1912. p. 858.

2. Perkins; Woods; WSU Libraries.

3. Shurtleff, William; Aoyagi, Akiko. 2011. William J. Morse–History of His Work with Soybeans and Soyfoods (1884-1959). Lafayette, California: Soyinfo Center. 481 pp. (With many documents by and about Charles V. Piper. Free on the Web)

4. IPNI [International Plant Names Index]. Piper.

John H. Perkins. "Piper, Charles Vancouver"; American National Biography Online, Feb. 2000. Retrieved November 10, 2006 (subscription required).

Cage 317–Piper, Charles Vancouver–Papers, 1888-1926 (2005). Washington State University Libraries: Manuscripts, Archives, and Special Collections. Retrieved November 10, 2006.

Micah Woods (2006). "Charles Vancouver Piper: The Agrostologist." United States Golf Association. Retrieved November 10, 2006.

1315. *SoyaScan Notes.* 2017. The visionary work of Henry Ford and his researchers with soybeans–then and now: Played a leading role in transforming the soybean from a minor to a major American farm crop (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** During the 1800s and early 1900s the soybean

was such a minor a crop in America that the government didn't bother to measure its size. It wasn't until 1910 that the first statistics on soybean production were collected. This was done as part of the 13th U.S. census. The results, published in 1913, showed that in 1909 an estimated 16,835 bushels of soybeans were produced on 1,629 acres in the USA. They were worth $20,577.

In May 1918 the U.S. Department of Agriculture published its first statistics on U.S. soybean acreage and production. In 1917 some 531,000 acres were planted (56% of these were interplanted with other crops) and only 17% of these were harvested for grain/seed, yielding 1.186 million bushels. Most soybeans were grown for hay or forage.

In 1931 in America 17.260 million bushels of soybeans were produced on 1,141,000 acres. That same year, Henry Ford planted his first soybeans–about 500 acres near Dearborn and by 1932 he was growing 8,200 acres of soybeans in Michigan. By 1933 Henry Ford was growing soybeans on 12,000 acres of his own land in Michigan. This made him the single largest soybean grower in America and in the Western World, and (from 1933) in the United Kingdom. He also urged Michigan farmers to plant soybeans with the assurance that the Ford Motor Co. would buy them.

Henry Ford was active in promoting soybeans from 1931 to 1943. He was certainly not the only soybean promoter during this period, but he was probably the most influential–with the possible exception of the U.S. Department of Agriculture (largely through the work of William Morse). *Fortune* magazine reported of Ford in late 1933, 'He is as much interested in the soya bean as he is in the V-8.' Ford's great prestige–he was by now a true American 'folk hero'–and his strong, unswerving belief in the future of the soybean, made Americans everywhere take notice.

The Ford Motor Co. was also a major soybean user. On October 21, 1935 *Time* magazine (p.34), in an article on soybeans, noted: 'This year Ford will use the crop from 61,500 soy-bean acres.' That year a bushel of soybeans was used in the manufacture of every Ford car. On October 12, 1936 *Time* magazine (p.76, 78, 80) ran another long article on soybeans, noting that in 1935 soybeans had put $35 million into the pockets of U.S. farmers, outranking in value rye and barley. Soybean trading had grown so active that the Chicago Board of Trade in Illinois had just started trading soybean futures. But their greatest praise was reserved for Ford: 'The number 1 U.S. soybean man is Henry Ford.' A portrait photo showed Ford with the caption, 'Motormaker Ford. A bean's best friend.'

The soybean has unquestionably been the most successful American farm crop of the 20th century. A graph of harvested acreage of the major U.S. crops from 1924 to the present, shows that while the total acreage off all other crops was decreasing, soybean acreage was skyrocketing–and taking their place. Soybean acreage passed that of barley in 1940, cotton in 1956, oats in 1961, wheat in 1977, hay in 1978, and corn (harvested for grain) in 1979.

1316. *SoyaScan Notes.* 2017. Chronology of green vegetable soybeans and edamamé (incl. maodou) worldwide–A.D. 1275 to 1939. Part I. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** First a few basic definitions: (1) "Vegetable-type soybeans" refers to certain large-seeded soybean varieties developed for use as a vegetable crop. (2) "Green vegetable soybeans" refers to vegetable-type soybeans harvested at the green stage for use as a vegetable. The beans can be cooked and served in or out of the pods. (3) "Edamamé" is the Japanese term for green vegetable soybeans cooked and served in the pods, often as a snack–like peanuts in the shell. The green beans are popped out of the pods directly into the mouth of the person eating them.

Before 7th century BC–The *Shijing* (*Book of Odes*) is China's earliest classic and the earliest document seen worldwide that mentions the soybean, which it calls *shu.* It does not mention green vegetable soybeans. Zheng Xuan (Wade-Giles: Chêng Hsüan), the most important commentator of the 2nd century AD, confirms that *shu* refers to the soybean and that soybean leaves, called *huo,* can be pickled–presumably when green, then presumably eaten.

AD 100–The term *Sheng dadou* [Chinese characters: raw / fresh + large + bean] appears in both *Shennong bencao jing* (*Classical pharmacopoeia of Shen Nung*) and later (about AD 450-500) in the *Mingyi bielu* (*A critical record of famous doctors. A materia medica*). However a careful analysis of the context by a Chinese scholar who is an expert in the history of Chinese foods and of soybeans (H.T. Huang, PhD) indicates that this term refers to raw soybeans rather than fresh green soybeans. Therefore, surprisingly, we know of no early reference to green vegetable soybeans in China.

1275 July 26–The word "edamamé" first appears in Japan when the well-known Buddhist saint Nichiren Shônin writes a note thanking a parishioner for the edamamé he left at the temple. In: In: *Nichiren Shonin Gosho Zenshu* (*The Collected Writings of Saint Nichiren*).

1406–The Ming dynasty famine herbal titled *Jihuang bencao,* by Zhu Xiao is the earliest Chinese document seen that describes: (1) eating the tender leaves of soybean seedlings (*doumiao*)*;* (2) eating the whole pods of young soybeans, (3) eating green vegetable soybeans; (4) or grinding the green beans for use with flour. The last three uses are recommended for times of famine only.

1620–*Maodou* (Chinese characters: hairy + bean) are first mentioned in the *Runan pushi* [*An account of the vegetable gardens at Runan*]*,* by Zhou Wenhua. *"Maodou* has green, hairy pods. It is also called *qingdou* ('green beans).' It is mentioned in the *Bencao* [materia medica] literature [we are not told which book], which states that it has a sweet flavor, is neutral, and nontoxic. It can be used

medicinally mainly to 'kill bad / evil chi.' It stops bodily pain, eliminates water [reduces edema], dispels heat in the stomach, reduces bad blood, and is an antidote to poisonous drugs... Boil the beans in the pods until done, then remove the beans from the pods and eat them. The flavor will be sweet and fresh. Or you can remove the beans from the pods before cooking, then cook the beans in lightly salted water. Or the beans can be placed on a metal screen over a charcoal fire to roast or dry them... They can be served with tea or fruits, as a snack." This is also the earliest document seen that gives medicinal uses for green vegetable soybeans.

1855 April 12–T.V. Peticolas of Mount Carmel, Ohio, is the first Westerner to mention green vegetable soybeans. In an article on soybeans in the *Country Gentleman* (p. 12) he writes: "They are inconvenient to use green, being so difficult to hull."

1856–Only a year later, at least two Americans have apparently figured out how to shell them with ease, and to enjoy them. Thomas Maslin of Virginia writes: "They are fine for table use, either green or dry..." Abram Weaver of Bloomfield, Iowa, praises them in the *Report of the Commissioner of Patents, Agriculture* (p. 256-57). "I had some of them cooked, while green, at their largest size, and found them delicious."

1890 Dec.–The first large-seeded vegetable-type soybean variety arrives in America. Named Edamame, it was introduced from Japan by Charles C. Georgeson, who had been a professor of agriculture in Japan. Other early large-seeded varieties included Easycook (introduced in 1894 from Shandong Province, China) and Hahto (1915, from Wakamatsu, Japan).

1915 Jan.–William J. Morse (of USDA's Office of Forage Crop Investigations), the man most responsible for introducing green vegetable soybeans and vegetable type soybeans to the United States, mentions them for the first time in a USDA special publication titled "Soy beans in the cotton belt": "The green bean when three-fourths to full grown has been found to compare favorably with the butter or Lima bean."

1917–During World War I, USDA researchers conduct cooking tests on many soybean varieties in search of an inexpensive source of protein that lacks the typical unpleasant beany flavor and will cook quickly. Only two such varieties are found–Hahto and Easy Cook; both are large-seeded. Some progress is made in convincing Americans to eat these varieties–but only as whole dry soybeans.

1923 March–*The Soybean,* by Charles V. Piper and William J. Morse, published by McGraw-Hill (329 p.), is the first major book written about this plant in the United States. It contains a long section titled "Immature or Green Soybeans" (p. 221-22) that includes a description, nutritional analysis, recipe ideas. It also includes the first photograph in a U.S. publication of green vegetable soybeans, showing many cooked, open pods on a white plate. The caption reads: "Seeds and pods of the Hahto variety of soybeans, the seeds being especially valuable as a green vegetable." Between 1915 and 1929 Morse mentioned green vegetable soybeans in more than 20 publications.

1929-32–During the USDA sponsored Dorsett-Morse Expedition to East Asia, William J. Morse (now a soybean expert) and P.H. Dorsett were surprised to learn that: (1) Soybeans are widely "used as a green vegetable" or as "green vegetable beans," served in the pods. (2) The seeds for these soybean varieties are sold by horticultural seed companies, are listed with the garden beans in their seed catalogs, and are larger and sweeter than regular soybeans. On 24 April 1929, while in Tokyo, Dorsett made the first edamamé purchases, seven varieties with "Edamame" in the varietal name from T. Sakata & Co. They eventually collected more than 100 varieties of large-seeded vegetable-type soybeans (other suppliers included Yamato Seed Co. in Tokyo) and had them grown for a year at USDA's Arlington Farm in Virginia. (3) Edamamé account for less than 1% (actually 0.8%) of all the soybeans used in Japan. (4) Green soybeans are salt-pickled in the pod in Hokkaido, the northernmost main island. (5) The soybean seeds are planted at intervals of several weeks in the same field, then, when ready, the plants are uprooted and sold in bundles. On 15 July 1929 Morse wrote: "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." Near Tokyo, three crops of vegetable soybeans are grown during the season–early, medium and late season. The 8,000-page typewritten report is interspersed with many photos of green vegetable soybeans at various stages from the farm to the table.

1929 July 20–A letter from William Morse in Tokyo is read before the attendees at the Tenth Annual Meeting of the American Soybean Association in Guelph, Ontario, Canada, and later published in the *Proceedings of the American Soybean Assoc.* (Vol. 2., p. 50-52). It is the first publication in which Morse describes his many new discoveries concerning vegetable soybeans.

1931 Jan. 3–Morse writes in his log in 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." This is the earliest document seen that contains the term "green vegetable soybean(s)."

1934–Vegetable-type soybean varieties that yielded well at Arlington Farm are sent to many state agricultural experiment stations for further trials. In addition, extensive investigations of the cooking qualities and composition of the green shelled and dry edible soybeans are conducted at various departments of home economics. The green beans

are found to be one of the most nutritious vegetables ever analyzed.

1935 Dec.–Dr. John Harvey Kellogg of Battle Creek, Michigan, is the first person on record to can green vegetable soybeans, or to consider harvesting them mechanically. In a letter dated Dec. 9 he writes to William Morse at USDA. "We have been doing some experimenting this year with growing and canning shell soy beans. I am having a couple of cans sent you so you can see what our product is like. We think it is very fine. The few thousand cans we put up went off like hot cakes... One of the difficulties in the way of the soy shell bean business is the expense of picking from the vines and shelling the pods. Do you know of any machinery that is used for either of these purposes?"

1935 Aug.–Rokusun, the first vegetable-type soybean is mentioned in a U.S. publication–followed in March 1936 by Bansei, and Chusei. These soybeans are now publicly available in the U.S.

1936 April–A 2-page leaflet titled "Soybean introductions named in January 1936" is published by the USDA, Bureau of Plant Industry, Div. of Forage Crops and Diseases. It is the first official publication in which varietal names are given to the new vegetable type soybeans introduced by Dorsett and Morse from Japan and tested at USDA's Arlington Farm. Twenty varieties suitable for use as a "green vegetable" are listed, together with their seed color, days to maturity, and region of the USA best suited for production. This is the earliest English-language document seen that mentions the following vegetable-type varieties–all with Japanese names: Chame, Fuji, Goku, Hakote, Higan, Hiro, Hokkaido, Jogun, Kanro (in USA), Kura, Nanda, Osaya, Sato, Shiro, Sousei, Suru, Toku, and Waseda. It is also the earliest document seen in which soybeans are classified by use as "green vegetable" or "dry edible bean" or both.

1936 July–Green Shelled Soy Beans (canned) are first sold in the USA by Dr. John Harvey Kellogg's Battle Creek Food Co. in Battle Creek, Michigan. This is the earliest known commercial green vegetable soybean product in the USA.

1936 Oct. 30–A long article titled "Canning green soy beans," by Corinne Loskowske, appears in the *Herald,* published by the students of Henry Ford's Edison Institute. They have mechanized the canning process. They canned and sold 500 cans in 1935 and 1,000 cans in 1936. Similar canned green soybean products soon follow: 1939–Mother's Choice Brand Green Vegetable Soybeans (Canned), by the Fox Valley Canning Co. of Hortonville, Wisconsin.

1939 March–"Eighteen Varieties of Edible Soybeans," by J.W. Lloyd and W.L. Burlison is published at the *University of Illinois Agricultural Experiment Station, Bulletin* No. 453. The 58-page report is the most detailed and interesting to date, being based in part on comments received from 1935 to 1938 from more than 685 home gardeners, market gardeners, and canners in Illinois. The university offered to send free seed and growing instructions to any gardener who would test the green soybeans and submit frank comments in writing. The new way of growing and eating soybeans got rave reviews. For example: "Fresh soybeans had a satisfying flavor... They were delicious... We like them better than peas or beans... I served soybeans to all guests this summer and most everyone liked them... Everyone who tried them said they were splendid... We have never eaten beans as good... The beans were delicious to eat and were universally liked by my family and guests. In fact it took persuasion to leave any for seed."

During the 1930s William Morse and the University of Illinois took the lead in popularizing both green-vegetable soybeans and vegetable-type soybeans in the USA. Continued. Address: Lafayette, California. Phone: 925-283-2991.

1317. *SoyaScan Notes.* 2017. The development of conventions and systems for naming soybean varieties in the United States (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** (1) Japanese varietal names imported to USA: In 1891 the first two soybeans with varietal names appear in the United States. They are Eda Mame and Yamagata Cha-daidzu, both imported from Japan by Prof. Charles Georgeson of Kansas State Univ. He apparently left the Japanese varietal names unchanged. Other early varieties which apparently kept their Japanese names were: Kiyusuke daizu (1890-1892), Asahi (1901), Bakajiro (1902), Rokugatsu (1902), Yoshioka (1902), Hahto (1918).

(2) Varieties named in the USA by maturity and color: In 1894 the first three varieties were named in the USA. The form of the two-word name was maturity plus color: Medium Black, Medium Green, and Early White.

(3) Three-word names introduced: In 1896 the first three-word name was introduced: Extra Early Dwarf. It was also the first name to include the size of the plant ("Dwarf"). In 1897 three more three-word names appeared, each specifying the maturity more precisely: Medium Early Black, Medium Early Green, Medium Late Black.

(4) Single-word names introduced: Black (1900), Yellow (1900), Mammoth (1902), Green (1904).

(5) Japanese names given by American soybean workers: By 1902 Ito San was named by Mr. E.E. Evans, a soybean breeder in West Branch, Michigan, in honor of Marquis Ito, the Japanese statesman. "San" is an honorific suffix in Japanese. So "Ito San" means "the honorable Mr. Ito."

(6) American place names become part of variety names: In 1903 Wisconsin Black was introduced. It was followed by Ogemaw (1904, a county in Michigan where E.E. Evans lived and bred soybeans), Amherst (Massachusetts, 1907), Manhattan (Kansas, 1907), Arlington (Virginia, 1910),

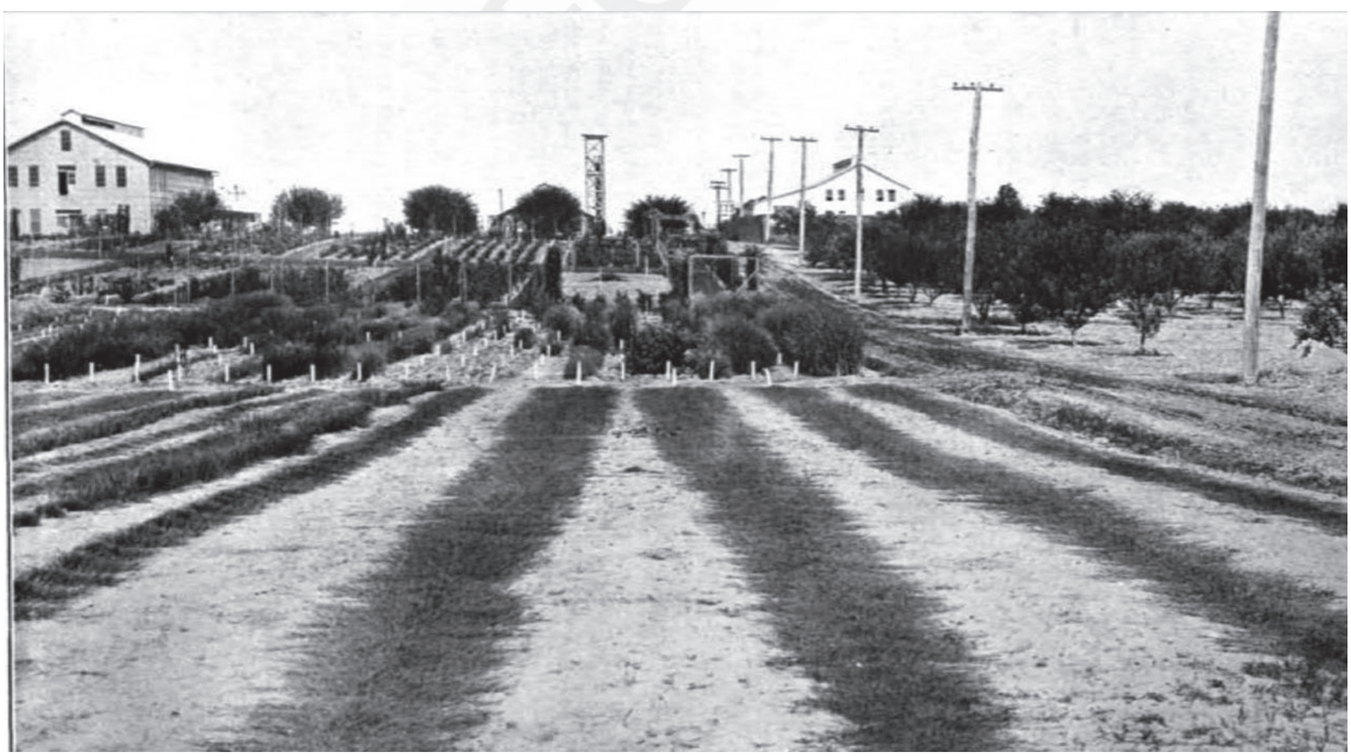
Auburn (1910), Columbia (1910), Virginia (1915), etc.

(7) The names of American and European soybean workers used in variety names: In 1907 the variety Haberlandt is named after the first Friedrich J. Haberlandt of Vienna, Austria, the first Westerner to conduct large-scale soybean trials or to write a book about soybeans. Also in 1907 the variety Meyer is named after Frank N. Meyer (1875-1918), an early USDA plant explorer in Asia who sent back hundreds of soybean varieties. Also in 1907 the variety Nuttall is named after Thomas Nuttall of the Botanic Garden, Cambridge, Massachusetts. He cultivated soybeans is the summer of 1829 and wrote an early article about them in Oct. 1929. Also in 1907 the variety Baird is named for Reverend W.M. Baird, a missionary, who secured the seeds in Korea, and had them sent to the USA. Also: Wilson (1909), Brooks (1909), Morse (1909), Hansen (1910), Fairchild (1910), Nielsen (1910).

(8) Fanciful American names: Hollybrook (1906), Buckshot (1907), Butterball (1907), Cloud (1909), Hope (1909), Acme (1910).

(9) Numbers are included in soybean variety names– usually at the end: Ohio 9035 (1914), O.A.C. 81 (1914), Wilson-Five (1918), O.A.C. 211 (1922).

An asterisk (*) at the end of the record means that SOYINFO CENTER does not own that document.2017A plus after eng (eng+) means that SOYINFO CENTER has done a partial or complete translation into English of that document.2017An 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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